INSIDE ...
- K-beauty
- Top trends in cosmetics
- Digitizing pharma
- Achieving uniform dosing
- Biologicals in agriculture
- Bio-based alternatives
- Molecular tagging
- Women in Science

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Welcome to the June/July magazine, which is partnered with top industry events like the Fecc Annual Congress (European Association of Chemical Distributors), in-cosmetics Korea and the Biopesticide Summit.

Reflecting these partnerships, we are delighted to bring you some great articles on K-beauty, biological products in agriculture and chemicals distribution, as well as our regular sections on pharmaceuticals and materials science, some insights into corporate social responsibility, and two truly inspirational articles on Women in Science.

Don’t forget to stop us and say hello if you see us at one of our partnered events – we love your feedback, and we’re always interested to hear what you think about the magazine.

Ellie Bruni
Publishing Director
Chemicals Knowledge Hub (Global)

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The elephant in the room

“I was taught that the way of progress was neither swift nor easy”

(Marie Curie)

Prior to the 1970s, women were rarely recognised — and frequently unpaid — for their contributions to science. It was during that turbulent decade, which began to see results from efforts started in the 60s, that we started to see greater equality for women, African Americans, Native Americans, LGBT and other marginalized people in all walks of life — including science.

However, change takes time. When I graduated from University in the very early 90s, my friends and I boycotted the leavers’ ball because the guest speaker was Judge Pickles — a household name in the UK at the time, this ‘colourful’ character courted controversy, not least for his tendency to advocate leniency in sexual assault cases. Why such a man was invited to speak at this event remains a mystery to me but, since I didn’t attend the event, I suppose I can’t honestly say whether the choice was in fact good or bad!

Thankfully, we have since made huge progress. Yes, women still account for a minority of the world’s researchers — according to UNESCO estimates in 2018, only 28.8% of researchers worldwide are women. However, data suggest that this gender gap is shrinking. For example, according to the UK’s WISE (Women in Science & Engineering) association, there were more than 900,000 women with core STEM occupations in the UK in 2018, which is about 45,000 more than in 2017. This is surely testament to tremendous efforts by educational institutions to attract more young women to study STEM, and by companies to encourage a better balance.

The place that this balance doesn’t yet seem to be impacting is the boardroom. In the UK at least, only 26% of the country’s top STEM companies have achieved 33% representation of women on their boards. A similar problem is seen in academia. Later in this magazine (page 59), you can read the views of some young scientists — who happen to be women — on the current state of STEM careers. According to them, they see equality at the starting level, but the proverbial glass ceiling is still a significant barrier.

But why — despite all the efforts made — is it so difficult for women to progress to senior positions?

In fact, the reason might be simple. It is still falling mostly to women to take responsibility for — and take the ‘hit’ on their career progression to accommodate — not just maternity leave, but primary caregiving and parental care afterwards. Of course, speaking from a personal perspective, this is something I’ll never regret. Having children drove a complete career change for me, and resulted in a total refocussing of my life and my priorities. My children are more important to me than anything else in the world, and I don’t know any mother who would disagree.

But surely that’s true for all the fathers out there too.

So why is it still falling to the mothers to sort this out?

Bizarrely, at all the women’s networking meetings, symposia and webinars that I’ve ever attended, this has never been discussed. Perhaps it’s being talked about at other events, but in my experience it’s like the elephant in the room that nobody dares to mention. This is why I was so impressed that the young scientists — who happen to be women — that we interviewed for this issue were so open about the family/career challenges they might one day face.

I would also like to thank Lynn Taylor, also interviewed for this magazine (page 58), for voluntarily sharing her own story of balancing her career and motherhood. As someone who has definitely smashed that glass ceiling, it’s great that she feels able to raise this as an issue for other women. Perhaps, with more leadership and support from women like her, a proper and genuine discussion can begin.

You see, we need to start discussing maternity and paternity leave, and how families — not just mothers — are going to manage the balance, allowing women to remain in work and reach the positions they deserve. As we say later on, “When it is no longer assumed the responsibility of the mother to manage this balance, then perhaps we will be closer to equality than previous generations ever dreamed possible.”

Marie Curie (1867–1934)
The first woman to win a Nobel Prize, the only woman to win it twice, and the only person to ever win it in two different sciences
Forthcoming Events

Fecc Annual Congress
12–14 June 2019
Barcelona, Spain
www.fecc-congress.com

Organic Process Research & Development
17–19 June 2019
Toronto, Canada
www.scientificupdate.com/conference_events

World Congress on Biopolymers & Bioplastics
26–27 August 2019
London, UK
biopolymers.insightconferences.com

International Oligonucleotides and Peptides Conference (IOPC)
17–18 September 2019
Milan, Italy
www.iopc-tks.com

Specialty & Agro Chemicals America
4–6 September 2019
Charleston, SC, USA
chemicalsamerica.com

in-cosmetics Latin America
18–19 September 2019
Sao Paolo, Brazil
latinamerica.in-cosmetics.com

CPhI / P-MEC China
18–20 June 2019
Shanghai, China
www.cphi.com/china

Annual Portfolio Management Strategies for Biosimilars & Generics
25–27 September 2019
Barcelona, Spain
http://bit.ly/2SiXnbN

in-cosmetics Korea
26–28 June 2019
Seoul, South Korea
korea.in-cosmetics.com

European PVC Industry Summit
25–26 September 2019
London, UK
www.wpigroup.com/aci/event/european-pvc

Biopesticide Summit
2–3 July 2019
Swansea, Wales
biopesticidesummit.com

Pharma ChemOutsourcing 2019
17–19 September 2019
Parsippany, NJ, USA
www.chemoutsourcing.com

K 2019
16–23 October 2019
Dusseldorf, Germany
www.k-online.com

For more information about these and other events in the speciality chemicals industry, visit www.chemicalsknowledgehub.com/events
Presenting Voices of the Future for chemical distributors

The European Association of Chemical Distributors (Fecc) welcomes you to this year’s Annual Congress in Sitges (Barcelona area in Spain) on 12–14 June 2019.

The Fecc Annual Congress is the leading event for the European chemical distribution industry, offering a unique platform to communicate to all stakeholders of the chemical distribution supply chain.

This year Fecc will offer participants an attractive programme with a new format: high-level participants have been invited to join two panel sessions where they will debate and share their vision of the future for the chemical distribution industry. The speakers include representatives from all stages of the supply chain, from manufacturers to customers. The panels will be moderated by Katrina Sichel, who has twenty years’ experience in communications as a television producer, event presenter/moderator and campaign director.

The main themes of the panels are:
• Digitalization and cyber-security
• Value chain and services for the future
• Promoting and attracting young and diverse talents into chemical distribution
• Sustainability, security and safety.

Each panel discussion will be followed by a Q&A session, during which our interactive application (Fecc2019APP) will be used for live questions, in addition to the traditional microphone, and will facilitate interactions between the participants. The programme will close with a full day dedicated to networking on 14th June – this will include a tour on a catamaran followed by a networking lunch.

Fecc invites delegates to join and experience first-hand the Congress, which offers a key opportunity for networking in the chemical distribution value chain to generate new businesses and reinforce existing relationships, while also learning about new trends to improve the company’s performance.

The beautiful city of Sitges will host the Congress this year. Located just 35km from Barcelona and 25km from Barcelona-El Prat Airport, Sitges will provide participants a perfect location for networking, with an unforgettable insight on the region’s gastronomy and culture.

Fecc warmly thanks its congress sponsors, who give an added value to the event and support this unique stakeholders’ gathering in the field of chemical distribution.

For further information, visit www.fecc.org or www.fecc-congress.com.
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The beating heart of beauty innovation

in-cosmetics Korea will be showcasing the dynamic personal care ingredients market in Korea at COEX in Seoul on 26–28 June 2019.

With 2019 marking its 5th edition, in-cosmetics Korea is a platform for some of the most exciting ingredient launches in Korea. The show offers visitors unrivalled access to the latest raw materials, testing services and extensive learning opportunities, as well as the most innovative ingredients available on the Korean market.

Over the course of three days, the personal care industry will be united, with more than 250 international suppliers of ingredients, fragrances, testing, lab equipment and regulatory solutions meeting with an expected 7,000 (predominantly Korean) cosmetic manufacturers, R&D representatives and regulatory professionals. This interactive event offers visitors a unique opportunity to not only touch and test brand new products, but also enjoy a free educational programme, providing comprehensive learning opportunities across three themes:

- Cosmetic science and technology
- Technical and marketing trends
- Regulations.

South Korea’s beauty industry is estimated to be worth around $15 billion, and Korean beauty (“K-beauty”) trends are having a major impact on the global beauty industry because Korea is the beating heart of beauty innovation. Focused on health, hydration and a preferred lack of pigment, rather than simply covering everything up, ‘K-beauty’ offers a route to pristine, perfected skin through products that benefit and nourish, as well as beautify. The effects of this approach have ricocheted across the world, prompting a change in the way that Millennials, in particular, approach their skin-care and beauty regimes.

As a result, K-beauty has been challenging traditional western formulations, and this trend is set to continue its drift westwards. Product innovations that drive the Korean market frequently become adopted quickly into European brands. Multifunctionality is key, and the more traditional approach of western formulation is being challenged by the novel rheologies that many of these products exhibit.

If you are attending the exhibition, you will be in good company, with the likes of AmorePacific, Azelis, Beraca, DKSH, Dow, Evonik, Givaudan, Lonza, Nouryon, Roquette, and dozens more in attendance. Every year, personal care manufacturers and suppliers - big and small, bulk and niche - return to the event to source ingredients, learn, and get inspiration. At in-cosmetics Korea you will find the people, products and services that you’re looking for, and you will be inspired by the latest trends, innovations and formulations emerging from this centre of innovation.

Shaping future industry trends, in-cosmetics Korea offers the most cost-effective business and networking opportunities for the Korean personal care ingredients community. The exhibition takes place at Coex Convention & Exhibition Centre, which is located at the heart of Gangnam – Seoul’s most populated business district.

For further information, including an exhibitor directory and links for registration, visit korea.in-cosmetics.com.
Sustainable Beauty is all about Skin Health And Nutrition

Visit us @ in-cosmetics Korea! Booth K10

WHO ARE WE?

A family-owned Group serving customers globally, Roquette is a leader in specialty food ingredients and pharmaceutical excipients. Roquette’s offer is produced from plant-based raw materials such as corn, wheat, potatoes and peas. Since its foundation over 85 years ago, the Group’s growth has been based on innovation, a passion for the job and a commitment to achieve. Roquette operates in over 100 countries, has a turnover of around 3.3 billion euros and currently employs more than 8,400 people worldwide.

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www.roquette.com

SUSTAINABLE BEAUTY IS ALL ABOUT SKIN HEALTH & NUTRITION

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Let’s address limitations of current biopesticides

The Biopesticide Summit, taking place on 2–3 July in Swansea, UK, will address the pressing need to develop alternatives to chemical pesticides.

The recent banning of chemical pesticides by the European Union (EU) and Environmental Protection Agency (EPA) suggests that there are significant risks to food security, human health and the environment. Biopesticides are the natural alternative to toxic chemicals – plants, bacteria, fungi and minerals for the control of pests of diseases which attack food and other crops of all kinds. The Biopesticide Summit 2019 will focus on developing and introducing innovative and alternative biocontrol solutions that will help protect our food chain in a controlled but timely manner.

Despite significant growth in the biocontrol industry, there remain major limitations with current biopesticide solutions. There is an urgent need to develop novel products and application technologies to not only “fill the gaps” in the market due to pesticide removal but also to anticipate future requirements as pest and diseases are developing resistance to currently used pesticides.

The Biopesticide Summit 2019 will bring together scientists, researchers, key industry stakeholders, government organizations, investors, policy makers and integrated pest management practitioners to discuss the challenges faced by this industry sector, and future opportunities. The summit will also provide insights from end-use markets, giving updates on product performance in different sectors. The Summit will:

• Highlight the global challenges facing growers and regulators today and in the near future
• Bring together academia, industry and investors to commercialize novel innovations

Examine new tools and methods being used to accelerate discovery of new biopesticides.

Hear about innovative technologies and formulation application strategies

Dr Minshad Ansari, Founder and CEO of Bionema, said “This Summit is the first event of its kind to bridge the gap between academia, industry and regulators in a bid to introduce innovation and new products to meet the growing demands for safe, residue-free crops.”

The programme, which will run for two consecutive days, will see a number of keynote speakers from academic, government organisations, biocontrol industry, policy makers and investors.

For more information, visit http://biopesticidesummit.com

SCIENTIFIC UPDATE
We’ve got chemistry

CONFERENCES 2019

CATALYSIS IN THE PHARMACEUTICAL INDUSTRY
Lucerne, Switzerland
14-15 May 2019

ORGANIC PROCESS RESEARCH & DEVELOPMENT
Toronto, Canada
17-19 June 2019

ORGANIC PROCESS RESEARCH & DEVELOPMENT
Lisbon, Portugal
23-25 September 2019

6TH WINTER PROCESS CHEMISTRY CONFERENCE
Birmingham, UK
9-11 December 2019

TRAINING

We offer training courses for industrial organic chemists on the following topics.

Upcoming Training Events:

Flow Chemistry & NEW Masterclass
24-26 May 2019 | Graz, Austria

Medicinal Chemistry
5-7 June 2019 | Basel, Switzerland

Heterogeneous Catalytic Hydrogenation
18-19 June 2019 | Munich, Germany

Chemical Development & Scale Up
24-26 June 2019 | Brussels, Belgium

Biocatalysis as a Tool for the Synthetic Chemist
27-28 June 2019 | Cologne, Germany

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All Jazzed Up!

The Society of Chemical Manufacturers & Affiliates (SOCMA) is delivering new solutions for the specialty and fine chemical industry, including a new Lead Sheet program and capabilities mapping for its commercial services.

The most successful associations in today's market solve problems and deliver the right solutions in a changing environment. Helping our members reach their strategic goals is at the heart of everything we do at SOCMA. Over the course of the past two-and-a-half years, SOCMA has strengthened its connection to the industry and we are acutely aware of the pain points companies face. While members value our focus on legacy issues such as regulatory policy and manufacturing/operations, we most clearly heard their call to reinvigorate the commercial services arm of SOCMA.

As such, we have implemented a commercial services network that includes not only industry intelligence and providing venues for members to share best practices, but also a new clearhouse, where we are mapping capabilities and assisting the industry in identifying additional business connections.

Targeted services for both contract and proprietary chemical manufacturers

In developing our commercial services solutions, it was important that we recognised the distinct differences and growth needs between members who are contract manufacturers and those who create proprietary chemistries.

We’ve found that companies with a focus on proprietary products are more interested in market trends and end-use market regulations. To address these needs, we created ChemSectors – an information network to provide the latest industry intelligence in the areas of performance, agricultural and pharmaceutical chemicals. This segment of the industry convenes at our Executive Forums and Regional Roundtables throughout the year in key regions of the United States to establish business connections, discuss specific key value chain issues and share best practices. This is also an opportunity on the advocacy front to equip our members in navigating regulations that directly impact their ability to do business.

Custom and contract manufacturers, on the other hand, are seeking opportunities for new business partners. A common problem in this area is the increased pace of material insourcing and outsourcing and the need for assistance in streamlining the project evaluation process. We have also heard anecdotally that many contract manufacturers are running at capacity, so if a new project comes along, customers need to know who else is out there with the equipment, raw materials and technical expertise to meet their specifications and get the job done. SOCMA is here to help. With a network of industry alliances, we are uniquely positioned to forge these connections through our new Lead Sheet program. SOCMA has a team that includes two chemical engineers and an environmental engineer, who work with customers’ procurement teams to develop Lead Sheets, which are distributed to our member network. The Lead Sheets are succinct, but thorough, making it easy for business development teams to quickly assess the project and determine if the job is a fit for their capabilities.

20 years at Chemspec Europe

Another platform to complement our commercial services is the SOCMA pavilion at Chemspec Europe. The specialty chemical industry is global, and we realise the importance of amplifying our footprint around the world. For more than 20 years we have provided a concierge-level atmosphere at this international trade show. This year, we have expanded our floor space to accommodate and host 10 member companies, including Aceto, Athlon, Digital Specialty Chemicals, FAR Chemicals, Nation Ford Chemicals, Optima Chemicals, PHT International and Polysciences in section A50, and Callery and GFS Chemicals in section B36. We welcome you to drop by our pavilion and meet our members and team.

Showcasing SOCMA’s transformation

As a culmination of the work and transformation we have made at SOCMA in the past two-and-a-half years, we are unveiling our modernized new brand in late June. The rebrand is a clarity of purpose. No other association understands the unique needs of the specialty and fine chemical industry like SOCMA, and we are positioned to be agile and responsive – a mirror image of our members. The rebrand includes a sleek new logo and tagline, a user-friendly and industry-focused website, a new member publication, and a brand new event.

SOCMA returns to New Orleans on 4–6 December for our inaugural Annual Conference and Dinner. Registration for this new event opens in June. See you in the Crescent City!

Contact:
SOCMA, 1400 Crystal Drive, Suite 630, Arlington, VA 22202, USA
T: +1 571 348 5100; E: info@socma.com
Bonded together.

