

13–15 OCTOBER 2021
SEPAWA
CONGRESS
 virtual



The 68th SEPAWA® CONGRESS VIRTUAL, the 17th European Detergents Conference and the Cosmetic Science Conference as virtual events from 13 to 15 October 2021

We had all hoped to have a regular SEPAWA® CONGRESS in 2021. This wish has not been granted. The unchanged epidemiological situation has left us as organisers with the only option of organising a congress in virtual format. So now for the second year running there will be no congress on site at the Estrel Congress Centre in Berlin, no face-to-face contact between the participants, the speakers and the exhibitors.

With the experience gained from the first virtual congress last year and the web-based congress portal, which has been further improved in the meantime, the congress ran pretty smoothly. In this regard, special thanks go to the staff of the organising team from **Verlag für chemische Industrie** in Thannhausen.

Despite the exclusively virtual format, the congress statistics can be summarised as follows: **Participants - 844** (including 231 exhibitors), **exhibiting companies - 78**, **co-exhibiting companies - 42**, **number of presentations - 125** (including 67 in the Forum for Innovation and 58 scientific presentations), **posters - 13**.

Conclusion: The 68th SEPAWA® CONGRESS was held virtually together with the 17th European Detergents Conference (EDC) and now for the first time with the Cosmetic Science Conference (CSC) of the DGK e.V. Given the external circumstances, there was no alternative to the chosen congress format. The SEPAWA® CONGRESS together with the EDC remains the most important industry meeting place for the detergent/cleaning agent, cosmetics and perfume industry in Europe.

SEPAWA® Award Ceremonies

One highlight every year is the honouring of special achievements made in conformity and in fulfilment of our association goals. The 1st Chairman of SEPAWA® e.V., **Dr. Hans Jürgen Scholz**, performed the appreciations virtually, i.e. from our temporary congress studio in the office. The monetary amounts attached to the SEPAWA® Young Researchers' Awards were genuine and were sent to the award winners, as were the certificates (see page 4: SEPAWA® Young Researchers' Award Ceremony).

Award Ceremony Young Scientists' Award of the GDCh

The GDCh Division Chemistry of Detergents awarded 2 young scientists for excellent scientific work with special relevance for the development of detergents. The award ceremony was moderated by **Prof. Dr. Birgit Glüsen**, TH Köln, University of Applied Sciences, Chairperson of the GDCh Division.

The prize for the best Master's thesis was awarded to **Jan Nilles**, Hochschule Niederrhein/Kao Chemicals GmbH. The title of the thesis is: **"Systematic Investigation of Alkoxyated Alkyl Ether Carboxylic Acids in Metal Cleaning"**.

The prize for the best dissertation was awarded to **Dr. Lars Gabriel**, Friedrich Schiller University Jena. The results of the thesis entitled **"Polysaccharide-based Functional Polymers: Synthesis, Characterization and Properties"** were presented in a lecture. Excerpts from it as follows:

Polysaccharides are the most important biopolymers and thus, a readily available and sustainable source for bio-based functional polymers. While cellulose or starch are well investigated and their derivatives are commercially used to a large extent, the chemical modification of a myriad of other polysaccharides is not studied in detail. Therefore, my work was focused on the heterogeneously feasible carboxymethylation and sulfoethylation of different polysaccharides to generate water soluble products, on one hand. On the other hand, the available but underestimated hemicellulose xylan was studied regarding modular synthesis approaches to produce new soluble functional polymers. The water-soluble products obtained were characterized in detail and their effect as detergent additives was evaluated.

The carboxymethylation was performed for a variety of polysaccharides to analyse their reactivity under technical relevant conditions. The reaction-influencing parameters were varied and interpreted. The sulfoethylation was also studied in detail



by varying relevant reaction parameters and comparing the reaction behaviour of different polysaccharides. In case of chitosan, chemoselective conversions of hydroxyl- and amino groups could be achieved for these etherification reactions and even mixed sulfoethyl-carboxymethyl ethers became available. The interaction of these anionic polysaccharides derivatives with cellulose surface was investigated by QCM-D measurements and a significant effect as anti-greying agents in detergents could be shown.

Xylan was converted into xylan phenyl-carbonate as reactive intermediate for modular synthesis approaches. Using a variety of different amines, xylan phenyl-carbonates were converted into functional xylan carbamates that demonstrate their versatility as activated intermediates. Xylan carbamates were studied regarding their bioactivity and their thermal and hydrophobic properties. In addition, they are active as soil-release additive in detergents.

The Virtual Lecture Event – A Compilation of Selected Focus Topics

The lecture event excellently reflects the scientific foundation as well as the breadth of technical applications of our detergent, cosmetics and perfume industry.

SEPAWA® Innovation Award Ceremony

Innovations are crucial for growth and competitiveness in our markets and form the basis for successful and sustainable business. For the ninth time, this year's **SEPAWA® Innovation Award** was presented to three winners from the cosmetics and detergents sectors. The prize is intended to provide impetus for active idea management in the member companies of SEPAWA® e.V. and to raise public awareness of a valued innovation.

A neutral, independent jury consisting of 6 members of the scientific advisory board of SEPAWA® e.V., the board and the advisory board of SEPAWA® e.V. selected 3 prize winners from 14 submitted proposals. The prize consists of a certificate and a trophy showing the SEPAWA® wave in stylised form.

The **first prize** was awarded to the company **Solvay** represented by **Max Chabert, Amit Sehgal, Kamel Ramdani, Oliver Hufer, Laura Gage**. The title of the award-winning work is **“Ac-tizone F5, a Disinfectant Cleaner Making Long Lasting Antimicrobial Protection an Everyday Life Reality”**.

The **second prize** was accepted by **Dr. Nora Schiemann** for **IMCD Deutschland GmbH** for her work on **“Beauty Salon in a Pill Box - Finger Beauty”**.

The **third prize** went to **Mr. Stefano Lualdi** of **Roelmi HPC** for work on **“EquiBiotics LRh: Long-term Skin Ecosystem Well-being”**.

In keeping with tradition, the prizes were awarded by the 1st Chairman of **SEPAWA® e.V.** **Dr. Hans Jürgen Scholz** before the keynote speech.



SEPAWA® Young Researchers' Award Ceremony

The annual **SEPAWA® Young Researchers' Award** fulfils one of the most important goals of SEPAWA® e.V. to promote the education of young professionals especially.

The award is given to students for outstanding bachelor, master and doctoral theses. The jury selected 4 prize winners from the submitted theses. Specifically, three bachelor's theses and one doctoral thesis were deemed worthy of the award.

The **1st prize** in the category **"Outstanding Bachelor's Graduate"** was awarded to **Ms. Lara Knöbl**, Symrise AG, for her thesis on **"Development of a Thickener System of Natural Origin for Cosmetic Multiphase Systems"**.

The **2nd prize** was awarded to **Ms. Laura Riemensperger**, Jungbunzlauer Ladenburg GmbH for her work on **"Reclassification of Cosmetic Raw Materials**

as Microplastics by ECHA? - Replacement of Synthetic Thickeners in Face Care Products".

Marian Rademacher, bb. med product GmbH / Rhein-Waal University of Applied Sciences, was awarded **3rd prize** for his work on **"Development of a Model to Investigate the Influence of Prebiotic Active Ingredients and Preservatives on the Skin Microbiome"**.

A **prize** was awarded in the category **"Outstanding doctoral theses"** this year.

This honour was accepted by **Dr. rer. nat. Vanessa Harms**, Leibniz Universität Hannover/ Symrise AG. The title of the thesis is **"Biotransformations of Natural and Non-natural Substrates for the Formation of Terpenoids with Olfactory Properties"**.

ability and environmental friendliness," says **Prof. Dr. Birgit Glösen**.

Polymer Cubosomes: High Surface Area Micelles that Capture, Release, and Glow in the Dark

Prof. André Gröschel
Universität Münster

The self-assembly of block copolymers in solution is controlled by polarity differences of the blocks towards the selective solvent. The block volume or better yet the volume ratios control the shape of the micelle. While block copolymer micelles in the form of spheres, cylinders and vesicles have been studied in detail in the past 25 years, it was discovered only recently that high asymmetry in favor of the hydrophobic block leads to block copolymer microparticles with an inner morphology of highly ordered channel systems. These channel systems often adopt triply periodic minimal surfaces with cubic (Im3m), double diamond (Pn3m) and gyroid lattice – termed cubosomes, or inverse hexagonal (HII) phases as the organic analogues to mesoporous silica – termed hexosomes. **André Gröschel** said: *"I summarize recent progress from us and others to understand the formation of these inverse morphologies and how to introduce specific functionalities through block chemistry, e.g. carbonization for energy conversion, biodegradation for drug release, and fluorescence for bioimaging"*.

Novel Concept for the Design of Water-soluble Polysaccharide Derivatives for Laundry Applications

Thomas Heinze
Friedrich-Schiller-Universität Jena

Nature produces efficiently unlimited amounts of polysaccharides (PS) with structural diversity and functional versatility. By chemical modification of PS, a myriad of novel functional polymers with designed properties is available; PS and their derivatives will be increasingly used in commercial applications and thus contribute to a sustainable world.

Within the framework of the **European Detergents Conference**, which is organised by the 'Chemistry of Detergents' section of the **German Chemical Society**, 12 scientific lectures were held on the topic of **"Polymers and Surfactants in Detergents and Cleaning Agents - Effects, Benefits, and Applications"**. The lectures were supplemented by the theses on the award-winning doctoral thesis by the award winner. During the SEPAWA® Scientific Conference, which thematically deals with the latest research results of our industries detergents/cleaning agents, cosmetics and perfumes including their regulatory framework, **22 lectures** were presented. Firmly established in the congress programme are the lecture blocks in the Forum for Innovation. This year, **67 speakers** took the opportunity to present the latest in their developments. The entire lecture programme was complemented by a total of **13 poster presentations**, sub-

mitted by young scientists from universities and academic institutes, as well as by employees from industrial research and institutional facilities in our sectors.



A Selection from the Lecture Block of the 17th European Detergents Conference

In 2021, the EDC focused on **"Polymers and Surfactants in Detergents and Cleaning Agents - Effects, Benefits, and Applications"**. *"We discussed the role of natural and synthetic ingredients in detergents and cleaning agents, as well as their production and modification, and aspects of sustain-*

Thomas Heinze said: "In the frame of our studies to design the structure and hence properties of water-soluble PS derivatives, novel concepts for the PS chemistry are developed in addition to the conventional direct modification of the functional groups by etherification or esterification". A novel approach is based on reactive platform derivatives of PS containing sulfonic acid ester- and phenyl carbonate moieties. The preparation of PS phenyl carbonates could be easily carried out under homogeneous reaction conditions applying various reaction systems including Ionic Liquids, which are not only most efficient solvents but also environmentally friendly due to their inherent properties like stability and recyclability.

The phenyl carbonate groups, which may possess different functions in the aromatic systems to control their reactivity, are easily accessible to nucleophilic displacement reactions using multifunctional amines that are also important naturally occurring molecules. Thus, a broad variety of novel, finally completely bio-based and water-soluble PS derivatives could be obtained that were studied regarding their activity as redeposition inhibitors and soil release agents. Representative results of derivatives of different PS backbones (cellulose, xylan) of different degrees of substitution obtained by conversion with hydroxyalkyl amines, which contains oxygen atoms and secondary and tertiary amino moieties in the spacers, had been presented (WO 2019/243071; WO 2015/044061). From these studies, structure-properties relations can be concluded to optimize the structure for these applications.

European Plant-based Surfactants as Building Blocks for Sustainable Consumer Products

**Dr. Paula Barreleiro
Werner & Mertz**

For more than two decades, renewable natural oils constantly gain importance in the manufacturing of surfactants. However, the source of this natural part of surfactants is not diverse but depends largely on palm kernel oil and to a smaller extent on coconut oil. Lauric oils have become the standard in oleo chemistry for many

reasons. Alternative available natural oils based on plants that grow in the moderate zone of the globe would bio-diversify the one-way road to oleo-based surfactants.

Vegetable oils from the temperate zone are different to those from the tropical part of the earth. The carbon chain length of these triglycerides is longer (C18) and, depending on the oil, there is a higher degree of unsaturation, as is demonstrated in the individual iodine numbers. This clearly has effects in chemical reactions and in applications as well. The double bonds of C18 polyunsaturated fatty acids (C18-PUFA) with respect to melting point and viscosity show similar behaviors like branching in saturated C-chains with the advantage of very good biodegradation properties of the C18-PUFAs. Chemical modifications in principle are also possible at the double bonds. On the other hand, this increased reactivity demands more attention than usual when working with unsaturated substances. In this respect, quality of raw materials and the use of natural antioxidants support good sensorial characteristics. In any case, surfactants based on plant oils of the moderate zone are not drop-in solutions in home care consumer goods.

Two examples were shown: oleyl glucamides from sunflower oil and cationic surfactants from sunflower/rapeseed oil. Newly developed formulations with these surfactants show at least comparable performance versus cleaning products containing current palm kernel oil/coconut oil. It can be concluded that C18-UFA

based plant oils enlarge the base of oleo feedstocks for sustainable surfactants (**Fig. 1**).