Are you a SOCMA member?
Mergers & Acquisitions

**Thermo Fisher Scientific** has completed its acquisition of **Brammer Bio**, a leader in viral vector manufacturing for gene and cell therapies, for approximately $1.7 billion.

**Catalent**, a provider of advanced pharma technologies and development solutions, has acquired **Paragon Bioservices**, a development and manufacturing partner for gene therapies, for $1.2 billion.

**Boehringer Ingelheim** has acquired **ICD Therapeutics**, including rights to ICD’s MacroDel biologics delivery platform, which will be used in the development of novel therapeutics.

**CPL Aromas** has completed the acquisition of the UK fragrance business of **Aromatic Flavours and Fragrances (AFF)**.

**Italpollina** has acquired US-based Horticultural Alliance, which specializes in an organic approach to plant health and maintenance through mycorrhizal inoculants and beneficial bacteria.

**Koppert** has acquired **Oecos**, a UK company that produces trapping systems for agriculture and horticulture.

**U.S. Water Services** has joined the **Kurita Water Industries** companies, a leading international water management company headquartered in Japan.

**Saudi Aramco** has signed a share purchase agreement to acquire a 70% majority stake in **SABIC** from the **Public Investment Fund of Saudi Arabia** in a private transaction worth $69.1 billion.

**Pfizer** has entered into a definitive agreement to acquire all the shares of **Therachon Holding**, a privately-held clinical-stage biotechnology company focused on rare diseases, for $810 million.

**Symrise** has signed a contract to acquire the Italian biotech company **Cutech**. The purchase will expand the expertise of Symrise in testing cosmetic ingredients and open new opportunities for collaboration with scientific institutions.

**Royal DSM** has reached agreement with **SRF Ltd** to acquire its Engineering Plastics business, a leading player in India in the development, production and sale of specialty materials.

**LabCorp’s Covance Drug Development** segment plans to acquire **Envigo’s** nonclinical research services business, while **Envigo’s Research Models Services** will acquire **Covance Research Products**. This will result in **Envigo** becoming a pure-play research models and services business, while **Covance** will expand its non-clinical development capabilities.

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**Lonza highlights cosmetic innovations at NYSCC**

At NYSCC Suppliers’ Day 2019, Lonza highlighted the newest in its portfolio of bioactives, and its new range of polyglycerol esters.

**H2OBioEV Bioactive** is a multifunctional ingredient that revitalizes, rejuvenates and moisturizes skin. Lonza created **H2OBioEV Bioactive** by optimizing a unique combination of ingredients derived from plant origin, including **Aphanathece sacrum** and **Galactoarabinan polysaccharides**. The product is ideal for facial and body moisturizers, lip balm, hand care and face masks.

“**H2OBioEV Bioactive** moisturizes by replenishing essential humectants, which provide an optimal environment for epidermal proteins to form and maintain a strong barrier, thus restoring a smooth and radiant appearance,” said Vanessa Arruda, Global Market Development Manager, Bioactives.

The new SYTHEN polyglycerol esters are versatile non-ionic emulsifiers and surfactants that strike the perfect balance between functionality, aesthetics and mildness. Launched at in-cosmetics Global, the range is based on a unique and customizable polyglycerol ester chemistry. These emulsifiers/surfactants can be used in a range of leave-on and rinse-off applications for skin, hair and scalp care.

“We designed the SYTHEN product range to help formulators address consumers’ desire to care for their bodies and the environment while meeting their demands for innovative, luxurious products,” said Jennifer Clancy, Lonza Senior Director of Global Marketing.

---

**Clariant to open centre for Consumer Care Innovation**

Clariant plans to open a state-of-the-art consumer care innovation centre in New Providence, NJ, USA. The new centre, which is set to start its activities in July 2019, will incorporate spaces such as a demonstration room, a high-tech application and claims laboratory, a testing centre where lab results can be correlated with actual consumer perceivable testing, and a collaboration space for interactive and creative thinking.

“I am excited by all the possibilities this technical centre holds for the business and our customers,” said Michael Haspel, Head of Regional Business Line North America, Business Unit Industrial & Consumer Specialties. “We will be able to build our expertise and provide more differentiated product offerings with substantiated solutions that will really support our customers’ brands and their evolution.”

With this development, Clariant plans to further strengthen its ability to leverage its portfolio to provide differentiated and even tailored product offerings to its global personal and home care, as well as healthcare, customers.
WE CREATE FRAGRANCES THAT
IGNITE THE IMAGINATION

CPLAROMAS.COM
Advonex presents squalane alternative

Squalane is a high-end moisturizing agent used in skin and hair care products, vaccine manufacturing and other personal care applications. Until now, squalane has mostly been extracted from olive oil, but meeting global demand requires a large volume of olive oil as the ingredient is only present in trace amounts. Furthermore, Xylella fastidiosa bacteria have been affecting olive oil production in Europe, making extraction even more challenging. This means alternatives are being sought.

Advonex International has announced the release of a new product – Entrada-SQ – squalane synthesized in a laboratory. With its patented process technology, Advonex can produce squalane from plant-based oils such as soybean, palm, canola and other plant sources.

Chad Joshi, CEO, said “Our Entrada-SQ exhibits sensory characteristics similar to olive squalane. Entrada-SQ has the same smoothness, glossiness and spreadability and leaves a smooth softness on the skin. With our pilot production plant engineering underway, Advonex expects to have Entrada-SQ available in quantity by early 2020.”

IIVS receives EPAA grant for non-animal testing in cosmetics

The Institute for In Vitro Sciences (IIVS) has received a grant from the European Partnership for Alternative Approaches to Animal Testing (EPAA) to support its annual training of Chinese scientists in non-animal testing methods. As part of the agreement, two scientists from BASF, a member of EPAA, will join IIVS to provide hands-on training for non-animal approaches for skin sensitization.

“We are proud to have the support of EPAA for our training programs, which are designed to build proficiency and capacity in non-animal test methods in China,” stated Erin Hill, President of IIVS. “We approached BASF scientists to assist us, given their technical proficiency in the tests and experience in providing training. Their inclusion allows us to provide a comprehensive training of internationally validated test methods, as well as introducing a newly developed method, the Kinetic DPRA.”

This training follows China’s recent acceptance of one non-animal method for skin sensitization, the DPRA. IIVS’ annual training is part of an agreement between IIVS and China’s National Institute for Food and Drug Control (NIFDC), with the intention of assisting Chinese scientists in becoming proficient in non-animal testing methods.

Clarins unveils new beauty farm in the Alps

Clarins has set up home in the Alps for the next stage of its beauty developmental strategy. The French beauty brand has acquired 200,000 acres in the region, which it has named ‘Le Domaine Clarins’.

The purpose of the natural farm and laboratory is to carry out biodiversity studies and cultivate plants for use in skincare and makeup formulas. Le Domaine Clarins – which sits at 4,500 ft altitude, meaning it benefits from an optimal microclimate for growing vegetation – is a long-term project that will allow the company to grow seasonal plants in an organic, natural fashion in pollution-free soil.

“As a scientist, I am very vigilant about the quality of natural ingredients and the way these ingredients are extracted,” said Olivier Courtin-Clarins, Managing Director of Groupe Clarins. “Le Domaine Clarins gives us a chance to obtain the best ingredients while preserving the environment.”

Industry leaders collaborate on bio-based personal care range

DuPont Tate & Lyle Bio Products, Corbion, INOLEX, and ACT Solutions are collaborating to create a range of certified, high performing, personal care product formulations with bio-based content. A critical requirement was to have each formula receive USDA BioPreferred product certification. This certification has the potential to serve as a new way to quantify the definition of natural ingredients.

“These newly formulated personal care products developed through our technical collaboration are proof the formulator no longer needs to trade-off between performance and sustainability,” explained Steve Hurff, Vice President of Marketing & Sales at DuPont Tate & Lyle Bio Products.

“Consumer demand for natural products is continuously growing and they expect products that perform,” added Lisa Gandolfi, Director of Marketing at INOLEX. “The market-ready bio-based formulations developed in this collaboration are a significant step forward in delivering consumer-desired products that are certified for bio-based content.”

These ready-made formulations have been tested across a wide range of industry accepted criteria, including stability testing, to ensure they meet the demanding requirements for personal care products. Based on global consumer trends, the increasing need for both high performance and truly natural ingredients is now a mandate for product formulators.

Cambrex completes lab for generic APIs

Cambrex Corporation has opened a new 120m² quality control (QC) laboratory at its site in Milan, Italy. The laboratory expands on the current facilities that analyse and test its generic API portfolio of products during development and manufacturing. The laboratory is fully operational, having been authorized by the Agenzia Italiana Del Farmaco (AIFA).

Cambrex manufactures over 70 generic APIs, which are produced to cGMP standards at the Milan site, where seven production departments are supported by a pilot plant, kilo scale plant and development and analytical laboratories. The additional laboratory space will increase the efficiency of the QC department as the site expands the number of generic APIs in development.

“Our facility in Milan is the centre of the Cambrex’s generic API business, and this investment is the latest in a number of steps we have taken at the site to increase its efficiency and flexibility as we look to grow the portfolio of products that we offer,” commented Aldo Magnini, Managing Director, Cambrex Milan.
With the acquisition of Chemroy, we proudly take our place as the #1 Canadian distributor of specialty chemicals and food ingredients.

Azelis Canada has been a market leader, founded on technical and marketing excellence in the Personal Care, Pharmaceutical, CASE, and Essential Chemicals segments. We are pleased to build on that foundation by adding the products, capabilities and expertise of Chemroy; including our three application labs (CASE, Pharma and Food). We will now be able to provide more solutions and product selection for our customers in the CASE, Food, Pharma, Lubes, and Nutraceutical industries.

Put the expanded power of Azelis Canada to work for you.

Azelis Canada Inc.
An Azelis Americas Company
1570 Ampère, Suite 106
Boucherville, QC, J4B 7L4

Chemroy
An Azelis Americas Company
106 Summerlea Rd
Brampton, ON L6T 4X3
Catalent achieves Global ISO accreditation

The British Standards Institute (BSI) has awarded Catalent a global accreditation against the international management standards for Environment (ISO14001:2015) and Occupational Safety (OHSAS18001:2007). The accreditation, for Catalent’s global Environment, Health & Safety (EHS) management system, is one of the first to be awarded in the pharmaceutical industry to a contract development and manufacturing organization (CDMO).

BSI’s auditors judged that Catalent’s EHS system demonstrates a high degree of sophistication and maturity and competes at a world-class performance level. Catalent’s global network of facilities produce over 70 billion doses annually and are approved by 35 regulatory agencies to provide flexible commercial and clinical manufacturing supplies in oral, sterile, biologic and inhaled dose forms.

“Our EHS system drives our core values of injury prevention and environmental sustainability, and is central to supporting customer and patient expectations,” commented Mark Incledion, Catalent’s Global Director, EHS. “This accreditation is very much in line with Catalent’s patient-first and corporate responsibility-driven philosophy, while helping us meet our environmental targets and promote a cleaner planet.”

Amgen and Syapse in precise collaboration

Amgen, a world leader in biotechnology, and Syapse, a company powering precision medicine insights through its global provider network, have announced a collaboration. The two companies will develop observational research analytics to assess treatment outcomes for areas of unmet need in oncology.

This effort will identify existing patients within the Syapse Learning Health Network that could be eligible for Amgen-sponsored clinical trials and seek to bring these trials to community health system sites. Amgen will have access to real-world evidence for potential use in regulatory filings, and to develop real-world evidence standards to support the acceleration of therapies to market.

“As cancer remains one of the leading causes of death around the world, emerging software and data analytic tools are creating exciting opportunities to more rapidly develop and deliver targeted treatment options to patients,” said Mike Nohaile, Senior Vice President of Strategy, Commercialization and Innovation at Amgen. “Our collaboration with Syapse supports this effort by leveraging real-world evidence to accelerate bringing new oncology treatments to market and empowers healthcare providers with more robust insights and decision-making tools to improve patient care.”

Samsung Biologics signs contract with GI Innovation

Samsung BioLogics and GI Innovation have signed a Contract Development Organization (CDO) contract for immunochemotherapy at Samsung BioLogics headquarters. This is the second such contract signed between the two companies, and is the first among a new multi-project deal.

GI Innovation is also the world’s first bio-venture company to explore the development of new drugs through the combination of microbiome (human microorganism) and protein drugs. Samsung BioLogics will provide services from the development of cell lines to the production of Phase I drug substances. This deal is expected to further leverage Samsung BioLogics leading CDO technology and capacity with GI Innovation’s competitive candidates to accelerate new drug development.

“Thanks to Samsung BioLogics’ CDMO business, we can overcome the problem of producing high quality clinical test samples, the biggest barrier of bio-venture companies,” said Soo Yeon Nam, CEO of GI Innovation. “We are very positive that global pharmaceutical companies interested in the R&D pipeline of GI Innovation will be able to access global new drug licensing (BLA) and biotech drug business through Samsung BioLogics’ CDMO service. Through this collaboration, we wish to demonstrate the win-win model of venture firms and large corporations.”

Pfizer opens biologics manufacturing facility

Pfizer has announced the opening of a new 175,000 square-foot manufacturing facility in Andover, Massachusetts (USA). Pfizer’s Andover campus currently includes seven buildings, which house laboratories, clinical and commercial manufacturing suites and support areas. The new multiproduct manufacturing facility has a modular and flexible design that allows clinical products to be manufactured more efficiently and fully enables next-generation manufacturing technologies.

“We are excited to expand our presence in Andover with a state-of-the-art facility that is designed to provide clinical manufacturing options in a cost efficient and flexible manner to help further accelerate important treatments to patients,” said Mikael Dolsten, Pfizer Chief Scientific Officer and President, Worldwide Research, Development, and Medical. “We aim to increase connectivity between our research and in-house manufacturing efforts to better inform the process, ensure quality assurance, and ultimately improve patient access to potentially life-changing treatments.”
**People**

The board of Fec is glad to announce the appointment of Dorothee Arns as the new Director General.

**BASF** has appointed Vincent Gros as President, Agricultural Solutions, Limburgerhof.

Donald Chen is the new Chief Executive Officer (CEO) of leading rubber producer ARLANXEO.

**ELIX Polymers** has appointed David Castañeda as CEO and Board Member.

**Glenmark Pharmaceuticals** has appointed Dr. Yasir Rawjee as CEO of Glenmark Life Sciences, its API manufacturing business.

Bryan Davies is the new Chairman of **Castle Chemicals**.

**Nanoform**, an innovative drug enabling nanotechnology company, has appointed Miguel Calado as Vice Chairman of the Board, and Dr. David Rowe as Head of Manufacturing.

**Gelest**, a leading innovator in materials science and technology, has appointed Jim Whitlock to the newly created position of Chief Operations Officer.

Vera Stoeva has joined the **Society of Chemical Manufacturers & Affiliates (SOMCA)** as Senior Vice President, Finance & Administration.

Dirk Voeste has been appointed Senior Vice President, responsible for Global Product Safety and Registration in BASF’s Agricultural Solutions division.

Charlotte Purcell has been promoted to the Global Operating Board of **CPL Aromas**, as Global Technical Director.

**SONGWON** has expanded its management team: Elena Scaltritti assumes the position of Division Leader – Industrial Chemicals, and Gerard Mulqueen takes on the role of Leader – Fuel & Lubes. **SONGWON** has also appointed Olivier Keiser as the organization’s first Chief Sustainability Officer.

**MFG Chemical**, a global leader in specialty and custom chemical manufacturing, has named Dana Gibbs as the company’s new Corporate Planning & Supply Chain Manager.

Mark Leasure has accepted the role of Business Development Manager for Charkit Chemical, a subsidiary of **LBB Specialties**.

**Nufarm** has made three appointments to lead its Greenville, Mississippi manufacturing facility operations: Scott Pfantz, Operations Manager, Vicki Goss, Site Supply Planner, and Cathy Ray, Production Superintendent.

**PerkinElmer opens Centre of Excellence in Singapore**

As part of its expanding commitment to helping advance drug discovery and life sciences research in Asia, PerkinElmer, a global leader focused on the health and safety of people and the environment, has announced the inauguration of a new Centre of Excellence in Singapore at the world-renowned A*STAR Biopolis research complex.

The Centre of Excellence is the second Singapore-based facility of its kind opened by PerkinElmer in the past year. The Centre will serve as a training and knowledge sharing facility for life sciences researchers located throughout the Pacific Rim. Operated by PerkinElmer’s Bio-discovery business unit, the Centre will provide advanced solutions in automation and detection, cellular imaging and analysis, and drug discovery and research reagents.

Richard Eglen, President of Bio-discovery at PerkinElmer, said, “PerkinElmer recognises the importance of technical support and training to ensure that our customers benefit fully from our expertise in imaging and detection as well as our reagent biology and chemistry... PerkinElmer looks forward to providing industry leading laboratory instruments, consumables, services and customer service to advance solutions for human health in Asia, and worldwide.”