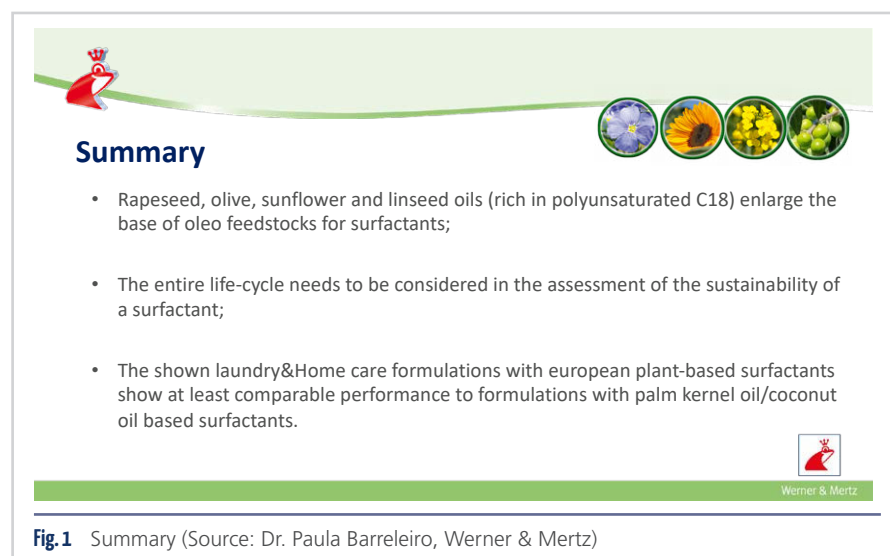
Effective Cleaning Thanks to a Second Skin - Naturally Against Biofilms and Dirt

**Dr. Matthias Reihmann
GELITA AG**

The innovative easy-to-clean concept with hydrophilic protective layers, which are formed by functional collagen peptides on cleaned surfaces, enables the development of more environmentally friendly cleaning agents that work effectively even in mild pH conditions. In addition to a convincing cleaning result, extended cleaning cycles, lower water consumption and easier cleaning are advantages that have already been documented.

During the cleaning process, surfactants displace the dirt and a hydrophilic protein film forms on the cleaned surface as a natural surface protection. Depending on the nature of the cleaner used, surfactants are also absorbed on and in the protective film. When rinsed with water, these layers partially dissolve and release the surfactants, while a thin protein layer remains as surface protection.

It has been shown that this mechanism can be used effectively to combat biofilms. Using real-time measurements on a quartz crystal microbalance, it was possible to show, for example, that milk could be effectively cleaned off the hydrophilic protective layer as a model system. Further studies investigated the protective



Summary

- Rapeseed, olive, sunflower and linseed oils (rich in polyunsaturated C18) enlarge the base of oleo feedstocks for surfactants;
- The entire life-cycle needs to be considered in the assessment of the sustainability of a surfactant;
- The shown laundry&Home care formulations with european plant-based surfactants show at least comparable performance to formulations with palm kernel oil/coconut oil based surfactants.

Werner & Mertz

Fig. 1 Summary (Source: Dr. Paula Barreleiro, Werner & Mertz)

effect of the hydrophilic protein layer against surface adhesion and growth of microorganisms.

In addition, the transport or fixation of active substances, such as biocidal quaternary ammonium compounds and esterquats, on cleaned surfaces is also conceivable, with which surfaces can be temporarily protected against pathogenic substances (Fig. 2).

Exchanging EO Groups in Non-ionic Surfactants by CO₂ Groups as a Solubilization Capacity Tuning Parameter

Rahel M. N. Marschall
Technische Universität Berlin

Investigation of carbon dioxide (CO₂) as sustainable resource is of fundamental interest for research and industrial applications. It can be used as a building block in chemical compounds such as polymers or surfactants. Substituting ethylene oxide (EO) units in abundantly produced non-ionic EO-surfactants by CO₂ can increase the sustainability and save natural and fossil resources. Similarly interesting, introducing CO₂ gives a new tuning parameter for non-ionic surfactants, allowing to better match particular application requirements and thereby a more economical consumption and potentially even opening up pathways for novel formulations.

The solubilization potential of CO₂ towards industrial relevant oils (decane, isopropylpalmitate, bis(2-ethylhexyl) carbonate) with different polarity has been characterized by small-angle neutron scattering (SANS) and compared with data from static and dynamic light scattering (SLS, DLS), interfacial tension measurements (IFT) and quantitative NMR (qNMR). At a given surfactant concentration, the use of CO₂-containing surfactants can greatly increase the solubilization capacity for oils compared to that of conventional EO-surfactants, as the incorporation of CO₂ into the head group renders the surfactant more effective with respect to their interfacial activity (Fig. 3).

Improving effectiveness of disinfection agents

Presented studies and results

How is the skin compatibility of NOVOTEC® CB800?

- NOVOTEC® CB800 was rated "excellent" in dermatest study

What is the effect of pH on surface adsorption of NOVOTEC® CB800?

- With decreasing pH, the thickness of the adsorbed NOVOTEC® CB800 layer increases.
- A stable surface film is observed at all pH's 5, 7 and 9.

What impact do surfactant and biocides have on surface adsorption?

- The surfactant type influences the rate at which equilibrium film thickness is reached during water washing.
- A stable surface film is observed with all surfactants (cationic, anionic and non-ionic).

How does NOVOTEC® CB800 influence biocidal activity of the surfactant (Alkyl polyglucoside, APG)?

- NOVOTEC® CB800 alone has no bactericidal activity, as expected.
- When NOVOTEC® CB800 is added to APG we observe a cooperative effect compared to APG or NOVOTEC® CB800 alone with Gram-positive *L. monocytogenes* and Gram-negative *E. coli*.

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Fig. 2 Improving effectiveness of disinfection agents (Source: Dr. Matthias Reihmann, GELITA AG)

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CO₂ as Tuning Parameter in Surfactants

Technische Universität Berlin

Exchanging EO groups by CO₂ groups

- Decreases water amount in shell
- Lowers surface tension and CMC
- Lowers interfacial tension between water and oil
- Increases the solubilization capacity
- Leads to bigger oil-surfactant aggregates in water

Decane/IPP/EHC → CO₂ containing surfactant

Exchanging EO groups by CO₂ groups is an additional tuning method for non-ionic EO surfactants

hydrophobic chain | hydrophilic chain

European Detergents Conference 2021 | Rahel M. N. Marschall

Fig. 3 CO₂ as Tuning Parameter in Surfactants (Source: Rahel M. N. Marschall, Technische Universität Berlin)



A Selection from the Lecture Block of the Cosmetic Science Conference of the DGK e.V

The cooperation between SEPAWA® e.V. and the German Society for Scientific and Applied Cosmetics (DGK) has proven its worth over many years. Last year, for the first time, the Forum Cosmeticum took place parallel to the SEPAWA® CONGRESS as a joint event of the national associations from

Germany, Austria and Switzerland. Continuing the synergy of related topics and often overlapping personal membership, the Cosmetic Science Conference (CSC) of the DGK took place at the 68th SEPAWA® CONGRESS. This is certainly a strengthening of the scientific aspects of cosmetics.