**Certis expands industry’s only bacteriophage product**

OmniLytics, in coordination with Certis USA, has announced a groundbreaking new tool in the fight against fire blight (Erwinia amylovora), releasing AgriPhage-Fire Blight for targeted use on apple and pear crops in several US states for the 2019 growing season.

Already proven in the control of tomato and pepper crop infections, AgriPhage utilizes bacteriophages, which are naturally occurring organisms that infect and kill targeted bacteria. AgriPhage-Fire Blight is the only bacteriophage product approved for use against fire blight, and its introduction expands the product line’s reach to address the rising threat to pome fruits.

Because bacteria that have developed resistance to antibiotics and other bactericides remain susceptible to bacteriophage infection, Certis believes AgriPhage is a key element in unlocking answers for growers who are experiencing fire blight infection. AgriPhage-Fire Blight is a strong fit within an integrated pest management program applied alone or in combination with approved tank-mix partners for maximum fire blight control.

**Vegalab honoured at National Hemp Expo**

Vegalab, an industry leader in the soft chemistry segment of the natural agrochemical industry, was honoured with the “Best Fertilizer Company” award at the National Hemp Expo held in Louisville, Kentucky (USA) earlier this year.

This was the inaugural year for the exposition, which highlighted the rapidly growing market for hemp seed and fibre, which are used to create a plethora of products including cannabidiol (CBD oil), the demand for which is growing at an explosive rate.

David Selakovic, CEO of Vegalab, stated, “Growers and industry leaders, who had the opportunity to learn about our products during the expert panel and by stopping by our booth, agreed that Vegalab’s soft chemistry products are a perfect solution for hemp growers. With interest generated from hundreds of growers, as well as regional retailers who are interested in carrying Vegalab products, we believe Vegalab’s line of all-natural, biologically derived pesticides, fertilizers and specialty agricultural products will become the go-to products in the hemp industry.”

June/July 2019
Belchim USA announces exclusive distribution of rice insecticide

Belchim Crop Protection USA has announced that it is the exclusive distributor in the US of Tenchu 20SG, an insecticide used to protect rice crops against the rice stink bug, a major cause of pecky rice in Texas and the Mississippi Delta region. Tenchu 20SG is a systemic insecticide that contains the active ingredient dinotefuran, and can be used as an alternative to pyrethroids or in sequence with them.

“With Tenchu, we’re seeing at least 7–10 days of residual control, and sometimes more,” said Dr Way, Professor of Entomology at Texas A&M AgriLife Research Center at Beaumont in Texas. “This means that growers only need to do one or at most two applications to protect their rice… When compared to four or more applications of a pyrethroid and the fact that there is also some pyrethroid resistance out there, Tenchu is the clear winner.”

“We’re thrilled to now be the exclusive distributor of Tenchu in the US,” says Tom Wood, General Manager for Belchim USA. “We see what a huge help this product is to rice growers, as well as being a complementary addition to our overall product portfolio.”

LANXESS to deploy AI in plastics

LANXESS is set to break new ground when it comes to the development of customer-specific high-performance plastics. By deploying artificial intelligence (AI), the specialty chemicals company is looking to drastically cut the amount of time it takes to develop new materials. For this, LANXESS has entered into close collaboration with Citrine Informatics, a US-based AI company specializing in data-driven materials development.

The two companies have launched a pilot project aimed at gauging the potential of AI for the plastics production. The aim is to further optimize the glass fibres that LANXESS uses for reinforcing many of its high-performance plastics and ultimately to enhance the performance of the materials. The process of optimizing glass fibre sizing is complex, laborious and time-consuming.

“We expect AI to cut the development time for optimized formulations by more than half,” said Axel Tuchlenski, Head of Global Product and Application Development in the LANXESS High Performance Materials business unit. “This will enable us to not only offer our customers even better tailor-made products, but also reduce time to market.”

Ecovia expands capacity for bio-based ingredients

Ecovia Renewables, a Michigan-based biotechnology company focused on high-performing bio-based materials and ingredients, has announced progress on the construction of its in-house pilot plant at its R&D facility at Michigan Innovation Headquarters in Ann Arbor.

“Demonstrating Ecovia’s bioprocess platform at pilot scale will be an important and exciting milestone for the company, representing a key step in de-risking our technology and preparing for commercial production”, explained Jeremy Minty, President and CEO of Ecovia Renewables.

Ecovia Biopolymers are created from a proprietary fermentation process and are 100% USDA-certified biobased. They are biobased, biodegradable, and functional alternatives to conventional synthetic polymers and starch-based natural polymers. With 40% more square footage dedicated to process scale-up, the new capacity includes both fermentation and downstream capabilities. It supports ongoing sampling efforts for Ecovia’s suite of biopolymers, including AzuraBase and AzuraGel, which can be used as soil additives for water retention, superabsorbent cores for infant diapers or thickeners for food, among many other applications.

Final call for nominations – Global Biopesticide Awards

Biopesticide Summit 2019 will be presenting its Awards for innovators in the biocontrol industry as part of its gala dinner on 2nd July. The Summit is the first event of its kind to bridge the gap between academia, industry and regulators in a bid to introduce innovation and new products to meet growing demands for safe, residue-free crops. Nine awards will recognise outstanding achievements in the field of biopesticides and their impact in crop protection.

- Best new bioinsecticide
- Best new biofungicide
- Best new biofertilizer
- Best new biostimulant
- Best new biochemical
- Innovative research project of the year
- Best industry collaboration
- Outstanding achievement
- Best new biocontrol of the year

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Dr Minshad Ansari, Founder and CEO of Bionema, co-hosts of the Summit said: “The Global Biopesticide Awards 2019 will be the first awards of its kind to recognise the outstanding achievements of biocontrol industries. It is hoped that this event will become an important part of the annual calendar.”

To enter the Global Biopesticide Awards 2019, email events@biosteticidesummit.com for an application form, stating your entry category.
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**BASF to market Lactips’ bio-based films**

BASF and Lactips have signed an exclusive contract to market Lactips’ water-soluble, bio-based and fully biodegradable material. This long-term partnership supports BASF’s strategy to leverage sustainable solutions to drive business growth.

BASF and Lactips will bring in their respective expertise to offer this innovative technology to the home care as well as industrial and institutional market. While Lactips, a young, French company in the area of biodegradable plastics, focuses on the development of the film material technology based on technical casein obtained from excess milk protein production, BASF will bring its expertise in network and supply chain to market the product. The films are intended to replace polyvinyl alcohol films in home care and industrial applications, such as dishwasher tablets.

“Sustainability plays a major role in all of our business processes,” states Robert Parker, Director, New Business Development at Care Chemicals, BASF. “Lactips’ solution for films for dishwasher tablets supplements our existing portfolio of sustainable offerings. It allows us to provide our customers with a broad portfolio of bio-degradable products for the home care industry.”

**EcoVadis sustainability ratings awarded**

Kraton Corporation, a leading global producer of bio-based polymers and high-value performance products, and DKSH, the leading market expansion services provider, have both been rewarded for their commitment to Sustainability with the internationally recognised EcoVadis silver rating.

Through its global platform, EcoVadis provides companies with evaluation data of suppliers on Sustainability. Its network connects suppliers and buyers across 198 industry sectors in 155 markets. EcoVadis uses a methodology that rates companies according to 21 sustainability criteria in environment, labour and human rights, ethics and sustainable procurement.

Kraton works with more than 6,000 suppliers globally. Its Supplier Code of Conduct, Conflict Minerals Policy, and Slavery and Human Trafficking Statement guides its suppliers on high integrity and ethical behaviour. This is the seventh consecutive year that Kraton has been recognised for its sustainability performance.

“At the end of the day, we have to progress and build a sustainable economy together with all actors in the value chain. No company can do it alone,” said Suzanne Pesgens, Kraton’s Vice President and Chief Procurement Officer.

DKSH also places continuous efforts to further progress its sustainable business practices. The company’s vision for Sustainability is to support economic and social progress in the Asian communities where it operates.

Stefan Butz, CEO of DKSH Group said “The silver rating from EcoVadis is a significant recognition, both for us as well as for our clients and customers around the world... Subjecting ourselves to EcoVadis’ independent assessment clearly demonstrates how committed we are to make continuous progress in the area of Sustainability.”

**Azelis shows continual improved performance**

Continually striving to improve its service, Azelis conducts a bi-annual principal satisfaction survey. The survey is sent to 100 principals and the last one, undertaken in late 2018, saw the high response rate of 70%. Having analysed all the results, Azelis is proud to share the results of the company’s third principal satisfaction survey.

From a satisfaction score of 3.91 in 2016, Azelis’ overall score improved to 4.06 (out of 5) in 2018. Principal management, long-term partnership, friendliness of the staff, strategic alignment, transparency and professionalism were all highly scored, both in 2016 and 2018. Compared to the 2016 principal satisfaction survey, Azelis improved most in sales forecasting, in-depth knowledge of principal products, limited staff turnover and raising and handling customer complaints in the appropriate way.

Hans Joachim Müller, Azelis Group CEO, commented, “Partnerships are at the heart of our business and I am grateful that our partners took the time and effort to share their perception about our work with us. Without their feedback, we would not be in the position to fine-tune our actions and constantly improve our service. We are proud of our continued enhanced performance but will not stop there — continuously driving improvement is a core value of Azelis.”

**SOCMA speaks out against China Tariffs**

The Trump Administration’s decision to raise tariff rates from 10 to 25% on Chinese imports will disproportionately burden specialty chemical manufacturers, according to a statement by the Society of Chemical Manufacturers & Affiliates (SOCMA). This is because, in many cases, China is a sole supplier of raw materials and building-block chemicals.

“While SOCMA supports the Administration’s end goal of zero tariffs and improved IP protection in China, a 25% tariff on $250 billion in Chinese imports will place a significant burden on our members and the industry,” said Jennifer Abril, President and CEO of SOCMA.

“Specialty chemicals are vital inputs to critical sectors of American industry. These sectors are thriving but cannot continue to sustain the volatility introduced by these actions. We have illustrated the interdependency of these supply chains to USTR [the US Trade Representative] and … SOCMA looks forward to working with the Administration towards an expeditious and transparent process for evaluating List 3 exclusion requests.”

Before the increased tariffs went into effect on 10th May, the US had levied tariffs on 1,517 Chinese-origin chemical products valued around $15.4 billion and China has levied retaliatory tariffs on more than 1,000 chemical and plastics products valued at roughly $10.8 billion. As the two countries negotiate the sequencing of tariff removal, SOCMA is monitoring and advocating on behalf of the specialty chemical industry, particularly encouraging the USTR to roll back tariffs on key chemical products as soon as possible.
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The global pull of K-beauty

Victoria Ryoo, Deputy General Manager at SammiChem, part of the Azelis group, looks at how K-beauty has taken the world by storm.

It seems to be a common understanding that Koreans have great skin. Admittedly, when you walk around in the Korean streets, many Korean women seem to have healthy, shiny skin. So, why is it that Korean women seem to have a better skin condition than women from other countries? Is there some kind of special skin gene?

Korean women’s healthy skin is the result of a thorough and conscientious skin care routine, with 5 to 7 steps. These many steps and products are a complete contrast to the skin care ritual of Western women who have traditionally only used 2 to 3 different products in their daily beauty routines.

Korean beauty trends have recently become widespread around the world: it is no longer only Korean women that use the ‘Korean Skin Care routine’ as their bible. BB creams, for example, have become very popular outside Korea and have become a global success and whitening products are also trending beyond southeast Asia. Korean skin care and cosmetics have spread across Asia and into Western societies such as Europe and America. Fashion magazines refer to this as the ‘Korean Skin Care Phenomenon’. In addition, Reddit, a social network website in the US, claims that Korean skin care has become one of the most popular cosmetic regimes for all ages and skin types. So when did the Korean beauty industry, commonly referred to as ‘K-beauty’, get the attention of the whole world?

A good way to grasp exactly how popular K-beauty has become is to visit a cosmetics shop in Myeongdong, Seoul. Chinese and other foreign customers completely outnumber the Korean customers. Here, K-beauty’s popularity is mostly visible amongst people in their twenties and thirties, a group of consumers fascinated by the sophistication and unique characteristics of the Korean cosmetics.

The rise of K-beauty in China was interrupted for a while due to political conflicts. However, in January 2018, local factories began to operate again, and large-scale export orders continued. During this period, a Korean cosmetics company reported supplying a total of 64 billion dollars’ worth of K-beauty products to 20,000 Chinese stores. The duty-free shopping industry in Korea expects the popularity of K-beauty to lead to an increase in domestic sales.

K-beauty is also hot in Hong Kong. Korea’s share of cosmetic imports to Hong Kong has remained at the top since 2015. By October 2017, Hong Kong’s cosmetic imports amounted to 769.2 million dollars, which accounted for 23.4% of the top 10 importing countries. The biggest share of Hong Kong’s imported cosmetics goes to skin care and other beauty products, followed by lip and eye make-up products.

Lee Kyung-nam, Korea Trade & Investment Promotion Agency’s (KOTRA) Hong Kong Trade Center researcher, comments “Competition amongst cosmetic companies has become fierce as Korean cosmetics have secured a considerable position in Hong Kong. Consumer trend analysis and marketing strategies will become more important in order to persuade the consumers.”

Following a full integration in Northeast Asia, K-beauty is now increasing its advances into Southeast Asia. According to cosmetic industry experts, local cosmetics companies are speeding up their advance into the Middle East with the opening of new outlets in Southeast Asian countries such as Indonesia and Malaysia. Nature Republic, a South Korean cosmetics brand which had previously made inroads into Indonesia in 2012, has recently been preparing to step up its offering and expand its sales network, and has opened its first store at the Jakarta-based shopping mall ‘Liquo Mall’. They believe that the ‘Korean Wave’, also known as ‘hallyu’, a term referring to the global popularity of South Korea’s cultural economy exporting pop culture, entertainment, music, has a good chance of also incorporating personal care as demand for Korean cosmetics has soared.

LG Household & Health Care also entered the Middle East in 2006 after advancing to Indonesia in 2004 with Face Shop, a South Korea-based skin care and cosmetics manufacturer and retailer. Currently, LG Household & Health Care has around 70 stores in Indonesia and 50 in Malaysia. Likewise, AmorePacific, another South Korean beauty and cosmetics conglomerate, has been expanding its business towards Indonesia, showing high growth for cosmetics, as well as in Singapore, Malaysia and others. It opened its first innisfree store in Indonesia in March last year and has started targeting Middle East markets since 2018.

“The cosmetics market in the Middle Eastern countries has grown rapidly in just one to two years,” an industry source said. “The social atmosphere around the spread of the ‘hallyu’ culture and the expansion of women’s rights is serving as a channel for the spread of K-beauty.”

K-beauty is expanding beyond Asia to Europe and America. Recently, interest in Korean cosmetics has been surging in Russia. For years, there seemed to be a Russian preference for ‘Made in Europe’ cosmetics. What caused the Russians, however, to break their prejudices and pay attention to Korean cosmetics?

It could be the unique marketing strategy, the cost and outstanding quality and variety of materials used by Korean cosmetics companies that influenced this shift of product preference. South Korean cosmetics companies are making good use of social media and bloggers to promote their products. It’s also important to understand that Korean cosmetics are cheaper than A-listed brands. With the Russian ruble currency falling,
Obituary: the late Francis Pickthall

Francis Pickthall, CPL Aromas’ Global Marketing Director and one of the members of the family which founded the Group, tragically died on 1st March after a short battle with cancer. He was 51. He leaves behind his wife, Jacqueline, and two young children, Grace and Leo.

Francis joined CPL in 1985 when he began his career as a trainee perfumer working under the late Michael Pickthall and later with Robert Calkin. Francis developed a passion for the business and went on to establish himself as a successful perfumer creating well-known market products such as Penhaligon’s Racquets Formula fragrance. Michael Pickthall, Co-Founder of CPL and Creative Perfumer died in 1989 leaving Francis, for a time, as CPL’s only perfumer. Francis held the company together at a very young age, until the company was able to recruit other perfumers.

Francis became more involved in the commercial side of the business, developing overseas markets such as the Middle East, Europe and South America, later becoming joint Managing Director of the UK division prior to the company’s flotation on the London Stock Exchange. He was closely involved in establishing CPL Dubai, and he successfully led the project to build CPL Dubai’s factory in Jebel Ali, which is still the only fragrance factory in Dubai. Francis also served as General Manager of CPL Dubai before returning to the UK to oversee the group’s global marketing and branding.

But the lure of the sunshine was too strong and Francis returned with his young family to Dubai in 2013 as Global Marketing and Branding Director, where he enjoyed working with key clients in the region and maintained a keen interest in perfumery.

Francis worked with so many members of the CPL divisions around the world and he will always be remembered as being open and approachable, kind and supportive of all employees. He wasn’t just seen as a member of the main board, he also became a good friend to many.

Chris and Nick announced the news of his brother’s passing with the following message: “We are so sorry and sad to tell you that our beloved brother, Francis, lost his short and brutal battle with cancer and died last Friday. The loss to our family and company is immeasurable. Rest in peace Bro. Love Nick & Chris x”
Harnessing the natural vitality of the orient

We speak to Aiden Park, Senior Vice President and Head of Sulwhasoo Science & Heritage Center at Amorepacific’s R&D Unit, about how the company’s heritage guides its research and development activities in the beauty industry.