Sustainability and Performance: The Winning Formula in Beauty Care

Marie Arzel
Solvay

Today's consumers are becoming more and more concerned about the impact cosmetic products can have on human

health, the environment and society. Suppliers have made strides beyond the Clean Beauty trend over the past decade in terms of safety, transparency and origin of ingredients. The industry is heeding a new call to action all along the supply chain for significantly reducing our environmental footprint toward a “carbon neutral” beauty industry. Achieving these goals as key actors, requires beauty ingredient suppliers to find innovative and sustainable solutions thanks to the eco-design approach as well as a methodology for assessing the environmental impact associated with all life-cycle stages for commercial products, processes, or services.

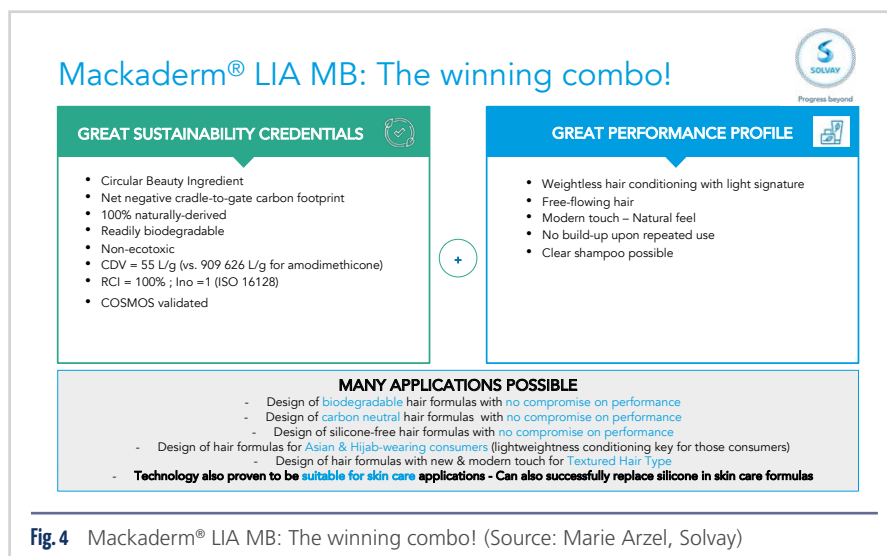
Beauty brands must turn to trusted raw material suppliers to help them navigate this challenging landscape and overcome a multitude of regulatory issues. One of the critical concerns in the hair care space today focuses on the lack of biodegradability with silicones, according to Organization for Economic Co-operation and Development (OECD) standard tests.

Our Solvay hair care experts have transformed this ongoing challenge into an offering rooted in the principles of Circular Beauty. Following the path from natural origin to biodegradability to a negative carbon footprint, not only fulfills consumer expectations for more natural solutions, but also enables formulators to make significant steps toward carbon neutrality (Fig. 4).

The Future of Multifunctionals: Moving to Greener Pastures

Balint Koroskenyi
Symrise Inc.

Very recently, multifunctional cosmetic ingredients have been experiencing a green transformation as nature-derived materials have been appearing on the market, offering alternatives for use even in completely green finished products or to make products greener. An example is pentylene glycol derived from bagasse. Since the first 1,2-alkanediol, which happens to be pentylene glycol, was launched 30 years



ago, several other chain lengths of this chemistry - C6/C8/C10 - have been introduced on the market, covering a range of benefits for cosmetic formulations. The new substance that we are going to introduce here was curiously missing from this homologous series until this year. No longer the odd one out, this unique uneven carbon alkanediol exceeded obvious expectations of performance based on its structure and has proven to be a venerable member of this family of multi-functionals, complementing the portfolio of 1,2-alkanediols. Its optimal chain length combines the liquid form and water solubility of shorter diols with the efficacy of longer ones. As a tribute to the green path towards the future of multi-functionals, the new substance is 100% nature-derived and sourced from the castor bean plant and therefore not competing with foodstock. Innovation doesn't stop. It just moves on to new pastures.

Modern Trends in Sunscreens

Prof. Dr. Dr.-Ing. Jürgen Lademann
Charité – Universitätsmedizin Berlin

Sunscreens are a still rising cosmetic product category, designed to prevent premature skin aging and the generation of skin cancer. In recent years, new requirements on sun protection and proof of protective capabilities have been established.

These are mainly based on the discovery that 50% of the free radicals, formed by

solar irradiation, arise in the visible and infrared spectral regions. If skin is exposed to UV/VIS light, up to a dose necessary to produce the optimal amount of vitamin D, predominantly ROS radicals are formed. Any further increase of the dose towards the MED leads to a dominance of lipid peroxide radicals (LOS) which are known to have strong damaging effects. Sunburn starting at one MED represents visible skin damage. Considering the role of free radicals in these processes, sunscreens must go beyond the UV, providing light protection in the complete solar spectrum.

Since there are no colorless filter substances in the VIS/IR regions, a protective function can be created using antioxidants and pigments. Studies on test subjects of the same age (50 years) show that people with a high antioxidant concentration in their skin developed less signs of skin aging than people with a low antioxidant status. Looking at the formation of free radicals in different skin types, it could be shown that people with skin type IV–V exhibit significantly fewer free radicals in the UV region than people with skin type I–III. In the infrared spectral region, it is the other way round.

A second methodical trend in sun protection is to replace the human volunteers-based invasive SPF determination by non-invasive methods. Latest developments based on a „photon banana“, permit to detect backscattered light from skin treated with sunscreen and thus to determine the SPF non-invasively.

A Selection from the Forum for Innovation – Personal Care

Medical Mushroom Meets Epigenetics - a Novel Concept for a Skin in Harmony and Balance

Barbara Obermayer
RAHN AG

Mrs. Barbara Obermayer talked in her lecture: *“We know this from music: A piece of music only sounds harmonious with perfectly coordinated instruments and the precise direction of a conductor. If a single instrument is out of tune or off-key, it ruins the symphony and the joy of listening. Your skin also has a conductor: Skin functions are directed by epigenetic markings on the DNA. If there is dissonance, this stresses and ages the skin.*

Join our presentation und learn how our new active ingredient LIFTONIN®-QI resolves epigenetic dissonance and brings the skin back into harmony and balance”.

The following topics had been highlighted:

- Epigenetics – how the programming pattern of genes determines your skin condition
- Ling Zhi – how the medical mushroom from Traditional Chinese Medicine provides eternal youth
- Better than CBD – how LIFTONIN®-QI puts a smile on your face
- LIFTONIN®-QI in action: how to get superior lifting effects and firm skin with a refined texture.

To Stabilize Almost Anything: ISOLAN® 17 MB - The All-rounder W/O Emulsifier for Well-groomed Consumers

Sebastian Beckers
Evonik

Today's increasing awareness for environmental concerns raises consumers demand for ecofriendly skin care products. Therefore, most formulation developments start with one question: which ingredients can I use that combine sustainability with high-performance? In terms of the stabilization of

W/O emulsions, Evonik's answer on this is clear: ISOLAN® 17 MB – a multi-talented, polyglycerine ester-based emulsifier that allows formulators to discover and extend the boundaries of natural cosmetics. Due to its unique composition and high molecular weight the emulsifier offers an outstanding stabilization performance even in challenging systems containing e.g. UV filters or natural preservatives. What makes ISOLAN 17® MB really tempting to work with is its very broad application profile. The emulsifier is cold processable and allows the preparation of versatile textures ranging from butters, creams or lotions to thin sprays and gives a broad formulation flexibility even in terms of oil phase content or polarity. These properties make ISOLAN 17® MB to the next-best, sustainable alternative to silicone emulsifiers.

MossCellTec™ Aloe - Harmonizes the Skin's Moisture Flow

Beata Hurst and Dr. Franziska Wandrey
Mibelle Group Biochemistry

By 2050, 66% of the world's population is projected to live in cities. Yet, spending time in nature becomes more and more sought after - especially in times like these where we are forced to stay inside most of the time.

One trend reflecting this need is forest bathing and originates from Japan. Forest bathing means basically being in nature, connecting with it through our senses of sight, hearing, taste, smell, and touch. Slowness and tranquility are the main values. Forest bathing can be practiced in a wellness program lasting several days or as an attentive walk alone in the nearest forest.

The new ingredient MossCellTec™ Aloe was specifically developed by Mibelle Biochemistry for holistic well-being concepts that incorporate lifestyle trends such as forest bathing or other relaxing and comforting approaches.

MossCellTec™ Aloe is an unequalled aloe-moss extract sustainably obtained through the MossCellTec™ technology, which enables large scale produc-

tion of moss in both a reproducible and sustainable way (only small quantity of plant material needed, no waste of water and land).

Thanks to an intensified connexin-mediated cell-to-cell communication, MossCellTec™ Aloe optimally evens the moisture distribution in the skin and reduces the volume and depth of wrinkles. It fades away the signs of aging and comforts dry skin.

SymGuard CD – Modern Hygiene Technology for Cosmetic Formulations

Bernd Heinken
Symrise AG

Consumers' increased awareness for hygiene as a result of the global COVID-19 pandemic is impacting the way they look at beauty and personal care products. Experts say this is especially relevant when it comes to consumers' perception of ingredient safety, the shelf life of products and substantiated hygiene claims. There is also an opportunity for cosmetic manufacturers to add additional benefits to personal care products, particularly when it comes to hand hygiene and liquid cleansing products but also for leave on formulations such as creams. SymGuard CD is a fast-acting cosmetic hygiene ingredient that has a dual function, protecting the cosmetic formulation and the skin of the consumer. It is suitable for use in rinse off and leave on formulations. SymGuard CD offers a sustainable alternative to traditional actives that is a safe, readily biodegradable and skin friendly.

The presentation demonstrated a set of experimental data as well as new concepts across the range of cosmetics focusing here on gels, wipes and creams.

Stepping Ahead with High Performing Sustainable Ingredients for Modern Rinse-off Formulations

Dr. Stefan Liebig
Evonik Operations GmbH

Sustainability has become a major driver of transformation in the industry

leading to broad based reformulation projects with a focus on natural-based, easy-to-use, multifunctional and safe ingredients.

As a natural-based thickener with emollient properties, our novel TEGO® Remo 95 MB (INCI: Sorbitan Caprylate; Glyceryl Oleate) is an ideal choice to support this important market trend. TEGO® Remo 95 MB is fully derived from renewable feedstocks contributing to the production of sustainable palm oil (RSPO), responsibly sourced and readily biodegradable. TEGO® Remo 95 MB provides highly efficient thickening of modern surfactant-based formulations and multiple skin care benefits. The low viscous liquid is very easy to use and to process at ambient temperature, resulting in significant energy savings and a reduction of the carbon footprint.

This smart blend is suitable for PEG-free and sulfate-free as well as natural cleansing formulations, contributes to a pleasantly creamy foam structure and delivers a smooth and soft skin feel by maintaining the natural moisture balance of the skin.

Providing a pseudoplastic rheology, TEGO® Remo 95 MB supports the stabilization of particles, including opacifiers and pearlzers, in surfactant-based formulations. Evonik has recently launched TEGO® White 50 MB as a readily biodegradable opacifier blend especially suitable for modern formulations void of PEG- and Sulfate-based ingredients. The low-viscous liquid is cold processable and may be conveniently added in a continuous production. As an alternative to commonly used synthetic polymer particles, the product efficiently delivers a deep whitening effect with a natural appearance while enhancing the richness of the formulation texture and the creaminess of the foam.

TEGO® Remo 95 MB and TEGO® White 50 MB stand for more naturality and multifunctionality, efficient performance and ease of processing – a unique combination to support the modern formulator looking for the development of sustainable and environmentally friendly products.

Upcycling Wood Chips from Santalum Album for Skin Aging Inspired by Ancient Rituals

Anne Clay
Ashland Industries France

Sandalwood extract is a natural ingredient extracted from Santalum album and developed with Artificial Intelligence for well aging. Obtained by supercritical CO₂ extraction from up-cycled wood chips, this unique and patented bio-functional leverages the forest therapy trend, a trend also known as shinrin-yoku in Japan. Forests often deliver large amounts of odorant molecules, identified as “forest VOCs”. Sandalwood produces forest VOCs that form only with the right mix of genetics and environmental factors. Sandalwood extract captures selective forest VOCs from the sandalwood and enhances skin olfactory receptors shown to decrease with age and air pollution. It reduces skin cell senescence and helps mitigate air pollution damage. It has clinically proven benefits on skin regeneration, firmness, wrinkles, and on the skin olfactory signature of aging. Sandalwood extract is oil soluble and can be formulated into a wide range of beauty products for aging well.

A Selection from the Scientific Conference - Personal Care Lecture Block

European Market for Natural & Organic Personal Care Products

Iveta Kovacova
Ecovia Intelligence

Europe has one of the largest markets for natural & organic personal care products in the world. Consumer demand has remained buoyant during the pandemic, with many country markets reporting healthy growth rates. The speech gave an update on the European market, highlighting the impact of the pandemic on market growth rates, trends, and competitive developments. What growth is pro-

jected in the European market? How is the pandemic changing consumer behavior?

A Selection from the Scientific Conference - Home Care Lecture Block

Algorithm Based Computer Analysis of Large-scale Public Domain Information

Alexander Madl
Whitespace Intelligence GmbH

The vast amount of information resources in public domain holds valuable gifts for many industries and purposes. However, in today's business environment, decision makers often face an increasing difficulty to navigate through the complexity coming with the exponentially growing amount of information to process. We believe that only using the advantages of computing power and smart constructed algorithms combined with human expertise allows for navigating and curating this information to make informed and un-biased decisions.