Amorepacific is a South Korean beauty and cosmetics conglomerate, operating over 20 health, beauty and personal care brands. Founded in 1945, it is Korea’s oldest and biggest beauty company. Focusing on the ‘legacy of Asian beauty’, the company says it strives to share traditional chemistries, merged with cutting-edge technologies, with the world through its various brands. We caught up with Aiden Park, Senior Vice President and Head of Amorepacific’s Sulwhasoo Science & Heritage Center, to find out more.

Q: Amorepacific has a beautiful story of origin – can you share it with us?
Amorepacific’s pursuit of beauty began with the artisanal spirit of Yun Dok-jeong, the mother of Suh Sung-whan, the founder of the company. Yun sold high quality camellia oil at the Chang-seong store and gained wide customer loyalty. Yun instilled the value of using good ingredients to her son, who continued the legacy by establishing Amorepacific, previously named Pacific Chemical. This passion and commitment to vitality of nature is in the company’s DNA and provides a unique foundation that has helped the company lead the global beauty industry.

Q: Which Asian botanicals are used in your products?
Amorepacific’s heritage ingredients include ginseng, green tea, beans and plum blossoms. As for Ginseng, Amorepacific started research into ginseng in earnest at the start of the 1960s, amounting to over 50 years of research. In the 2000s, our research on ginseng blossomed into what is called ‘bio-conversion’ technology. This technology uses enzymes to create a high concentration of rare saponin, which only exists in extremely low levels in ginseng. Amorepacific used this technology to develop products containing rare active saponin, an ingredient found in ginseng with excellent anti-aging and brightening properties. Amorepacific has since expanded the scope of its research, to studying the efficacy of different parts of ginseng such as the flower, seed, leaves and stem in addition to roots; the delivery mechanisms to the skin such as Ginsenisphere; large-quantity production of rare saponin using bio-conversion technology and its efficacy; studying ginseng cultivation environment and methods. Amorepacific named this technology as ‘Ginsenomics’ and has been able to develop a wide range of high-functioning, high-potency cosmetics products from it.

To this day, Amorepacific continues to deliver ginseng’s vitality and potency to customers worldwide through comprehensive research including: hydroponic cultivation and smart farms, explantation technology that enables consistent production and the creation of high-concentration of ginseng’s core ingredients throughout the year, and metabolomics research to identify ginseng’s singularity.

Q: What are the benefits of Plum Blossom used by Amorepacific?
Plum blossoms embody the strength that endures the cold winter. After studying plum blossoms, we discovered that their anti-aging and brightening properties are due to a unique enzyme that regulates the skin’s metabolism. This enzyme is found in the petals of plum blossoms, which Amorepacific uses in its products to help maintain healthy skin.

Continued on page 26…
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#incosNA
Amorepacific came up with a paper that substantiates anti-aging efficacies of a plum blossom. This was published in the *Journal of Investigative Dermatology*, a well-known journal in the field of skin research (see Research Summary Report below).

The results demonstrated the regenerative and antioxidant effects of the plum blossom flower, and its ability to overcome ‘skin exhaustion’ were influential enough to feature the cover of the journal. Plum blossom extracts can not only regenerate cell doubling rate but also get rid of ROS that accumulates in mitochondria, protecting collagen and stimulating its production. This ingredient is applied to Sulwhasoo’s Bloomstay Vitalizing line, which was launched in 2018.

Q: Your laboratory in Korea is said to have cutting-edge technology – can you tell us more about this?

Amorepacific was the first to build a cosmetics laboratory in Korea, in 1954. Our founder, Suh Sung-whan, firmly believed that “having a superiority in science and technology will make us a globally leading company.” This belief was the foundation of our success in developing unprecedented beauty categories such as boosting serums, sleeping masks and cushion compacts that have reshaped the global beauty industry.

Organisms age as time goes by, or due to external stimuli. During this process, skin becomes wrinkled, while skin elasticity and barrier functions are reduced. Therefore, the development of effective substances which inhibit the cellular aging process is an important task. Amorepacific’s R&D Center conducted studies on the anti-aging effect of metabolites in cells. As a result, it was discovered that ‘pyruvate’, a metabolite produced during the decomposition of glucose, exhibits a potent anti-aging effect. This study was published in the *Journal of Investigative Dermatology* as a cover story in December 2018, and is summarized here.

**Research Summary Report**

**Protective role of ‘pyruvate’ against skin cellular senescence**

Kil In-sup, Chief Researcher at Amorepacific’s R&D Center Bioscience Lab, explains how Amorepacific is focusing on studies of highly effective functional metabolites with low toxicity/side effects. Here, he details his research on the effects of ‘pyruvate’ on skin cellular senescence.

**How it works**

When human fibroblasts are cultured, pyruvate enters the cell and produces a well-known substance of NAD+ nicotinamide adenine dinucleotide as a potent anti-aging agent. This allows pyruvate to promote the degradation of abnormal mitochondria and reduce free radicals. It has also been shown that the expression of a senescence-associated secretory phenotype (SASP) is reduced, thereby inhibiting skin cell senescence. In particular, through the research of artificial skin models, it has been found that pyruvate deficiency causes aging of dermal cells, which inhibits the growth and differentiation of the epidermal layer, resulting in a phenomenon similar to the aging of human skin. Thus, it could be expected that pyruvate may exhibit a potent anti-aging effect even in real human skin.

**What sets this research apart from previous studies?**

Past methods of inhibiting aging mostly used either the natural products present in plants or synthesized compounds. However, pyruvate is a metabolite already present in human blood so it is characterized by low toxicity and few side effects. In addition, when cultured in vitro, a large number of cells are cultured using a culture medium containing...
industry in recent years. To develop such singular innovations, our R&D Center carries out a wide array of research, from primary to new material development, even to cultivating methods of our natural ingredients. To retain our strong expertise in Asian botanical research, Amorepacific operates the Sulwhasoo Heritage & Science Center to study ginseng as well as other treasured plants.

Q: What recent products have excited you most and why?
Sulwhasoo is Asia’s leading luxury beauty brand, which uses treasured Asian Botanicals to provide potent beauty solutions. There are two products from this brand that I think are particularly interesting.

1) Concentrated ginseng Renewing Serum, which uses all of ginseng from leaf, stem, root and seeds. It contains a small and delicate capsule Ginsenisphere, developed by Sulwhasoo’s cutting-edge technology. This capsule effectively delivers precious ginseng seed oil to the skin by melting quickly as you spread it across your face.

2) Bloomstay Vitalizing Line, launched last year, had its product assortment developed based on global customers’ sensory preferences. Of these, the Bloomstay Vitalizing Serum is infused with rejuvenating and anti-oxidant energy of plum blossoms, as well as containing components from five germinated fruits and seeds to bring out a healthy glow.

Q: What inspires your R&D focus? How do you decide what to develop next?
Amorepacific has a very customer-centric philosophy. I also believe that all the answers to our questions come from our customers. As a researcher, I always try to think about what our customers would want, and to get inspired through providing new experiences to them, so as to ultimately develop products that are truly valuable.

Q: What does the future hold for Amorepacific?
We aim to reach the next level by expanding our research in biosciences, new material and technology development, as well as combining different technologies. By gaining insights from customer research and establishing that ‘brand singularity’, Amorepacific aims to proactively provide innovative beauty solutions. Furthermore, we aim to continue providing novel value to our customers by combining Asia’s latest expertise in beauty and health with the latest biosciences and digital technology.

1 mM pyruvate. This is 20 to 30 times higher than the actual concentration in human blood. This research confirms that the use of culture medium containing pyruvate when screening for anti-aging and antioxidant materials resulted in masking the effect of these substances due to the anti-aging and antioxidant effects of pyruvate itself. For this reason, we studied the aging model in the conditions in which pyruvate is contained similar to the actual human blood concentration because this anti-aging substance screening method will provide a similar environment as an actual in vivo environment. Through this process, we identified the anti-aging effect of the plum blossom extract, which is the main component of ‘Sulwhasoo Bloomstay Vitalizing’ line.

Going forward, it is necessary to re-examine the function of pyruvate present in human blood, which was previously simply regarded as an intracellular energy source. In particular, it has been demonstrated that pyruvate is involved in improving the function of mitophagy responsible for the degradation of abnormal mitochondria among autophagy, which degrades intracellular components or organelles. This result is expected to be applicable to various research fields.

Application to the luxury beauty brand Sulwhasoo
Notably, this research result was applied to the ‘Sulwhasoo Bloomstay Vitalizing’ line launched by Amorepacific in 2018. An aging cell model deficient in pyruvate was used to screen for substances exhibiting an actual anti-aging effect. As a result, it was found that the plum blossom extract had an excellent anti-aging and antioxidant effect and was included in three products in the Sulwhasoo Bloomstay Vitalizing line, including Bloomstay Vitalizing Cream, Bloomstay Vitalizing Water and Bloomstay Vitalizing Serum.

Reference
Top trends for cosmetics and personal care

We look at the top trends in cosmetics and personal care ingredients emerging so far in 2019.

Natural ingredients continue to be a mega-trend across many industries. In cosmetics and personal care, this has driven a demand for ‘free-from’ products. As stated in an industry blog by in-cosmetics Global earlier this year, “This year’s key ingredients are valued as much for what they don’t contain as what they do.”

Of course, this includes ingredients that have long been seen as ‘good to avoid’ such as palm oils, microplastics, petrochemicals, alcohols and parabens, as well as new ones like ‘quats’ – quaternary ammonium compounds, used as potent disinfectants and as conditioning agents for skin and hair products. Such ingredients are being replaced with more sustainable, eco-friendly alternatives, such as biodegradable cellulose particles, apricot kernels, pumice, or walnut shells in lieu of microplastics. A variety of oils can substitute for palm oil (e.g. sweet almond oil, grapeseed oil, olive oil), and natural or synthetic alternatives to parabens include plant extracts or other more benign chemicals. As such alternatives become more mainstream and easier to source, they are being incorporated into more products.

Halal products are also going mainstream across Europe, making halal-approved ingredients a greater focus for formulators and suppliers. Alongside Islam being the fastest growing religion in the world, recent changes to legislation in Indonesia requiring consumer products to have halal certification has been a catalyst for growth. Although the Asia Pacific region is leading this trend, there is increasing global interest due to an association with health and well-being – for example, halal products are perceived as being ethical, and certification ensures that they are alcohol-free and traceable.

Another growing trend is edible beauty. Ingredients such as honey, caffeine and vegetable oils represent healthy and eco-friendly alternatives, and their inclusion makes products less complex and appealing to consumers. Food-derived ingredients have created new opportunities for food manufacturers in the cosmetics and personal care sector, and formulators in the beauty sector are finding inspiration at the supermarket with creations such as popsicle moisturizers and sugar cookie scrubs (Clariant).

Perhaps the next step – to consumable skincare – was an obvious one. As part of the in-cosmetics Global conference programme, Nutri vitality’s Alex Campbell explained how drinkable skincare can provide “true beauty from within”. Consuming collagen as a form of drinkable skincare could offer marked benefits, he said, adding that drinking collagen is a more logical solution than current topical skincare regimes.

Wellness, happiness and intrigue are all emotions associated with beauty products. These can trigger emotional purchases, so it is important to excite the consumer with novel formats and textures. In addition, a key beauty trend for 2019 is emotional support – for instance, cosmetics that provide stress relief or help sleeping. One example is Givaudan’s active cosmetic ingredient Sensityl, derived from microalgae and said to offer “dual benefits on beauty and well-being”.

Artificial intelligence (AI) is receiving a lot of attention in the pharma industry — cited by Forbes as one of the top healthcare predictions for 2019, the long-anticipated era of AI in healthcare is finally here, revolutionizing drug development as well as finding new targets for existing molecules. These developments are mirrored in the cosmetics sector. As explained by Professor Jose Prieto of University College London at in-cosmetics Global, AI and multivariate analyses are already being used to predict, find and interpret the bioactivities of products that may be of interest.

AI-powered technologies can also, of course, help to shape marketing strategies. AI Marketing (AIM) is taking the world by storm across many sectors, and cosmetics and personal care is no different. AIM enables highly personalized experiences that can have a greater impression on the consumer while costing less than traditional high-dollar campaigns. Tools are already available to gain agility in responding to customer evaluations and upcoming trends, and personalize recommendations by selecting products that best suit consumers.

This leads us neatly into our final trend – personalized products. This is perhaps best exemplified by Azelis’s Unique You range, which encourages individuality and enables consumers to celebrate what makes them truly unique. Six formulations are dedicated to creating cosmetics products that are personalized and fit unique needs. It includes, for example, a body lotion for those who love spending time outdoors, giving a powerful shield against extreme weather conditions, as well as a hand cream that protects against blue light for those more indoor types. Not to be outdone, DSM dedicated its in-cosmetics Global stand to individuality – celebrating diversity in skin care needs both seen (as in skin tone) and unseen (the microbiome). DSM scientists are exploring the potential of a wide range of molecules to discover one that can deliver results for everyone.

These trends and others are shaping the cosmetics and personal care industry for 2019 and beyond. Chemicals Knowledge is watching this innovative sector as new creations and trends unfold, and we’re all excited to see what comes next!

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Driving growth through patient focus

Dr Dennise Broderick, President and Managing Director of Galen (a member of the Almac Group), explains her commitment to driving growth with a strong focus on the customer and the patient.

Galen, a Northern Irish based pharmaceutical company, has an established commercial infrastructure in the US and UK, and reports sales globally. Key to this success has been a commitment to driving growth through licensing, acquisition and partnership. Dr Dennise Broderick joined Galen in September 2018, continuing an extensive career that included senior roles at IPSEN Pharmaceuticals, Pfizer and other companies across Europe. We spoke to her about her vision for Galen and her thoughts on the industry.

Q: Galen’s search for US-centric opportunities is focused on specialty branded products that could be incorporated into our sales and marketing activities. In the UK, we are looking to build our Trustsaver offering, where we work in partnership with healthcare professionals, patients and payers, by offering branded products with a cost saving to the NHS.

Q: A couple of years ago there were concerns about a lack of innovation in Pharma. However, the tide appears to be turning – do you agree that this the case and what could explain it?
I have witnessed the incline in innovation, particularly in the last few years — in my opinion it could be explained by two key elements. First, the increase in collaborative partnerships between pharma companies and traditional contract manufacturing organizations facilitates solutions with increased, readily available capacity, resource and capability. Second, the implementation of new technology solutions speeds up processes that traditionally were slow due to strict internal procedures. Creative, adaptable and digital methods have enabled companies to shift to more dynamic, responsive and customized solutions.

Q: What makes Galen such a good place for you right now?
Established in 1968, Galen is unique in that it is owned by the McClay Foundation so it remains completely private. I was attracted to the company’s vision of being customer-driven, innovative and quality-focused. Those values align with my own, which made the opportunity attractive.

Q: You were quoted in January as saying your goal is "to strengthen our vision to make Galen a successful global pharmaceutical company with a strong focus on the customer and the patient". How will you achieve this?
We need to increasingly focus on outcomes, which prove our impact and value as a company within an evolving and highly regulated environment. Part of that is emphasizing transparency. Being transparent in our actions is an important factor in building and maintaining confidence and trust with the general public and in demonstrating the integrity of our interactions and relationships with healthcare professionals and healthcare organizations.

Q: How does being part of the Almac Group help Galen?
Galen was the original business established 50 years ago by Sir Allen McClay, Almac’s Founder. It has evolved as a result of organic growth and timely product acquisitions. The relationship with Almac Group enables us to leverage many benefits and gives us the ability to focus 100% on our commercial operations. For example, we benefit from the Group’s centralized supporting functions and from manufacturing a number of our own pharmaceutical products through Almac (e.g. our Laxido product range).

Q: Galen covers an interesting range of therapeutic areas – is the broad scope a deliberate strategy?
Historically, the strategy has been broad because Galen’s ability to grow existing and new markets is largely unparalleled. We have the skillset and resources to streamline work and stay agile. Due to our established commercial infrastructure in multiple markets, we can execute a go-to-market plan quickly.

Galen’s search for US-centric opportunities is focused on specialty branded products that could be incorporated into our sales and marketing activities. In the UK, we are looking to build our Trustsaver offering, where we work in partnership with healthcare professionals, patients and payers, by offering branded products with a cost saving to the NHS.

Q: How does Galen bring added value to its international partners?
Because we combine innovation with development, and partner with manufacturers to position their products paired with competitive pricing, we create real, long-term value. Our tenure and relationships are key to our teams’ competitive advantage, which allows us to support our partners successfully.

As we celebrate our 50th year in business, I am excited for our future plans as we continue to drive Galen’s success and build upon our reputation for being the partner of choice to launch specialty pharmaceuticals.

What does Dr Broderick say about being a ‘Woman in Science’?
The men and women with whom I’ve worked have been exemplary mentors. Business is about people — all people — and it’s my intention to create possibilities for my team to generate the greatest impact in an industry that is fixated on advancing human health.