Public domain information can be used for business decisions from evaluating a company and its IP portfolio for a financial investment, the strategic decision where to put emphasis in R&D up to gathering market information for a new business development case or just find the right expert to hire for an innovation endeavor.

Alexander Madl mentioned in his speech: *“We developed a process to collect, link and evaluate contents of large amounts of documents with smart algorithms. With our system we are showing trends, answering complex questions, mapping technologies or matching customer needs with technology offerings by processing 50.000 – 100.000 documents within days. The traditional approach of search string construction bears the risks of many false negatives data and documents or information being missed.*

Our approach allows us to use much less search string restrictions. There-

fore our analysis is based on information that is truly loss-free. Every sentence is analysed by novel algorithms, generating insights in incomparable contextual depth. Due to our unique approach, we merge different data types, such as patents, scientific publications, technical texts, annual reports of corporate or academic institutions, conference proceedings, import and export databases filings and so forth to generate a novel level of expertise and enforced insights" (Fig. 5).

EU Chemical Strategy for Sustainability

Dr. Alex Föller
Verband TEGEWA e.V.

The presentation at the SEPAWA® CONGRESS 2021 described the predicted requirements and regulative measures of the "EU Chemical Strategy for Sustainability" to be considered by our member companies. After an overview providing the major cornerstones and the state of the art of the debate the assumed consequences for the supply-chains of the cosmetic and of the detergent industry had been outlined (Fig. 6).

Economic Platform for Producing a Range of Glycolipid Biosurfactants

PhD. Ben Dolman
Holiferm

The market share of biosurfactants is expanding rapidly due to commitments from major formulators to replace €billions/annum of surfactants with biosurfactants and due to favorable characteristics for use in personal care and household cleaning products. In particular, many biosurfactants have antimicrobial, moisturizing, controllable foaming and are 100% biodegradable. At present biosurfactants tend to be used in high end products due to their relatively high production cost.

Ben Dolman explained as follow: "We present results from the development of a novel gravity based in-

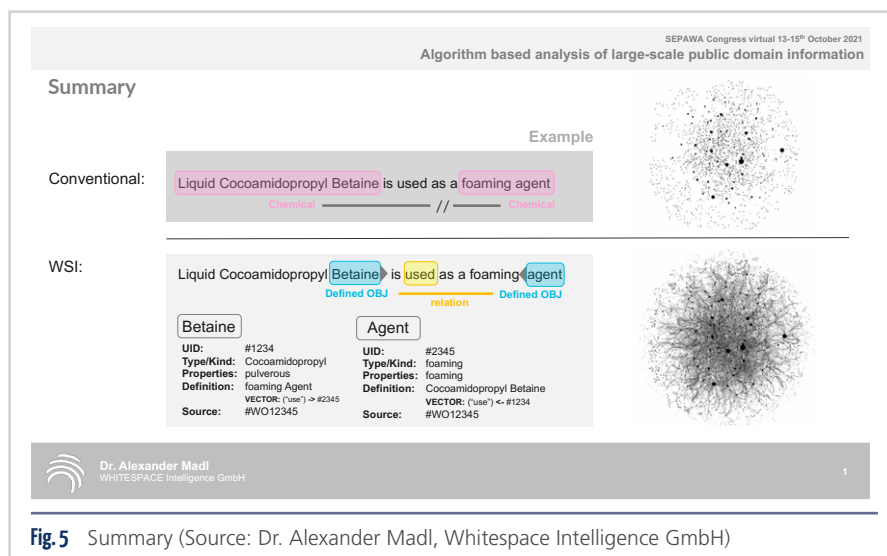


Fig.5 Summary (Source: Dr. Alexander Madl, Whitespace Intelligence GmbH)



Fig.6 Position of the chemical industry (Source: Dr. Alex Föller, Verband TEGEWA e.V.)

tegrated separation technique for the controlled production and in situ separation of glycolipid biosurfactants during fermentation. This technique has enabled us to increase productivity to >5.5 g l-1 h-1 and titer to > 1200 g l-1, initially for sophorolipid biosurfactants. We present results from the scale up of this technology to full pre-commercial pilot plant scale.

We have demonstrated our technology with two additional biosurfactants, and identified its suitability with a range of biosurfactants, enabling dramatic reductions in production costs. This technology platform is set to make biosurfactants an economically viable alternative to traditional surfactants across a range of industries, including the home cleaning sector where sophorolipids are already in commercial use".

Efficient Pre-screening of Surfactant Characteristics for the Development of Sustainable ADW-Products

Hannah Benson
Clariant Prod. (DE) GmbH

The development of sustainable surfactants and additives for automated dishwashing (ADW) can be a tedious, time- and resource-consuming development process. The standardized dishwasher-test, although irreplaceable and necessary, is not suited to effectively test the plethora of sustainable alternatives to common ADW additives and surfactants. **Mrs. Hannah Benson** described in her presentation: "To create a more sustainable and effective research effort, we established numerous effective pre-screenings based on well-established and recent scientific findings.

These pre-screenings determine the physical properties of surfactants and link these to effects desired in automated dishwashing, like plastic drying and water drainage from glassware. These highly desirable effects can be linked to two characteristic physical properties of a surfactant, the influence on the contact angle on a certain surface and the surface tension”.

Mrs. Hannah Benson explained furthermore: *“The testing for drainage capabilities and therefore the suitability as a rinse aid in ADW is done by static and dynamic surface tension measurements. These tests are done in a two-stage manner, in which, with a simple dynamic measurement, the suitability of the surfactant is determined and, in a second step, the effectiveness is investigated by more in depth temperature and concentration-dependent measurements”.*

In order to investigate the ability of a surfactant or additive to accelerate the slow drying process of plastic-ware in the dishwasher, we use dynamic contact angle measurements on treated substrates. The process of automated dishwashing is simulated inside a beaker with test-substrates, which are characterized afterwards using dynamic contact angle measurements.

Sustainable Lime Removers Based on Biopolymers

Nikolas Trimpe
Hochschule
Weihenstephan-Triesdorf

The use of conventional limescale removers poses a severe risk for environment and consumer due to high concentrations of acids and other harmful chemicals which are typical ingredients in such cleaning agents. Therefore, a rising demand on sustainable alternatives with reduced environmental risk occurs and forces manufacturers to design new products. In this study, a sustainable limescale remover based on biopolymers (alginates, xanthan gums, carrageenans) was developed. Alginates are a promising key component because of their ability to form com-

plexes with calcium ions. This can be used to increase the power of organic acids to dissolve calcium carbonate deposits. As a consequence, it leads also to a decreased amount of organic acid in lime removers while maintaining their efficiency. The cleaning agent should be applied as gel or foam to the targeted surface to maximize the contact time and to enable the customer to clean complex geometries like industrial machines in a cost-effective way with less effort. To measure the efficiency of different lime removers, a suitable method had to be developed. Mineral surfaces were coated with calcium carbonate deposits to simulate limestone and the cleaning agents were applied. The cleaning efficiency was optically measured and planimetrically calculated. The results indicate that biopolymers, like -carrageenan, -carrageenan and alginate can increase the ability of organic acids to dissolve calcium carbonate. Sodium alginate has been showing the most promising results so far.