Being blind to gender or other attributes is not advantageous in my opinion, as we must celebrate diversity in all its forms, rather than simply being respectful. Having a multitude of individuals with unique backgrounds at the table mitigates financial risks, enhances collaboration and ultimately produces better results for companies in all industries.

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SEQENS is a global Contract Development and Manufacturing Organization that supports emerging and large pharmaceutical customers for their drug substance or drug delivery needs.

The company has over 25 years of experience in process development, scale-up and ongoing cGMP manufacturing of small molecule APIs in volumes ranging from a few kilos to tens of tons.
Overcoming limitations to achieve uniform dosing

The experts at Cambrex outline the difficulties in achieving uniformity in pharmaceutical blends and dosing, and review two case studies in which outsourcing provided solutions with optimized equipment and targeted modifications.

Formulations of low-dose drugs require a careful balance of several factors to ensure that each dose has an acceptable blend and content uniformity. Determining the right methods and equipment specifications to pair with the selected material requires expertise across multiple areas of the development process.

When at this critical step in the drug development process, companies are faced with the question of whether to complete these activities in-house with purpose-built facilities that can be capital intensive, or to outsource the work to a contract developing and manufacturing organization (CDMO). Further complicating the choice is the wide selection of CDMO providers in the market, making it important that a customer fully understands their needs and seeks a supplier that is able to meet those requirements.

In this article, two cases are reviewed where customers had an immediate need for lower dose capsules in the clinic, which posed several challenges in blend formulation with very tight timelines for delivery, and needed to ensure greater uniformity of a pharmaceutical product. Optimized equipment and targeted modifications were applied to the formulations to solve the clients’ needs, and the analytical team aligned to deliver qualified methods to support release testing of batches of the new formulation. Working with a CDMO that has strong formulation expertise, and the best interests of the customer and end patients in mind, can bring added value in cases such as this.

Case study: A chemical solution to a physical problem

Pharmaceutical formulation is the process where the active pharmaceutical ingredient (API) and different chemical substances are mixed to create an end-user drug product. The amount of active drug in the product varies depending on the format and expected end users of the product. Formulation studies are carried out for new drug products to verify the activity of a drug and what combination of chemical substances is needed to reach the appropriate format and dosage. The dosage should not only have a uniform amount, it should also have uniform appearance.

Low-dose drugs can pose challenges during filling due to physical limitations of the equipment being used and the ability to achieve blend homogeneity. When doses are low, transfer accuracy can be compromised and lead to a higher reject rate. Here, the challenge was to add components to the formulation that would not alter the potency or safety profile of the drug substance, while improving the flowability of the product during capsule filling. The use of automated equipment to maximize throughput capabilities offers flexibility in transferring specific doses to capsules, but there are some limitations.

An existing method for the neat powder in capsule was used as a starting point, but recovery using that method was not adequate. The team theorized that the sample diluent was not breaking up the blend sufficiently. One of the excipients, methyl crystalline cellulose (MCC), may
have accounted for this by creating a complex with the API that filtered out during sample preparation. A key deliverable for the client was the development of a validated method for maintaining content uniformity using a new diluent to disrupt the complex formation. By selecting a new diluent during method development and using a ‘flood fill’ encapsulation method to accommodate the increased bulk of the formulated material, accurate content uniformity testing was achieved for the drug substance.

It takes expert knowledge of the chemical process in order to trace a physical limitation during manufacturing back to its chemical origin. Here, the limitations of the ProFiller ‘flood fill encapsulator’ during the filling operations were addressed by adding the glidant silicon dioxide to improve the flowability of the drug substance. This allowed the equipment to produce reliable low-dose capsules to meet the clinical demand.

**Case study: Blending to ensure uniformity**

Uniformity is a critical attribute in drug product formulation because it will ultimately impact the clinical effect on the patient by affecting drug dissolution, absorption and bioavailability. Achieving uniformity in formulation development not only has an impact on the product, it helps manufacturers to satisfy regulatory requirements and reduce lost revenue caused by insufficient or rejected product.

To verify that the critical attributes of uniformity have been achieved, thorough testing of formulations is critical. This helps to determine the uniformity after blending and after encapsulation with the goal of assessing the potency of the material. It also serves to demonstrate to regulatory authorities that the process is controlled to ensure the same amount of drug substance in each dosage.

Rather than relying on a single form of analysis, several methods were applied to ensure quality, including Karl Fisher (KF) water content and related substances methods. These methods can be redeveloped as needed according to the unique attributes of the drug substance. For example, after adding the excipients to the formulation in this case study, the water content increased dramatically. The existing KF method for the neat powder had to be modified for a different level of standard and melting temperature in order to yield valid results for the new blend formulation.

Chromatography was used to measure content and blend uniformity across several samples, and to quantify potency when performing the assay method. When the team detected excipient interference using the original method, they adjusted the wavelength to isolate the API.

In this case, the experts also developed a dissolution method for the material from scratch. Samples of the acidic media were pulled across various time points to assess the timing of drug product release while the dosage form disintegrates in the dissolution batch. Dissolution methods can be especially powerful because they mimic the drug activity in vivo.

All four of these methods were developed in parallel to dramatically compress the timeline and speed up time to market for the customers. With validated methods available, batch release testing was able to take place as product came off the manufacturing line, and the team was able to deliver the low-dose capsule formulation on time and on budget.

**Drivers for outsourcing formulation**

Every drug producer must evaluate the value of carrying out operations internally versus outsourcing to an experienced supplier. For formulation of small molecule drugs, the right CDMO can have a deep impact on the success of a drug manufacturers process, so choosing the right supplier is critical. A proper CDMO will apply expert knowledge of the root causes to address both chemical and physical challenges that customers come against during product development, and in key final phases, like formulation.

Beyond expertise, there are other advantages to working with a CDMO, including a drastic decrease in capital investment, elimination of transfer and scale barriers, and access to the newest technologies and methods. Where an individual company may not be able to take advantage of the latest equipment and advances, a CDMO has a vested interest in staying ahead of the curve to ensure that their capacity continues to book.

**Early stage impact**

Not only is the choice of a supplier critical, but an often-overlooked element is the stage when outsourcing is engaged, which is more impactful than it may first seem. In today’s market, interest is starting to be expressed in supplier support from earlier and earlier in the process, which reflects the continued drive for quality by design in the industry. Smart design from the start matters, and it has become common to see companies engage CDMOs for process development in discovery phase, as well as for meeting milestones, including regulatory filing and scale-up efforts and specific needs in the clinic. This earlier engagement ultimately improves the drug product formulation process.

Additionally, regulatory compliance has become a more important CDMO offering because discovery-based companies often do not maintain their own regulatory affairs departments. And it remains challenging to get into early stage manufacturing without enormous commitments in personnel, training and recruitment. Consequently, regulatory affairs are an expense that these firms do not necessarily fund in-house any longer.

Cambrex leverages top analytical and formulation expertise with customer support to overcome challenges and meet or exceed aggressive timelines and regulatory considerations. Leadership is focused on business decisions that advance the level of support available to customers from discovery to commercial development. A global network of facilities with optimized technologies and flexible capacity helps to secure the supply chain and offer the reliability customers need for the life of a drug product.

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www.cambrex.com
Time to get smarter in the race for personalized meds

Alwyn Jones, Siemens Digital Industries Head of Pharmaceutical and Life Sciences UK & Ireland, explains how advanced technologies are driving the development of products that are bespoke to a patient’s genomic make-up.

By their very nature, the manufacture of pharmaceuticals needs an incredibly high degree of consistency and traceability from discovery to delivery. As a result, pharma has evolved as a risk-averse industry focused on getting a commercially viable product right, and then ensuring it is reliably mass-produced with no variations in quality or alterations to the original formulation.

It has also taken pharma decades to develop the manufacturing systems we have today, built to produce a limited number of high-volume, mass-market medications in large batches. But the sector is also incredibly competitive – and with only three in every 20,000 drugs making it to market, and of those only one probably making a profit – the need to be increasingly agile is imperative.

The ultimate goal is ‘batch size one’, highly personalized medications tailored to an individual’s specific biological, physiological and psychological profile. While we are a long way from getting to that point, we are closer to the ‘mass customization’ of common drugs. Advanced technologies are also driving the development of smart biopharma – organically-derived products bespoke to a patient’s genome makeup.

What’s making this possible is the advent of digitalization, an operating model that offers pharmaceutical companies the combination of flexibility, communication and control they need to enable individualized production of personalized medicines at, ultimately, mass market cost.

Digitalization is not just about more automation and more data analytics; it’s about embedding smarter, more responsive technologies across the entire process. From recipe generation and management, plant engineering, scheduling, production, quality control through to logistics. It can impact every level of the pharma manufacturing process. From large volume over-the-counter drugs to highly personalized formulations for targeted therapies, and from biological to chemical processes, primary processing is as complex as it is diverse.

By embracing digitalization, manufacturers can add real-time intelligence to the personal medication equation. It turns Big Data, which is being generated across the factory floor, into Smart Data, driving better informed decision-making using analytical software that can be shared across the entire value chain.

Digitalization further enables informed decision-making on core operations such as scheduling production of a new medicine or maximizing use of available assets. Another benefit is identifying where capacity gains can be made and where downtime is minimized.

Many pharmaceutical companies are also now exploring how more joined-up production technologies can support modular manufacturing set-ups, providing the flexibility needed to produce smaller batches of customized products. The modular approach uses plug-and-produce equipment, systems and processes that are quick and easy to configure, scale and, if necessary, relocate. They can also reduce production times, enable a smooth transition between different product batches, and reduce the complexity associated with validation and sign off.

Of course, implementing any new or customized manufacturing techniques comes with risk, however slight. And even the smallest changes can open the door to unforeseen errors. Therefore, another transformational impact on pharma manufacturing is the rise of the digital twin – a virtual replica or simulation that allows operators to visualize and test any aspect of the product and process. Examples include simulating the design of experiments and manufacturing recipes, which enables manufacturers to plan and test production processes in a safe, de-risked environment before going live.

Once embedded in the real-life production process, digital technologies can have a major role to play across every aspect of the pharma ecosystem.

- Laboratory management, in terms of both safety and maximum process efficiencies, can be transformed.
- Ingredient management can similarly be made smarter, with the ability to track all product and process data for raw materials.
- Procedures for verification within pre-set and carefully monitored thresholds can ensure your fermentation or synthesis processes get the correct ingredients at the right time and in the correct quantity and quality.
- Process control can also benefit massively. For example, PAT (process analytical technology) to help monitor and control your API process and capture all relevant data to achieve right-first-time quality. Further, keeping your API isolated to ensure optimum yields through effective separation, purification and conditioning regimes is another key area where technology positively impacts.

For many pharma companies, digitalization is still a ‘nice-to-have’ rather than strategic imperative. It’s also not something that can be achieved overnight. However, for businesses willing to combine a strategic commitment to digitalization with a step-by-step approach to implementation, there is a world of new business opportunities waiting to be explored.

Alwyn Jones will be sharing more insights about the role of technology within the pharmaceutical industries at Siemens’ Digital Talks Conference in Liverpool on 11th June. More details at www.siemens.co.uk/digital-talks-2019
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BEYOND PROCESS CHEMISTRY
Where does our legal cannabis come from?

John Shearman, Executive Director Marketing & Cannabis Business, Applied DNA Sciences, explains how molecular technology is being used to provide visibility, transparency and traceability within the cannabis supply chain.

Although cannabis can provide important pain relief, many patients may be hesitant at first to use it because they associate it with psychoactive street drugs and they don’t know its source. However, legal medical marijuana sources are safe and highly controlled. For example, in New York State, the program has 10 licensed suppliers that are vertically integrated, meaning they are required to be the cultivator and processor, and to operate the dispensary. This allows the state to tightly monitor every aspect of the supply chain and control the quality of products. Facilities in New York use a state-required seed-to-sale system to monitor the flow of cannabis through barcodes on each plant. This is a great inventory management control system until harvest. After harvest, the plants are batched together and assigned another unique number that is used to track through transportation to dispensary.

There is a complementary overlay technology platform, called CertainT by Applied DNA Sciences, which uses molecular technology to fog the source plant at harvest and applies a unique indelible and invisible molecular tag to the exterior of the entire plant. Cultivators would be assigned a unique molecular signature representing their product. The molecular tag is applied at parts per billion, it’s non-GMO and it’s safe to consume. The delivery mechanism for the molecular tag fog is called a Cannabis Tagging System (CTS) Pod (Figure 1). This is a movable fogging room. A control panel will reside exterior to the room to wirelessly control the pod unit(s). The control panel is secured with authentication credentials that are recorded for each fogging session. All the data captured during the fogging process will be sent to a secure cloud-based portal, which can be interfaced to seed-to-sales systems through APIs, its blockchain readily allowing a digital footprint of all transactions around the cannabis flower and its derivative products to be recorded in real-time.

The beauty of this platform is that it also allows the addition of a tag directly to the processed products such as oils, isolates, butter and shatter (a cannabis concentrate that packs up to 80% cannabinoid content) so continuity is maintained from flower to extracted product. The molecular tag has been tested at various points in the extraction processes using ethanol and butane. The tag can be reintroduced into the crude, distillate or isolates. The oil infused with the tag was tested in baking of brownies in an oven at 325°F for 28 minutes and the tag was authenticated using a mobile PCR device.

Applied DNA Sciences uses PCR devices to amplify the tag to be able to detect the unique tag as it flows through the supply chain, allowing for outgoing and incoming inspection of the origin source materials. These authentication data are also captured in the same portal and can be shared with partnering systems.

According to several label and packaging companies in the industry, there is a large counterfeiting and diversion issue across markets. The same platform being used to tag the flower and by-products can also be used to add a unique molecular identifier to the varnish or ink that is used on packaging and labels in the cannabis industry. Applied DNA also offers a product called Beacon that is combined with the molecular tag that allows a quick optical read by activating a proprietary encrypted fluorophore that illuminates under a UV light source. Combining these two technologies allows for quick reads in the field and a forensic-level backstop through the molecular tag that can be used as evidence in a court of law if legal issues occur.

The global market for both medical and recreation cannabis will continue to grow and become legal across the globe. Just like other complex supply chains that supply us with everyday products, we want to know where these products are coming from and the materials that go into them. This will require a technology ecosystem and infrastructure to provide visibility to all within the supply chain and the end consumers. Trust, transparency and traceability will be key benefits provided by such an ecosystem and allow for fair and safe commerce across international borders.
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Biologicals are a natural fit

Experts at the Biological Products Industry Alliance (BPIA) outline the current status of biological products in agriculture, and how they are being used to protect and enhance crops while presenting little or no risk to human health and the natural environment.

Many sources, including the United Nations, are projecting the world’s population to surpass nine billion people by the year 2050. This is expected to drive food demand to unprecedented levels with the potential for food scarcity in many areas of the globe. In addition to the population issue, there is a growing recognition that food production needs to become more sustainable with less of an impact on the environment and fewer potential human health consequences. This combination of complex challenges presents a very real problem. Biological products are uniquely positioned to be part of the solution by protecting crops from pest threats as well as increasing crop quality and yield while presenting little or no risk to human health and the natural environment.

Biological products include both biopesticides and biostimulants. Biopesticides are biochemicals, plant extracts, semiochemicals, microbials, bacteria, fungi, viruses, and microorganisms such as predatory insects, mites and beneficial nematodes. Biostimulants currently encompass a diverse range of products including amino acids, microbials, organic acids and seaweed extracts.

“The global biopesticide market was valued at $3.8 billion in 2017 and is growing at a consolidated annual growth rate (CAGR) in excess of 16%,” according to Manel Cervera Comabella, International Business Director with DunhamTrimmer. “The global biostimulant market was valued at $2.2 billion in 2017 with a CAGR of 13%. By 2025, the combined global value of the biopesticides and biostimulants is projected to exceed $15 billion.”

Microbials make up approximately 55% of the biopesticides market with bacterial based products being the dominant type. Biochemicals represent about 35% of the biopesticides market with microorganisms being the balance. Microbials are growing faster with a CAGR in excess of 17%. In the biostimulant sector, seaweed extracts are the largest (40%) followed by amino acids (30%), then organic acids (20%) with the balance being microbials. Microbials are also growing fastest in biostimulants with a CAGR of 15%.

“The United States and Europe represent 2/3 of the global biologicals market with 32% of the market each,” said Comabella. “Latin America is the fastest growing region for biopesticides, expected to become 20% of the market by 2025. This is because the climate in Latin America is particularly well suited for the use of biological products.”

There are a variety of target crops and uses for biological products, ranging from pre-harvest pest control on strawberries to post-harvest sprout control on potatoes. Biological products can help the crop naturally fend off threats of insects and disease. Biological crop enhancement products, sometimes referred to as plant growth regulators, utilize naturally occurring bacteria to increase yield and marketability of crops. Plant biostimulants contain substances or micro-organisms to stimulate natural processes to enhance and benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, and crop quality. Biological larvicides and adulticides can even protect public health by controlling mosquito populations that can carry diseases such as Dengue, Zika and West Nile Virus.

In addition to increased crop quality and yield, biological products offer a variety of benefits. Biological products can help maintain beneficial insects including natural predator populations in the field. Most biological controls have short restricted entry and pre-harvest intervals allowing workers to get back into the fields after product application without any health risk. Plant growth regulators can aid in timing the crop harvest and in managing the ripening process.