In this study, methods to alter the properties of biopolymers were also investigated. The chain length of biopolymers was shortened by enzymatic and acidic hydrolysis and its efficiency on the cleaning process and viscosity of the hydrolysates were examined.

A Selection from the Forum for Innovation - Home Care Lecture Block

New Environmentally Friendly Solvents for Aqueous Cleaning Formulations

Chris Heald
Croda International Plc

Formulators of safe, sustainable cleaning products have limited choices when choosing a water compatible solvent. Traditional solvents can have measurable VOC's, toxicity concerns and can be difficult to solubilize. More recently developed green solvents meet certain sustainability criteria but often provide only moderate cleaning performance

or may have other disadvantages such as bad odours or aquatic toxicity.

Chris Heald said: *“We now introduce Crosolv™ 30 and Crosolv 50, a new class of ester-based solvents with high compatibility in aqueous cleaning formulations, excellent grease cutting performance, and a safe and sustainable product profile”.*

The products are readily biodegradable, non-irritating, VOC exempt and exhibit low aquatic toxicity. Performance testing at low inclusion levels in aqueous cleaning formulations exhibited significant improvements in the removal of greasy soils versus surfactant-based cleaners alone and compared to traditional solvents.

Crosolv solvents provides an opportunity to replace high VOC, high solvent cleaners with bio-based, sustainable aqueous formulations that still deliver excellent cleaning performance.

Amine Oxide Surfactants with Optional Circular Carbon Content Matching Today's Trends and Sustainability Needs

Elke Theeuwes
Eastman Chemical Technology

Amine oxide surfactants are widely used in the home care industry because of several advantages they bring to formulators: (i) excellent wetting properties; (ii) superb foam stability quality when combined with anionic surfactants; (iii) exceptional fatty and oily stain removal capability. Together with their broad pH range stability, excellent compatibility with bleaching agents and good environmental profile, amine oxide surfactants are used in a variety of home care solutions, for example manual dish wash, laundry and hard surface cleaning.

The study shows the properties of different amine oxide surfactants in home care formulations matching today's trends and sustainability needs.

Eastman is supplying the basic raw material, N,N-dimethyl alkylamine, to amine oxide producers and is constantly improving and innovating its tertiary amine platform to give its custom-

ers new means of answering changing needs in the amine oxide market. In the past, a switch was made from petrochemical olefin-based alkyl dimethyl amine (ADMA) to natural fatty alcohol, reducing petrochemical carbon content in amine oxide surfactants below 20%. Now we will introduce technology, based on circular economy principles, that can take out the remaining petrochemical carbon in amine oxide surfactants and help formulators meet their sustainability goals.

UV-Stabilizers for EU-Ecolabel Formulations

Dr. Arend J. Kingma
BASF SE

The amount of EU-ecolabel formulations in the home care and I&I market is steadily increasing. Therefore, the need of suitable colorants and UV-stabilizers has risen too.

Arend J. Kingma described: "Recent work in our labs has focused EU-ecolabel suitable test formulations using our EU-ecolabel suitable Cibafast® HA and Tinogard® Q.

We developed a method to determine the stability of these components in various formulations by using digital image analysis of the UV-irradiated samples. Compilation of these data by the 4-parameter-Hill equation showed time-dependent curves indicating the precise point of degradation.

We tested different combinations of the Cibafast® HA, Tinogard® Q and very small amounts of Tinogard® TL in various EU-ecolabel suitable test formulations - a sanitary-, all-purpose-, floor-cleaner and a liquid laundry detergent - and found a strong increase of the stability of the color, up to threefold".

Virucidal and Bactericidal Activity of L(+)-Lactic Acid

Alina Böhlinger
Jungbunzlauer Ladenburg GmbH

Demand is increasing for efficient, yet more natural, sustainable and less hazardous active ingredients in surface and skin disinfectants. L(+)-Lactic acid

is one of these ingredients – derived from renewable raw materials via fermentation and readily biodegradable. The gentle and versatile liquid ingredients lactic acid and lactates unite several positive benefits beyond the required attributes for formulations for cleaning and disinfecting applications entailing a wide range from hand soaps to veterinary products. Based on the completed BPR registration those benefits for activity against enveloped viruses, bacteria as well as moisturizing properties was presented. Within the presentation sample formulations illustrated the performance in ready to use formulations.

A Selection from the Forum for Innovation - Sustainability Lecture Block

Towards More Sustainable Fabric Softening

Lucie Maisonneuve
Stepan Europe

The consumers' quest for sustainable solutions has only been stronger for the past couple of years. Sustainability can be approached in several ways, from the starting feedstocks to the manufacture or use of the product. From a feedstock standpoint, tropical feedstocks are perceived very negatively, and tallow does not fit in with the recent surge of vegan products. Cold processable softening ingredients is another approach to consider for energy savings. **Mrs. Lucie Maisonneuve** said: "In the presentation, we therefore reviewed the different existing solutions to help fabric softening be more deeply involved in sustainability".

Reduction of 1,4-dioxane Residues in Home Care and Personal Care Products

Dr. Christoph Groß-Heitfeld
Sasol Germany GmbH

1,4-Dioxane contaminations in US drinking water has been heavily discussed in the US and legislations to reduce the

contents in Home Care and Personal Care products are already in place being valid with 2 ppm in detergents and rinse-off products from end of 2022 and - one year later - even stricter with 1 ppm. One surfactant which has been identified as one root cause of this issue is sodium laureth sulfate (SLES).

In the light of upcoming stringent sustainability improvements, SLES cannot be easily phased out of Fabric/Homecare and Personal Care product as it is performing well as a high foaming surfactant, showing excellent degreasing properties combined with a low skin-irritation potential. In addition, SLES can be produced by using either natural and synthetic raw materials which is one key advantage for choosing different options in terms of sustainable feedstocks. Hence, it is widely used in a variety of formulations in the application areas as laundry, hand dish washing, hand soaps or shampoos.

Although production processes in Europe have been improved in the last 10 years leading to relatively low residual dioxane contents of nowadays max. 20 to max. 50 ppm (100% a.m., standard specifications), the discussion has already started in Europe as well. **Christoph Groß-Heitfeld** described in his presentation: "From a leading raw material producer perspective, we wanted to give our view on this topic, show examples of formulations which might be affected by potential future legislation, discuss state-of-the-art dioxane levels and what can be already offered for different alcohol ether sulfates types used in Fabric/Homecare and Personal Care".