When used as components of Integrated Pest Management (IPM) programs, combining biological and synthetic practices, biologicals can greatly aid in resistance management. Pest resistance to conventional chemical pesticides is a significant grower and industry concern. Scientific research has repeatedly demonstrated that continuous use of the same class of pesticides, especially those reliant on a single mode of action, will result in the emergence of a pest population resistant to those products.

Populations of insect pests, plant pathogens and weeds all have the ability to develop resistance quickly, even to different types of functionally similar chemistries. This phenomenon is called cross-resistance and is caused by multi-chemistry detoxification mechanisms present in many pest populations. As new classes of low-impact chemistries continue to be introduced to commercial growers and educators, the challenge of resistance management must be met proactively through thoughtful use of diverse product choices for season-long pest control programs.

Biopesticides have long been used in combination with synthetic chemistries to provide the basis for excellent control programs that effectively manage resistance. “Biopesticides typically have modes of
action that are unique from synthetic pesticides and do not rely on a single target site for efficacy,” said Jennifer Lilly, Biologicals Product Registration Manager for BASF. “The naturally occurring soil bacterium Bacillus subtilis, for example, has multiple active components including antagonistic properties affecting pathogens and positive effects on the plant itself. Properly used, biocontrols have the potential to extend the effective field life of all products by curtailing the development of resistant pest populations.”

Currently, biological products represent approximately just 5% of the total global crop protection market in agriculture. That means conventional products still represent about 95% of the total global crop protection market, but the use of biological products increases every year as more biological products become available and growers become more familiar with them and their unique benefits. New biological products can take three to five years from discovery to commercial use and can cost as much as 10 to 15 million dollars to develop. By contrast, new synthetic pesticides can take twelve to eighteen years from discovery to commercial use and can cost as much as 100 to 300 million dollars to develop.

Thus far, biological products have found their greatest acceptance with fruit and vegetable growers where biological product use represents about 17% of those markets and continues to increase annually. Nevertheless, biological products are finding increased use and acceptance in all aspects of commercial agriculture as well as in forestry, greenhouses, home gardens, horticulture, ornamentals, public health and turf markets.

“The biggest challenges for biological products continue to be awareness and understanding of what these products are, how they work, and their benefits,” said Karen Warkentien, Director of Regulatory Affairs for Certis, USA. “There are still misperceptions regarding the effectiveness of biological products. However, there are now years of data for well-established products that can demonstrate their efficacy without question.”

There is also a misconception that biological products cost more per acre to use than conventional products. “That is not accurate when you factor in the dollar value of the unique benefits of biological products such as residue management, worker safety, exemptions from tolerances, and the very real cost savings that result from these benefits that are not found with conventional products,” said Warkentien.

Despite any challenges, around $2 billion is spent on biostimulants each year around the world. By 2021, the biostimulant market is expected to reach $3 Billion per year. The market for biopesticides is more established and larger than biostimulants and has already reached $3 Billion annually. The biopesticides market is predicted to reach $5 Billion by the year 2021. Clearly, the market for biological products will continue to grow as there is greater appreciation for the ability of biopesticides and biostimulants to help feed a growing global population in a truly sustainable way.

This article was written by the Biological Products Industry Alliance (BPIA). BPIA is the premier organization dedicated to fostering the use of biological technology including biopesticides and biostimulants. BPIA is a rapidly growing association with over 130 member companies ranging from small, innovative sole proprietors to large, international companies. BPIA members provide solutions that benefit growers, consumers, and the environment. For more information visit www.bpia.org
Improving the efficacy of biopesticides through novel formulation?

Dr David Calvert, Co-founder and Director of iFormulate, explains how formulation techniques are being used to improve the stability, utility and efficacy of biopesticides.

Biopesticides are usually defined as belonging to four classes: microorganisms (bacteria, fungi, viruses), macroorganisms (predators, parasites, nematodes), biochemical or botanical extracts and ‘others’ (e.g. pheromones). Sometimes regarded as a separate sector, there are also biostimulants and plant growth regulators (PGRs).

In all of these categories (perhaps with the exception of macroorganisms) formulation is often cited as a key enabler in helping improve efficacy. It has been said that a formulation can make or break a biopesticide. As the co-founder of a formulation consultancy, this should be music to my ears, although I do question the implied view that biopesticides are so very different to conventional chemical entities. In fact, there are commercial signs that the worlds of conventional and biopesticides are converging.

Headquartered in Israel, STK’s most well-known product is Timorex Gold, a biofungicide based on a plant extract (Melaleuca alternifolia, often called Tea Tree Oil [TTO]). The company’s most recent product innovation is REGEV, a dual action fungicide with two distinct Fungicide Resistance Action Codes (FRACs). The two fungicides are TTO and difenoconazole. The patent also makes claims for TTO with a large number of fungicides, and hence REGEV could be the first of many new mixtures. Seed treatments are also an area where biopesticides and conventional pesticides are being formulated together to deliver improved performance. Poncho/VOTiVO – now marketed and sold by BASF – combines the insecticide clothianidin with Bacillus firmus I-1582 in a seed treatment. Clothianidin is absorbed by the roots while the Bacillus forms a barrier around the seed which, it is claimed, protects against up to two generations of pathogenic nematodes.

In these two examples, it is clear that formulation techniques are used to make the active ingredients compatible. However, to make a product suitable for sale it must be stable, both in-can and for sufficient time in the field. This has often been cited as an issue for biopesticides, in particular their UV resistance. So, can this be resolved by formulation science?

In 2016 researchers in Canada encapsulated Bacillus thuringiensis (Bt) spores using a technique called Pickering emulsions. The resulting formulations performed better than conventional Bt formulations and was comparable to lambda-cyhalothrin. Interestingly, the materials used were acrylic particles, sunflower oil, iron oxide nanoparticles, ethanol and water, so were relatively innocuous and did not impact the biopesticide’s benign profile.

Similarly, Behle et al in 2010 improved the UV resistance of Beauveria bassiana by the use of feruloylated soy glycercides (FSG), which were subsequently encapsulated in starch. The authors also used soluble lignin as a potential spray tank adjuvant to protect against UV. In both cases, the use of environmentally friendly components did not impinge on the benign profile of biopesticides.

Formulations should also enable an active ingredient to be applied safely and effectively. This is perhaps an area in which there is most progress to be made with biopesticides.

Quite often, it is cited on product labels that biopesticides need to be re-applied frequently and that they should not be applied if rain is to be expected within a certain short timeframe. Whilst this is not uncommon for conventional pesticides, the incorporation of adjuvants such as stickers both in-can and in the spray tank is often a solution to improve rainfastness. I am sure that a number of these are being tried by biopesticide companies, but there should be more mileage and obvious success in this approach. If the existing adjuvants do not bring the desired performance improvement or do not have the required safety profile, then surely this opens opportunities for adjuvant suppliers – perhaps we will have a new category of ‘bio-adjuvants’.

In summary, formulation can be highly significant. Biopesticides are certainly on the up, supported by broad perceptions that they are much better than “nasty” chemical pesticides. Markets and Markets reported global sales of biopesticides of around US$3.0 billion in 2018, growing to US$ 6.4 billion in 2023. This is clearly good growth but, as the total global pesticide market was US$65 billion in 2017 and is growing at 7% CAGR (BCC Research), there is clearly scope for further market share. However, for biocontrol products to continue their growth, the sector needs more than good formulators. They also need to be adopted into new smart farming practices, and to be defined not just by industry associations but also by regulators.

You can meet David and hear him expand on some of the formulation approaches highlighted in this article at the inaugural Biopesticide Summit in Swansea, UK, on 2–3 July.

References

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Biological products in agriculture


During the past 10,000 years, humans have selected about 10 species of animals and 20 species of plants that provide about 90% of our food. This handbook of plant and animal resources has provided us with global game changers but, as concerns for global food security grow alongside an expanding global population, biological products in agriculture provide an excellent opportunity for enhancing productivity while minimizing ecological footprint and increasing our resilience to climate change. Biologicals are broadly categorized as biostimulants and biopesticides, which are applied to plants, seeds and the rhizosphere.

While definitions of different categories of biologicals are still evolving, the markets for biologicals as agricultural inputs are growing fast. Environmental concerns posed by synthetic chemical products, growth of the organic food industry, and rising demands worldwide for foods free of chemical residues are all driving the market growth of biologicals in the agriculture sector. Double digit growth is projected across North America, Europe and the Asia Pacific. Various market studies indicate that the biostimulants market will account for $2.6 billion share in about 20-30 years if the projected market growth continues. Furthermore, it is expected that advances in science and the application of next generation biotechnologies, omics and new technologies including nanoscience will contribute to elucidating the modes and mechanisms of action of biologicals helping to further expand their use and market share.

We have a huge untapped microbial resource: it is estimated that at least half of the living biomass on the planet is microbial and probably less than 0.1% has been characterized. Information on full genomes of microbes in the soil microbiome would enable discovery of agriculturally important novel biologicals. Long-term vision, world class innovation, entrepreneurship, enhanced public and private funding support and global partnerships across government, industry and academia are needed to explore the vast microbial diversity and identify potential game changers for sustainably increasing crop productivity and controlling the plant pests and diseases. Fortunately, we are living in the era of big data, robotic autonomous systems, analytics, bioinformatics, satellites, internet of things, artificial intelligence, omics technologies, whole genome sequencing and nanotechnology – all the key enablers required for successful development, production and wide adoption of biologicals in sustainable agriculture.

One of the most important priorities this century is food security – now and in the future. Biologicals may be integral components of a system that allows agriculture without compromising our ecosystems.

You can hear Shashi Sharma discuss the need and challenges of biological products in agriculture at the inaugural Biopesticide Summit in Swansea, UK, on 2–3 July.

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www.chemicalsknowledgehub.com

June/July 2019
Greener, safer ingredients for crop care

Emmanuel Peulens, Green Chemical Users Director at Minafin Group, the global fine chemicals developer and manufacturer, talks about the Group’s diversification into bio-based ingredients for the crop care industry.

Earlier this year, Minafin launched Minagro, a new business unit that targets green and safer ingredients for the crop care industry. Originally dedicated to scale-up of active pharmaceutical ingredients (APIs) under clinical testing, this is Minafin’s latest diversification into new markets such as personal care, agricultural and high-value industrial fine chemicals. We spoke to Emmanuel Peulens, Green Chemical Users Director, to discover the rationale for the development of this new business unit and the company’s mission to provide greener and safer ingredients to the crop care industry.

Q: Until fairly recently, Minafin was associated with the pharmaceutical industry. What triggered the diversification?

Minafin’s fine chemicals expertise is well known in the pharmaceutical market through its Minakem business unit. While pharma activities represent today around 50% of the turnover, the group is also developing and manufacturing products for other markets such as personal care, specialty chemicals and polymers. This additional diversification allows us to enlarge our market offering by providing the crop care industry with safer ingredients and sustainable solutions which are in increasing demand.

Q: The new business unit, Minagro, focuses on green ingredients for the crop care industry. What is the rationale for this particular diversification, and why now?

The crop care industry is increasingly favouring safer and naturally-sourced ingredients. This trend is mainly driven by tighter regulations on traditional chemical ingredients and by growing end-user demand for developing sustainable solutions.

We are convinced that we can support this market trend with the development of a co-formulants range based mainly on renewably sourced raw materials. We will also offer a line of biostimulant active substances based on plant extracts. With this portfolio, we believe we can offer customers sustainable co-formulant alternatives for their final products.

Q: What experience does the Group have in this field?

Minafin Group has an established network of customers in the field of agrochemicals through its business unit Pennakem which for more than 30 years has been developing and commercializing products based on renewable chemistries such as derivatives of furfural.

Q: What products and services will Minagro offer?

Minagro will offer co-formulants, adjuvants, biostimulant active ingredients and preservation packs based on renewable chemistries. These products will be promoted by strong application support and microbiology competencies provided by our experts.

Q: How do you see these sectors growing over the next 5 years, and what is Minagro’s strategy to maximize on potential opportunities?

The crop care market is growing steadily and evolving to respond to the increasing requirements of sustainable agriculture, food quality and efficient supply. Minagro’s strategy is to develop specific product offerings and to establish close links with our partners allowing us to address growing market opportunities.

Q: Is there anything else you’d like to share with our readers?

Minagro’s laboratories, commercial and administration offices are located in Louvain-la-Neuve close to Brussels, Belgium. Our team would be glad to discuss in detail our potential support for new customer developments.

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Biopesticides: the future of regulation

The experts at Envigo explain how regulatory agencies in the US and Europe are approaching biopesticides, and discuss current challenges in improving access to innovative green technologies.

There is no universally accepted definition of a biopesticide, but, essentially, it is a substance derived from nature that may be formulated and used like a conventional pesticide. Biopesticides, compared with conventional chemicals, are inherently less toxic, are well targeted to specific pests, have faster rates of decomposition and occur naturally. Despite this, they are usually regulated in the same way as conventional pesticides, which creates an unnecessarily high barrier to approval and a huge burden on the small and medium-sized enterprises that are the current main innovators in biopesticides.

Biopesticide regulation

Although both the US Environmental Protection Agency (EPA) and EU are committed to encouraging biopesticide development, the EU system is currently lagging behind.

- EPA: as of 25 July 2018, 366 biochemical and microbial biopesticide active substances were approved.⁰¹
- EU: by March 2018, 13 active substances had been approved as low-risk pesticides.⁰²

Data requirements to register a biopesticide are much lower than for a conventional pesticide in the USA, because the EPA accepts that biopesticides are inherently less toxic. While the EPA still requires specific information on the composition, toxicity, degradation and other characteristics of the biopesticide and runs rigorous reviews on the data, registration is faster than for conventional pesticides, taking, on average, less than a year, compared with over three years. In comparison, in the EU, biopesticides are regulated under the same regulation as conventional plant protection products (PPPs) — Regulation (EC) 1107/2009,³ which does not differentiate biopesticides as a separate group. Although specific data requirements for microorganisms exist, only guidance is provided for botanicals and semiochemicals. In 2017, Regulation (EC) 2017/1432⁴ amended Regulation 1107/2009 to recognise low-risk substances — a category into which most biopesticides are likely to fall. This differentiated requirements for high- and low-risk substances and PPPs, clarified toxicological criteria for botanicals and semiochemicals, and added additional ecotoxicological endpoints.

The amendments were designed to enable faster evaluation of low-risk substances than conventional active substances (120 days versus 12 months) and a longer approval period (15 years versus 10 years). However, although the amended regulation enables the recognition of low-risk substances, it still assumes that all active substances are high risk, unless proven otherwise, and places the burden for proving a substance is low risk on the registrant.

Regulation 1107/2009 is currently going through review as part of the European Commission’s REFIT (Regulatory FITness and performance) program. Although evaluation will be finalized in 2019,⁵ full revision may take substantially longer. To date, there appears to be little focus on biopesticides.

Issues with the EU’s regulation of biopesticides

The ‘chemical-oriented’ approach is a barrier to the approval of low-risk biopesticides, and this has multiple implications:

- Small-to-medium enterprises — currently the main innovators and producers of biopesticides — may not have the capability or resource to drive dossiers through this regulatory system
- It unduly impacts organic farmers, who rely on biological pest control solutions, as innovative green solutions are delayed from reaching the market
- It limits the EU’s ability to comply with its own sustainable use of pesticides directive, which calls for the production of safe food with minimal environmental impact
- It inhibits the competitiveness of European farmers and agrochemical producers compared with those in the rest of the world.

Finding a way forward

In 2017, the UN Food and Agriculture Organization (FAO) and World Health Organization (WHO) produced guidelines for the registration of microbial, botanical and semiochemical pest control agents for plant protection and public health uses. The goal was to provide a framework of practical guidance to facilitate best practice in biopesticide registration, with a focus on data requirements and evaluation approaches that still ensure appropriate protection of human and animal health and the environment.⁶ With approximately half of all EU pesticide submissions being for biopesticides or bioprotection technologies,⁷ there is a pressing need to revise the regulatory framework to make it fit for biopesticides, in order to improve access to innovative green technologies.

References

1. EPA. Biopesticide Active Ingredients. 2018.
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Natural-based lubricants offer high-performance and sustainability for PVC processing

Dr Sascha Simon, Head of Technical Development – Green Polymer Additives at Emery Oleochemicals, explains how bio-based plastic additives are helping industries to achieve sustainability objectives.

The demand for smart solutions in the building and construction, food packaging, and automotive industries continues to increase. One important thermoplastic material that has the versatility to function in a variety of applications is polyvinyl chloride (PVC). Typically, the term “sustainable” or “renewable” does not appear in conjunction with PVC when polymers based on lactic acid (polylactic acid — PLA) or starch are used. However, the raw material source might not be the sole criterion when considering the sustainability of different polymers.

PVC has a particularly key role in the building and construction industry. Based on its annual production volume, PVC is the dominant polymer followed by polystyrene (PS) or polyethylene (PE). In this industry, most applications like floorings, sidings or technical profiles, have a working life of 15 years or more. After that, these end products can be sorted, ground and recycled.