A Selection from the Scientific Conference - Sustainability LUV Lecture Block

The Chemicals Strategy for Sustainability, one Year on

Jan Robinson
A.I.S.E.

The Chemicals Strategy for Sustainability (CSS) forms part of the European Commission's Green Deal and rep-

resents the most substantial overhaul of chemicals policy in almost twenty years. It strives for a 'toxic-free environment', avoiding harm to humans and to the planet, whilst maximizing the contribution of chemicals to society and making EU industry globally competitive in the production and use of safe and sustainable chemicals.

A.I.S.E., as the voice of the detergents, cleaning and maintenance products industry, shares the goals of the CSS to prioritize the protection of human health and the environment. Chemical ingredients are essential to safe and effective cleaning and hygiene products, so A.I.S.E. has made it a top priority to contribute the industry's insights and expertise to ensure the CSS succeeds in contributing towards the zero-pollution ambition whilst fostering an innovative and sustainable future for our sector.

On the first anniversary of the publication of the CSS, A.I.S.E.'s Scientific & Regulatory Affairs Director Jan Robinson presented an overview of its progress so far and the engagement of the detergents industry to deliver on its objectives.

European Green Deal – Perspective of the Chemical Industry

Dipl. Ing. Benjamin Wiechmann
Verband der Chemischen Industrie e.V.

The Green Deal is the programmatic centerpiece of the EU Commission's work. It aims to achieve the transformation of the economy and society toward greater sustainability and environmental protection.

In addition to far-reaching climate and energy policy targets and their implementation, additional ambitious measures are planned - above all in chemicals policy, the circular economy and the promotion of biodiversity.

Almost all measures of the Green Deal have a direct or indirect impact on the business activities of the chemical-pharmaceutical industry.

The lecture gave an overview of the goals and measures of the Green deal. In total, there are more than 50 mea-

Keynote Address

The Brain, Computers and Mental Capacity – What have we Learned in the Last 20 Years?

Prof. Dr. Dr. Manfred Spitzer

As we know from brain research, all mental activity – to perceive, think, feel, plan, want, etc. – leaves traces in the brain. This is because mental activity is due to neuronal activity, i.e. nerve cells passing electrical impulses between one another other via physical connections (synapses). This changes the very connections through which signals pass by making them stronger. In contrast, connections that are not used get weaker. Thus, the processing of information changes the connections in the hardware doing the processing. This is called the memory, i.e., the storage of information. Therefore, there is no such physical separation between the processing and the storing information in the brain. In contrast, computers consist of a special-purpose chip (or a few of them) that process information – the so-called central processing unit (CPU). In addition to this processing unit, there is a "hard disk" (or another chip) that stores information. Thus, the processing and the storage are two distinct processes that happen within two separate structures. The CPU of the computer does not increase capacity or speed when the computer has downloaded information into memory. In contrast, brains cannot and do not download information, but constantly change by processing information – a process we call "learning", the result of which is increased mental capacity.



On the basis of this fundamental understanding, we can conclude:

- (1) that the more the brain processes, the more it stores.
- (2) The more information the brain has stored, the better it can process information in the same domain.
- (3) Whenever we "outsource", i.e. let the computer do the work for us, learning does not take place.
- (4) As a result, our mental capacity does not increase and may decrease.
- (5) Outsourcing early in life, when basic implicit and explicit learning takes place in many domains, is a fundamental mistake, as it decreases mental capacity.
- (6) The more is learned in early life, the easier it is to continue learning throughout the entire life.
- (7) Mental capacity is the foundation of "Lifelong learning". It is attained during the educational period of the individual, i.e., from the age of 0 to about 25 years.

asures that are summed up under the umbrella of the Green Deal. Some measures will be examined in more detail in the lecture. This is accompanied by a rough prioritization of the measures from the perspective of the

chemical industry. The transformation of the industry into a circular- and CO₂-neutral industry is a major task that needs to be tackled. The design of the measures is therefore of particular importance.

A Selection from the Scientific Conference - Fragrance Lecture Block

Smells for Sales in Personal and Home Care Products: the Importance of Odour Testing

Ing. Rita Ribau-Domingues
Olfasense GmbH

Olfaction is the most primitive sense and is closely linked to brain areas that control memory and emotions. In this regard, odours directly affect our behavior and mood and, consequently, is a decisive factor in the acceptance or rejection of all kinds of commercial products. Scents are of extreme importance in companies' branding strategy for creating strong emotional bonds with customers. The characterization of sensorial properties is therefore crucial in product development and optimization.

Odours are constituted by (semi-)volatile chemical compounds that, when released by products during unpacking, application, etc., cause an olfactory sensation. Our sense of smell is capable of converting the chemical signals of these molecules into perception. The human nose is very sensitive and detects extremely low concentrations of these compounds, even below the detection limits of advanced analytical techniques. Furthermore, laboratory instruments are not able to interpret how the smell of products is perceived by consumers. For this reason, a wide range of sensory analysis methods are used nowadays to evaluate the performance and perception of consumer products. Depending on the aim of every particular study, sensory tests can be complemented with high throughput instrumental analysis, such as gas chromatography and mass spectrometry with an odor port (GC-Sniffing-MS), for example to identify and quantify the presence of specific wanted or unwanted odorant molecules.

The lecture provided an overview on the implementation of joint senso-

Thanks and Outlook

The board of **SEPAWA® e.V.** would like to thank all those who contributed to the success of the **2nd virtual SEPAWA® CONGRESS**. Namely, the speakers who made the extra effort of video recording. It is the exhibiting companies who filled the virtual exhibition space with information and chats. It is also the **844 congress participants** who have actively participated in the chat or passively as viewers in the virtual auditorium. Interest in the lectures remains high. The demand for the quality of the content and the thematic breadth of the lectures remains and is also guaranteed by the active participation of the **Division of Detergent Chemistry of the GDCh** within the **EDC** and the **DGK** within the **CSC**.

The 68th SEPAWA® CONGRESS was more predictable than the previous one. This applies in particular to financial predictability and thus the minimisation of expenses that inevitably arise from long-term commitments to a venue.

In this context, special thanks go to the congress organisation team at the **SEPAWA® e.V. office** and at the **Verlag für chemische Industrie**.

There is no question that we all long for a face to face congress in the year 2022. Of course, the preparations for this have already begun.



ry and chemical approaches for the odor characterization of personal and home care products. State-of-the-art methodologies on the evaluation and performance of specific products based on odour descriptive analysis, quantitative studies, hedonic testing, discriminative assessment, and on the identification of volatile organic compounds via GC-Sniffing-MS are discussed. Some case studies on the strength of integrating sensory assessment and chemical analysis had been also presented.

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