Choosing the proper additives

The nature of PVC can be manipulated by the use of additives. With the foresight that availability of petrochemicals could be limited in the future, Emery Oleochemicals began the development of bio-based additives in the 1950s. The company has since developed a broad product portfolio targeting factors such as improving the properties of materials or facilitating processing. Today, ongoing developments are directed toward the replacement of petrochemical-based additives with natural-based lubricants for a variety of plastic applications.

Recently, Emery Oleochemicals introduced bio-alternatives to hydrocarbons based on natural oils and fats. These paraffins and Fischer-Tropsch waxes serve as external lubricants in PVC processing. The aim is to have a lubricating film between the hot metal surface in the extruder and the sticking polymer melt, allowing for smooth transportation of the thermoplastic PVC and reducing the melt pressure at the nozzle. The effect was studied in a test formulation shown in the top section of Table 1. All components were mixed on phr-level (parts per 100 resin) typically used in the PVC industry. In a CaZn stabilized formulation, which included a small amount of filler (chalk), a typical paraffin wax was compared with Emery Oleochemicals’ 100% renewable ester wax, commercially known as LOXIOL G 24. On the extruder, the torque level of the equipment and the melt pressure at two zones was monitored. The torque level indicates if a lubricant works as an internal or external lubricant during processing and how much energy is needed for the fusion and transportation. Melt pressure 1 was measured close to the vacuum zone, while pressure 2 was detected at the nozzle. As outlined in the Table, both materials showed similar behaviours during processing. This provides a processor with the opportunity to use a natural-based product as a 1:1 alternative to a conventional petrochemical additive.

Montan waxes are a by-product from lignite harvesting. The process to obtain the source material requires many steps including chromic acid bleaching. Since availability is highly dependent on the lignite layer, and because hazardous chemicals are necessary to purify it, price fluctuations in the market were common. The need to find an alternative to montan waxes has become prominent in recent years. Emery’s goal was to duplicate the performance of montan waxes using more sustainable options to process PVC, but the research not only revealed that natural-based alternatives show comparable performance to fossil-based additives for PVC processing – natural-based products can also deliver advantages in availability and handling. The synthesis started from natural fatty acids combined with polyols to build up ester structures capable of mimicking the effect of lignite-based counterparts. Various solutions with different composition tailored for the individual applications were introduced. These natural-based alternatives are being used today in the packaging segment to produce highly transparent films for pharmaceuticals and in boxes for electronics.

What’s next?

Substitution of petrochemicals with natural-based solutions will help industries to achieve sustainability objectives. Ester chemistry using natural fats and oils, and the pure fatty acids gained from them, provide ideal raw materials to produce tailored solutions.

By making use of natural raw materials which will still be available 100 years from now, and by creating tailored solutions for a specific polymer application, bio-based plastic additives are now recognised as more than a passing trend. Emery Oleochemicals continues to offer the market high-performance, natural-based solutions which are founded by over 60 years of technical expertise and plastics industry knowledge.

Table 1. Comparison of a petrochemical with a bio-based wax.

<table>
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<tr>
<td>Melt pressure II (bar)</td>
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Adding value with sustainable solutions

We speak to Torsten Schmidt, Vice President, Marketing, Chemical Segment at Kraton Corporation, about the expanding market for sustainable solutions to the high-growth coatings industry.

Q: Let’s start with why demand for sustainable solutions is growing. What’s ‘wrong’ with conventional coatings?
Conventional coatings are typically made from non-renewable materials. This isn’t sustainable because eventually sources of these materials will run out, and both the creation and disposal of products using these materials can harm the environment. These concerns have led regulators around the world to impose legislations on the usage of those raw materials, fostering their replacement with more sustainable solutions that reduce environmental impact.

Q: How do bio-based alternatives address these problems?
Solutions from renewable sources can help to meet sustainability demands from consumers and regulatory bodies. Our pine chemicals score high on sustainability because the raw material is a sidestream of another industrial process, does not compete with food crops, is not genetically modified, nor does it require new agricultural land. Instead, it originates from forests where pine woods are grown and harvested for the paper industry; and this sidestream of the pulp and paper industry is used as a raw material for biobased chemicals. This is resource efficiency in its highest form. Every part of the tree is used in the most efficient way to the highest value.

Q: What pine chemicals are used for bio-based coatings, and how are they extracted?
Our tall oil fatty acids (TOFA) are used in biobased coatings. To create TOFA, black liquor soap is taken from the Kraft pulp process and converted into crude tall oil (CTO). Our biorefineries distill CTO and extract high value added fractions from it. These fractions include TOFA as well as tall oil rosin, distilled tall oil and tall oil pitch. They are further refined and upgraded into biobased specialty chemicals at our biorefineries to enable superior performance. Beyond offering greater sustainability, it’s important that biobased materials should offer good performance attributes.

The use of fatty acids in alkyd binder coatings system is not new, so introducing TOFA into the formulation process is not disruptive. Instead, it enables customers to enhance some of their product features while reducing their environmental impact.

Q: What other applications can pine-derived chemicals be used for?
Pine-derived specialty chemicals can enable better performance in a range of consumer and industrial applications including adhesives, fuel additives, inks, mining, lubricants, oilfield chemicals, asphalt roads and tyres.

Q: At the ECS 2019, you launched a new TOFA for coating applications. Can you tell us more about that?
The SYLFAT Exp TOFA is our latest product designed for architectural coatings. It offers key features of our SYLFAT product family along with low initial colour and improved yellowing-in-the-dark performance. These benefits enable light colour and colour stability as well as enhanced high gloss, and scratch and corrosion resistance. The 100% biobased product offers significantly lower carbon footprint compared to other known vegetable oil-based substitutes.

Q: Do you have any other products in the pipeline?
Based on our customers and ever-changing market needs, Kraton continuously searches for new product development opportunities to address those demands. Currently, we are developing pine-based products with improved odour, colour stability and purity.

Q: How do you expect the coatings market to develop?
We believe that biobased solutions will eventually be the standard product of choice, not an alternative option. How long that will take depends on the pace of regulations and the quality that can be achieved in the different segments of the coatings industry. A first step is increasing the awareness of sustainable products already available in the market. Value chain customers need to be informed about the choices they have for more sustainable products. Thus, Kraton launched an animated video at ECS 2019 to explain the sustainable aspects of our SYLFAT TOFA offering for the coatings market.

Q: How should companies in the coatings sector prepare for these changes/developments?
Formulators need to monitor and anticipate regulatory changes that might impact their business. If they are currently using only hydrocarbon-based materials, they should start looking into alternative sustainable solutions and the tools or technology to support those materials. Stay updated on consumer demands in key markets, as their expectations will drive pressure upstream to formulators and manufacturers. Formulators will need to work with their raw materials suppliers to understand the sustainable options available to them.

Interview with:
Torsten Schmidt, Vice President, Marketing, Chemical Segment at Kraton Corporation, a producer of styrenic block copolymers, specialty polymers and high-value performance products derived from pine wood pulping co-products that is headquartered in Houston, Texas, USA. www.kraton.com

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Digitalization in speciality chemicals: The strategic imperative

Paige Marie Morse, Industry Director at AspenTech, explains how speciality chemicals manufacturers are looking to emerging digital technologies to help manage operational complexities and optimize production.

Specialty chemicals producers are under intense pressure. They need to be more innovative in product development. They need to manage operational complexity while delivering the variety and volume of products customers demand. And they need to maintain their assets more efficiently. It is a tough ask and, in seeking to address it, producers increasingly look to emerging digital technologies.

The Executive board chairman at Evonik, Christian Kullmann, says, “For us as a specialty chemicals company, digitalization brings with it a world of possibilities.”

The diversified chemicals major Dow added Chief Digital Officer (CDO) to its Chief Information Officer (CIO) title last year to reinforce the company’s emphasis on digital tools. At Fortune’s 2018 Brainstorm Reinvent conference, CDO and CIO Melanie Kalmar commented “Many companies have failed because they looked at digital as an add-on to what they do already … as a new tool. The reality is that you have to step back, simplify, and rethink how you execute your work on a day to day basis.” The value of using digital tools, she asserted, is to be more agile and to become closer to customers.

Better alignment with customers is one of three key emerging priorities in specialty chemicals — along with accelerating innovation and optimizing across the value chain — that digital technologies can help organizations address.

Aligning with customer demands

Models of manufacturing assets can be used to automate identification and evaluation of production scenarios across various timeframes. These models represent the full complexity and options possible, including production rates, constraints, set-up times, sequencing and site logistics. Specialty companies cite an 8–12% increase in on-time order fulfillment when these tools are applied.

Meeting customer needs includes ensuring that assets operate well and produce the targeted products. Multivariate tools can analyze interrelated operational data to identify and eliminate sources of process variability. Businesses apply this analysis to batch and continuous processes to ensure more production meets specification.

Innovation

Specialty chemicals manufacturers are continually looking to innovate and enhance product performance at lower cost. Digital technologies can boost productivity and reduce errors by easing the transition from laboratory to plant production processes.

Manual procedures, hand-written reports and paper-based systems are still common for critical activities such as recipe execution and raw material management. These isolated tools limit visibility into data and often delay responses to potential quality issues and regulatory requirements. Through digitalization, companies can achieve visibility of key data that, in turn, enables them to gain the necessary insight to drive improvements in quality and consistency.

Value chain

Rapidly-changing market and customer demands force frequent changes in production schedules. Adjustments as high as 25–45% each month are not uncommon. Planning and scheduling tools can help boost responsiveness and related profitability by incorporating key constraints — such as storage limitations and variable lead times — while minimizing excess inventory and off-spec production. Better scheduling capabilities can also boost asset utilization. At the same time, schedulers can see the impact of their decisions and make adjustments to avoid problems along the supply chain before they happen.

With targeted plant scheduling tools, the scheduler can rely on the model to inform decisions such as batch size determination, resource selection and batch sequencing. The technology enables better asset utilization and improved customer service by clarifying profit opportunities and extra costs in less than optimal operations.

The next step is vertical integration, which links manufacturing systems to scheduling. These systems can give visibility to storage tank levels, for example, so scheduling tools can decide when raw materials should be put in tanks and when they should be emptied. This link can also alert the scheduler if processes are taking longer than expected, allowing for adjustments across the plan.

Specialty-producer Criterion Catalyst & Technologies applied Aspen Plant Scheduler to its sales and operations planning process. Legacy tools provided less than three months visibility on asset availability, even as sales staff could not gain customer requirements in less than a six-month window. The redesigned scheduling process helped to better align customer demand timing with plant scheduling across 21 production lines at eight manufacturing sites.¹

Benefiting from digital acceleration

Digital technologies allow specialty chemicals producers to address key market drivers such as accelerating innovation, optimizing the value chain and aligning with customer demands, effectively giving them a route map to future success.

The tools, services and solutions specialty chemicals producers need to manage their complex operations and achieve new levels of reliability and profitability are accessible to companies now. To take advantage of the opportunity, producers must first consider their primary business challenge and identify the relevant digital solution to adopt. That will set them on a path toward a more holistic approach to achieving optimum return over the asset lifecycle.

Reference

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Rakem was recently recognised in the UK’s ‘Parliamentary Review’, a highly respected guide to industry best practice, which demonstrates how sector leaders have responded to challenges in the political and economic environment.

From humble beginnings

In 1996, Rakem was founded by Francis Rafferty and operated from a small office in Bolton (near Manchester, UK). Today, Rakem is part of the Rakem Group, operating across a multimillion-pound site in the neighbouring town of Bury.

Rakem specializes in supplying raw materials such as titanium dioxide (TiO₂), clay and polymers into the coatings industry. A wide and diverse portfolio covers a variety of industries including adhesives, environmental, construction, plastics, pharmaceuticals and paper.

Over the last 25 years Rakem’s reputation has grown within the chemical industry. Today the company is headed up by Francis’ three sons: Kevin, Eugene and Kieran. The company has always prided itself on its family business ethos and strives to treat all customers, suppliers and staff equally. Known for world class leading pigments, Rakem aims to be the UK’s number one supplier of raw materials into the coatings industry.

Can you imagine a world without pigment?

Day to day, we use objects and often have no idea how they have been made. Many people do not realise how common TiO₂ is in everyday items. From sun cream to paracetamol, to paints and plastics – if it is white or opaque, there is a high chance it contains TiO₂.

At Rakem, TiO₂ is the number one selling pigment. It is used in the manufacturing of all paints, plastics and inks made in the UK. The company also has a range of products that complement the use of TiO₂ in formulations. The company has used TiO₂ to grow all of its current businesses, from the paints produced in Maker to the by-product being sold on to the construction industry by Cemkem.

Rakem diversifies

2011 saw the birth of a unique company, Maker Industrial. Specializing in toll manufacturing, Maker formulates and manufactures customer blends using Rakem’s raw materials, such TiO₂. Using Rakem’s raw materials ensures the highest quality pigments are used in a variety of water-based blends, and gives the manufacturer a competitive edge as the supply chain is shortened and secure.

Maker Industrial also manufactures Cemkem’s range of cementitious additives. Formed in 2016, Cemkem distributes the novel lithium carbonate replacement range of Lithkem. Currently the product is one of a kind and changing the way manufacturers of building products formulate their blends, not only reducing the cost of raw materials but giving cement-based products superior qualities and finishes.

Innovation

At the core of the Rakem Group is innovation, from distribution to manufacturing we value our innovative products, blends and raw materials.

The company has the ability to test its raw materials and customers’ products in house. This enables the quick and efficient testing of finished products. Customers are also invited to the labs and have the opportunity to test their own products to Rakem’s standards.

In 2017 Rakem began work on a multi-million-pound research and development facility. Three buildings house specialized labs for both liquid and powder testing.

People Matter

From a small team of just 12 to over 40 employees, in the last 18 months The Rakem Group has grown into a leading distributor and manufacturer in the North West. In November 2018, their success was recognised again, this time by their local Bury Council who presented them with the Outstanding Achievement Award. Constantly growing and looking at ways to expand, the Group aim to continue providing jobs for the local community.

Continuing to give back to their town the Group joined the local Corporate Challenge, starting with £50 with the aim to make as much money as possible. Through various events and challenges as a team they raised over £30,000 for Bury Hospice. Annually they sponsor the Pride of Bury awards and continue to support various sports teams locally.

The Future

Innovation and people are at the center of the Group’s values. Over the next 12 months they aim to become the number one distributor of raw materials and toll manufacturing services, providing additional jobs in the local area and solutions for customers nationwide.

Hydropak, the company’s newest division, will provide Private Label solutions, taking a customer’s idea on paper to a fully formulated product, branded and ready to become a market leader on shelves up and down the country.

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Credibility: how do we know if we have it?

Kathryn Sheridan, CEO and Founder of Sustainability Consult, highlights the importance of building trust and credibility when discussing a chemical company’s sustainability claims.

Consumers have high expectations around the sustainability of the products they buy, even if they might not have much knowledge of the ingredients that go into them. Only a very small fraction of consumers has the technical expertise combined with the necessary motivation to truly study and understand ingredient labels. On products like paints or household cleaning supplies, the label does not even show the ingredients. So at the end of the day, it comes down to the trust the consumer feels for the brand and the retailer selling the product.

We want to buy from brands we feel can trust. Trust them to do the right thing, to be a responsible business and to use the safest and most sustainable ingredients available. And yet, for those of us working in and with industry, making decisions on sustainability is rarely as straightforward as some may believe.

At Sustainability Consult, we’ve spent the last ten years working across the chemical and plastics industry to raise our clients’ visibility and credibility through sustainability communications. We’ve seen time and time again that to build trust, we need to first build credibility. That means genuine commitment and communications – and no greenwashing.

Sustainability can be complicated

I’ve spent nearly two decades working in sustainability so I have seen first-hand how complex it can be at times. Imagine a cosmetics company that decides to shift an ingredient from petroleum-based to bio-based in a bid to be more sustainable. This sounds like something consumers and other stakeholders would appreciate. But then a life cycle assessment (LCA) might show this could disrupt biodiversity through land use change, whilst potentially generating more greenhouse gases. What at first seems to be “more sustainable” may not always be the most obvious option. As well as weighing up a wide range of sustainability factors, careful messaging and communications are also needed.

Imagine the potential reputation damage that can be done to a company which is positioned as a leader in sustainability if it is subsequently found to have practices which are less than decent. The consumer’s trust would be broken which would severely affect their credibility and market position.

New tool looks at the company behind the claims

In response to these challenges, we have launched the Credibility Audit to expose vulnerabilities in a company’s reputation – and also to highlight what’s going well.

A standardized stress test, the Audit looks at the company behind the claims as well as the claims themselves by analysing a company’s internal and external communications, its sustainability policies and...
Credibility Audit Q&A

What is the Credibility Audit?
The Credibility Audit assesses the credibility of the claims which companies make. It highlights strengths and exposes vulnerabilities in the company’s reputation. It makes recommendations on how to approach and communicate the challenges.

Who is it for?
The Credibility Audit is for any organization wanting to stress test the credibility of its profile, its claims and its story.

What is the outcome of the audit?
The company being audited receives a score based on the standardized questionnaire and an in-depth report. The report identifies strengths and weaknesses and provides tailored recommendations on how to navigate and communicate on any challenges.

Is there a score or a ranking?
The company receives a score from the Audit, followed by tailored recommendations. If we benchmark a company against others, we can provide a ranking based on the Audit results.

Is there a stamp or a label?
Companies that have been through the Credibility Audit and that wish to publish their score are provided with a logo to use. (This is a consultancy process so any company’s score would only be made public with their agreement.)

What happens after the audit?
The Credibility Audit can be repeated at a later date as a way to measure and report on progress. Credibility consulting is tailored and may include business strategy, internal communications, marketing, behaviour change, advocacy, supply chain or stakeholder engagement.

What input do companies need to provide?
The standardized part of the Credibility Audit uses information which is available in the public domain, e.g. company website, marketing tools, press releases, media coverage. This allows us to audit other companies for benchmarking purposes.

How is this audit different from the communications audit or credibility check previously offered by Sustainability Consult?
The Credibility Audit goes deeper than anything we offered in the past. It takes the whole business into account, not just the communications. It builds on our experience of using credible communications to make change and have an impact.

Strengthening credibility in the chemicals sector
The Credibility Audit helps demonstrate to a company’s employees and other stakeholders that they are as credible as they claim or that there is work to do. This helps build trust within and outside the company. Knowing that a company’s actions are in line with its corporate values is extremely important to employees, especially to younger generations.

The Audit supports both sustainability and communications directors by demonstrating to management what is needed to achieve a more credible and visible business. The results also serve to create a discussion between management and shareholders to prioritize the investments and actions that are needed.

As the chemical sector continues to adapt to new regulations while navigating its way through major societal challenges like climate change, the Credibility Audit is an essential tool for companies who fear their claims might not stand up to scrutiny, or for those seeking a credible, independent confirmation that they do. Challenging and validating the company behind the claims will strengthen and improve the company’s reputation – and sales – in the long run.

Reference:

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Getting the most out of energy

Marcel Galjee, Energy Director at Nouryon, explains how the company is implementing an energy strategy to manage costs and limit the risk in fluctuating energy supplies, while at the same time reducing its emissions and growing the business.

Energy is typically a very large expenditure for a chemical company and so keeping costs down directly affects a company’s bottom line. Cost-effective solutions are those which can withstand the test of time and, in an energy environment where prices are influenced by market dynamics and policy makers, what is cheap today may turn out to be a risky bet tomorrow.

At Nouryon, salt, chlor-alkali, chlorine derivatives and pulp bleaching chemicals production activities all consume large amounts of energy. To produce high-purity salt for example, steam is used to remove water from brine. And for making chlorine, you need large amounts of electricity for the electrolysis reaction.

The company is therefore implementing an energy strategy to manage costs and limit the risk in fluctuating energy supplies, while at the same time reducing its emissions and growing the business. Key to that is increasing the usage of renewable electricity; currently, almost half of the company’s energy consumption is sourced from renewable sources, far more than most similarly energy-intensive companies.

Over the past 10 years, Nouryon has significantly reduced the use of natural gas at its operations by using more steam from waste and biomass. In 2019, it increased the use of bio-steam at its salt operations at the Chemical Park Delfzijl and at its Hengelo site, both located in the Netherlands. The additional steam supply has replaced the use of natural gas, making the production at the sites more sustainable and reducing CO₂ emissions. In Delfzijl the company now emits 300,000 tons less CO₂ per year than in 2013, while in Hengelo the steam supply saves up to 80 million cubic meters of natural gas per year.

At Delfzijl the latest increase in bio-steam supply is produced by waste processing company EEW Energy from Waste, which has been supplying bio-steam to the chemical park since 2010. In 2017, the use of sustainably-produced steam was first increased when energy provider Eneco commissioned its converted combined heat and power (CHP) plant at Delfzijl, which provides both electricity and steam from renewable biomass. At Hengelo the bio-steam is supplied by Twence, also a waste processing company, and is based on the bio-content of the waste as well as waste wood.

Nouryon also set up a unique green energy purchasing consortium with DSM, Google and Philips, all of which consume a substantial amount of power in the Netherlands.

By working together the consortium negotiated and signed two long-term power purchase agreements that enabled the construction of two wind farm projects – Bouwdokken and Krammer. These wind farms came online in 2018 and 2019 respectively, and have a total capacity of over 140 MW, which is enough to power approximately 140,000 households.

The Rocky Mountain Institute’s (RMI) Business Renewables Center, a leading independent authority on sustainability, says the consortium is among the earliest examples of aggregated corporate demand successfully participating in clean energy markets worldwide. Nouryon is using the green energy chiefly to produce chlorine, caustic soda and ‘green’ hydrogen at its site in Rotterdam, the Netherlands.

Meanwhile, the company is also targeting energy optimization as part of its efforts under Industry 4.0, the name given to the trend of increased usage of automation and data usage in the manufacturing industry such as advanced analytics, artificial intelligence, robotics and the Internet of Things (IoT). In 2018 Nouryon implemented its ‘e-flex technology’ at its Rotterdam site. The new technology, which was developed in-house by employees from the site and the company’s energy and digital technology teams, allows automatic adjustment of chlorine production in line with electricity supply fluctuations. For example, production may be ramped up when there is a temporary oversupply on the grid, or limited at moments of energy scarcity (lack of wind or solar power).

While ‘e-flex’ provides Nouryon significant savings in energy costs, the flexibility – both in chemical production and electricity generation – will also help Transmission System Operators (TSO) to balance the grid. Today, we experience an increasing shift towards renewable energy globally, but nature is unpredictable. Only balancing with the generation-side of electricity is not enough any more, also the demand-side might might need to managed in accordance with energy supply fluctuations.

How does the e-flex technology work?

- **Step 1:** Large variation occurs in electricity generation from renewable energy sources such as wind and sun affecting the pricing on the short term electricity markets. To help balance the grid, energy providers want to reduce or increase the power consumption if needed.
- **Step 2:** The planner at the factory decides how much flexibility can be used for e-flexing purposes.
- **Step 3:** If an e-flex opportunity occurs and there is planned flexibility available, the plant will reduce or increase energy consumption through ramping down/up demand by automated steering on an individual cell level.
- **Step 4:** When the e-flex opportunity is over the plant returns to normal production.
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Raising the bar: an inspirational woman

Lynn Taylor, Senior Vice President, Head of Healthcare Global Government & Public Affairs at EMD Serono, Head of Corporate & Government Relations USA at Merck KGaA, Darmstadt, Germany, shares her views on women in science in the world today.

With more than 20 years of healthcare experience, and a passion for transformation and mentorship, Lynn Taylor is a senior leader and global corporate affairs executive at EMD Serono – the biopharmaceutical business of Merck KGaA, Darmstadt, Germany in the US and Canada. In addition, she maintains a civic presence serving as Chairman of the German American Business Council (GABC), Member Board of Directors of Healthy Women and member of the Board of Governors of the Bryce Harlow Foundation. We spoke to Lynn about her path to success, and her thoughts on the challenges facing women in science today.

Q: What were the best decisions that set you on the ‘right’ path? I aspired to be a leader and make an impact. I wanted to give back to society and be an advocate for those without a voice. It was those aspirations that led me to jumping on a bus to Washington, DC, without a job, but with big goals in mind. While there was no exact ‘roadmap’ that led me here, I always had the mentality of pushing boundaries and forging my own path. I wanted to raise the bar and take on new challenges. If I could overcome one obstacle, I knew I could overcome the next.

Q: Is mentorship an important component of professional development? Absolutely. I accredit my success thus far to those who have supported me. Great mentorship has the power to improve careers and lives overall. It’s not enough to climb the ladder, you need to bring others with you.

I also strongly believe in the need for ‘sponsorship’ or endorsement of individuals. It’s critical to sponsor others by lending your name (credibility and reputation) to help them advance within the company or externally.

Q: What has been your greatest accomplishment? Through my company and the mentors who believed in me, I’ve been entrusted to build a global function and lead a global team. I’m very proud to be part of impactful initiatives like Healthy Women, Healthy Economies, which aims to implement policies that advance women’s health to support their economic participation, and Embracing Carers, which recognises that caregivers are a critical element to the healthcare continuum and that caregiving disproportionately affects women. Being part of the creation of these movements is incredibly meaningful to me.

When it comes to personal accomplishments, when I was 35, single and devoted to my career, I thought a lot about having a family one day. But I understood that due to some health challenges my ability to have children could become increasingly difficult. I underwent treatment for oocyte cryopreservation (egg freezing) and years later, when the time was right, I went through multiple cycles of in vitro fertilization. I now have two amazing children with my husband and I’m thankful for the advancement in healthcare technology that allowed me to have a family.

Q: Have you faced any obstacles that were directly related to being a woman? I’ve experienced many challenges as my career ran in parallel with health obstacles and choices that I was only able to overcome through the support of my organization, family, friends and mentors. When I made the decision to freeze my eggs, I was a single woman who had to carry the weight of my responsibilities at work and manage this complicated procedure. It was hard on my body and my mental health, but it gave me the peace of mind to focus on my career and not worry about my ‘biological clock’. I was able to focus and rise in my workplace so that, when I met my husband years later, I was ready for the next stage of my life.

Q: What types of skills do women in the pharmaceutical industry need to develop? First, we need to do more than listen. If you’re in a position of leadership, it’s about more than your own ability to thrive. It’s about your entire team — and empowering them to have the flexibility to integrate work and family.

Second, use your voice — it has value. We can each be a very vocal advocate for things that demand change, especially if they stem from personal experiences. If your company has flaws, help fix them. Find allies, try to create momentum, and be soldiers for change.

Q: What advice would you give to young women aspiring to follow your path? Follow your passions, work hard for your dreams, and seek out mentors and sponsors that you can trust, while also being willing to mentor others. Trying to achieve career advancement and motherhood at the same time can be challenging but, with the right support and sense of tenacity, it’s achievable.

Interview with:
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June/July 2019
Young Women in Science

We speak to a panel of young women in science to discover how the STEM world has evolved, in terms of gender equality.

The Women in Science movement has made incredible in-roads into gender equality. Anyone working in STEM in the 1970s and 80s will recognise the huge changes that have taken place. When younger people are dismissive, it can be frustrating, but perhaps this is what we’ve been working towards… have we eliminated the gender gap? Sarah Harding, Editorial Director at Chemicals Knowledge, spoke to a collection of young women to find out what it’s like to work in science in the UK in the 21st century.

Where does it start?

Government efforts to promote engagement in STEM certainly paid off with our small sample! Young women in the 21st century find scientific inspiration at school.

“My high school science teachers and my college chemistry teacher were incredible,” says Charlotte Gronan, Technical Innovation Chemist at Stephenson. “She was crazy but the smartest woman I had ever met.”

Jordan Parker, QC Laboratory Manager at Stephenson, was also inspired by her teachers, saying “My high school chemistry teacher was brilliant. She challenged you to think about something from a different perspective and was great at helping you understand a different point of view.”

Lucy Stone, Research Communications and Marketing Manager at Cancer Research UK, started even earlier, saying “When I was ten, I had a great science teacher who showed us interesting experiments that made the textbooks come to life.”

Alice Davies, Technical Specialist at James Heal, admits that she didn’t discover her love of science until University, during which she had a 12-month placement as a laboratory assistant for an outdoor clothing retailer. “My manager there was a big inspiration,” she says. “Coming from a design degree, I was worried I wouldn’t be up to the technical demands of a lab-based position, but my manager was very supportive… She definitely inspired me to pursue a more technical career path.”

Elizabeth Hogg, PhD student at Cancer Research UK, Manchester Institute, also took a year in industry during her undergraduate degree. “I had a great supportive supervisor who spent a lot of time to teach me the world of industrial research,” she says. “I think my experience there inspired me to continue in science with more purpose.”

Perhaps most strikingly, these stories highlight the importance of great teachers and mentors in our lives.

“I don’t think I would be where I am today without mentorship,” says Lucy. “My previous boss [at Notch Communications] was a fantastic mentor. He trusted me and gave me a huge amount of responsibility and opportunity…. I think mentorship is important to show people what is possible.”

Emma Brown, PhD student at Cancer Research UK, Cambridge Institute, agrees. She says, “Mentorship is absolutely essential. I would not be where I am without the support of those with more experience.”

Gender neutrality in education

When my best friend studied engineering in the 1980s, she was 1 of 3 women in a class of 100. Statistics will tell you these ratios have improved, but I was curious to hear – first hand – how things had changed for young women in STEM further education.

According to Charlotte, “In my university lectures, there was an equal divide of male and female students and nobody was treated any differently.”

Jordan agreed, saying “Our classes and labs were pretty much a 50:50 split of women and men, so much so that when it came to graduation the ceremony included a speech on how many women were present and how great it was to see this in science.”

This is great news, but is equality sustained as the level of education rises? Sadly not.

“At an undergraduate/graduate student level, I would say that there is not much difference in the numbers of women and men,” declares Emma. “However, at higher positions, males still dominate. On the Department of Chemistry’s website at the University of Cambridge, there are 32 Professors under academic staff. As of April 2019, only 3 of these are women.”

Lucy agrees, saying “My cohort was fairly gender balanced. However, when you look at the chemistry department’s lecturers it is much less even. The Royal Society of Chemistry found some shocking results as the gender balance at undergraduate level is 44% female, but when you get to professor level it is only 9%.”

Continued on page 60…
Yes… so what about career progression?

Clearly, Lucy and Emma’s comments reveal that things are still not quite as they should be. I asked the panel if they felt that being a woman had ever affected their career progression. Already surrounded by other women at work, these high-achievers deny that they have been hindered, but they are not blind to the challenges out there.

“I don’t feel that it has made much of an impact for me,” says Alice. “Gender, race, sexuality etc should be irrelevant in any industry, but I don’t think we have reached that ideal yet. I count myself lucky not to have faced discrimination, but I know of people who have been less fortunate.”

Jordan agrees, adding “I can understand how frustrating it would be, to be turned down for a role you are equally or even sometimes more capable of. This possibly happens more often than we think.”

Emma adds, “I have never been halted in my career just for being a woman, but a lot of women choose not to progress because of family life etc. This means a lot of good talent is lost.”

“I don’t see a difference in how men and women in my peer group are viewed or treated,” says Elizabeth. “However, I see that the balance of men and women is not even as careers progress, especially in academia, which can be quite male dominated. I expect that in the future there will be a greater balance, but for this to realistically work the retention of women in senior roles needs to be addressed.”

Concerns for the future

It’s good to hear that our small sample doesn’t feel their careers have been affected so far, but what about the future? In fact, most of them are worried about balancing work and family if they decide to have children. (I don’t think we need to wonder how many young men would be even more worried about balancing work and family if they decide to have children.)

As Charlotte says, “This is a concern for me... the effects that taking maternity leave will have on my career progression and how time away could affect my position.”

Jordan also admits, “I recently married and am very aware that to have children, whilst this is something I would like in the future, there could be difficulties balancing a home and work life, especially having a husband who works seven days a week.”

Lucy also has concerns, saying, “Yes, I do think about this. I’m very ambitious and want to get to a senior position, but I’m also aware at some point I will want a family and it’s difficult to know how to balance that.”

“Being a woman in academic science is difficult because most women are still the primary caregiver. Fitting this kind of career in academia around family life is very difficult in a lot of cases,” says Emma.

Her concerns are echoed by Elizabeth, who says “I see that the academic workplace can be very challenging for parents to balance both family life and research in the fast-paced, competitive, work environment.”

Relating to previous generations

I asked our panel if they related to previous generations of women in science, who struggled for recognition, and was genuinely touched by their responses.

“THERE is so much admiration for the women in previous generations who had to fight to give my generation the chances we have now,” says Charlotte. “I would love to tell them that their persistence and strength has created incredible opportunities for women today.”

Jordan adds, “All the women who did not give up, it is because of them that I am where I am today, and I am extremely grateful.”

Alice also says, “I would like to say thank you. I feel grateful that they fought for the recognition they deserved because it has provided inspiration and helped to improve the situation for today’s generation.”

To conclude…

In summary, it seems safe to conclude that things are getting better. However, some areas still need a little work.

“There is a gender imbalance in research grants, as studies have shown that women are finding it more difficult to get funding for their research,” points out Lucy. She proudly mentions that her current employer, Cancer Research UK (the second-largest funder of cancer research in the world), is actively addressing this issue. “The organization has introduced a clear competency framework that focuses less on the number of consecutive years of experience, but rather on the researchers’ skills and achievements. This takes into account flexible research careers, such as part time working or career breaks,” she says.

But really, more than anything, women in any workplace need more support balancing work-life with their families. Like a big elephant in the room, we need to start discussing maternity and paternity leave, and how families — not just mothers — are going to manage the balance, allowing women to remain in work and reach the positions they deserve. When it is no longer assumed the responsibility of the mother to manage this balance, then perhaps we will be closer to equality than previous generations ever dreamed possible.

Thanks to…

Our panel of young women in science for their honesty and for their vibrant enthusiasm for science, and to previous generations of men and women who fought for recognition and equality, and helped make the world what it is today.
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