SEVENTH EUROPEAN DETERGENTS CONFERENCE REPORT

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GDCh Division of Detergency and Formulations

European Detergents Conference

59 SEPAWA CONGRESS AND EUROPEAN DETERGENTS CONFERENCE
ESPERANTO HOTEL FULDA, GERMANY
Meet your Business
23 – 25 OCTOBER 2012
(TUESDAY – THURSDAY)

Biosurfactants, New Ingredients and Formulations, Sustainability, Forum for Innovations

For the second time, the ESPERANTO Congress and Culture Center Fulda was the venue of the 58th SEPAWA Congress in conjunction with the 7th European Detergents Conference from October 12–14, 2011. The number of exhibitors increased again – a sign of healthy, growing mid-sized companies. Two hundred and twenty six exhibitors came to Fulda, an increase of 33 % over 2010. The number of booths increased to 173 (2010: 167). The famous baroque city of Fulda drew 1780 participants, 11 % more than 2010. Forty two countries were represented, an increase of 45 % over 2010.

The focus of the 7th European Detergents Conference (EDC) with eleven lectures and seventeen posters was on *New Amphiphilic Compounds from Renewable Sources*, the SEPAWA Section *Detergents and Cleansers* and the Session *Sustainability*, jointly organised by the German Chemical Society (GDCh) and the SEPAWA Expert Group Legislation–Environment–Consumer (LUV), presented 13 lectures. For the second time, the German Society for Scientific and Applied Cosmetics (DGK) together with the SEPAWA Group Applied Cosmetics organised two Sessions on *Skin Barrier* and *Trends* (together ten lectures). The SEPAWA Forum for Innovations presented 63 short lectures in the field of detergents and cosmetics, an increase of 37 % over the previous year. The German Society of Perfumers featured in its DGP Event "Game Changers" ideas that will change the way of doing business. Beside SEPAWA Prizes the Young Researcher Prize of the GDCh Division Detergency and Formulations was awarded. This Division also sponsored poster prizes.

This year's Formal Address "Mega Trend Resource Productivity" was hold by Prof. Dr. Dr. h.c. *Ernst Ulrich von Weizsäcker*. Instead of the traditional GfK lecture, in a Raw Materials lecture *Klaus H. Nottinger* asked "Oleochemicals – Still an Economic and Sustainable Feedstock for Surfactants?"

In his opening remarks the 1st Chairman of the SEPAWA e.V., Prof. Dr. *Klaus-Peter Wittern*, underlined that SEPAWA, as an intermediary between raw material manufacturers, producers, scientists and authorities has established a communication platform with its annual congress, which is experiencing a continually growing interest. The SEPAWA Congress has become one of the largest European branch events in this segment. Beside the numerous program highlights SEPAWA fosters the qualified youth development training. This is supported by the presentation of the SEPAWA Young Scientist's Award to successful students and the presentation of the Young Researcher Prize of the GDCh Division of Detergency and Formulations. The European Detergents Conference organised for the seventh time in a row during SEPAWA has attracted several internationally renowned contributors from both academia and industry to illuminate the exciting topic of the Conference from several different perspectives. He also stressed that the good reception of the short poster presentations last year encouraged the committee to repeat it this year.

Academia-industry Cooperation: Sugar Surfactants

"Scientific Results and Economic Effects from the Centre for Surfactants Based on Natural Products (SNAP)" were presented by *M. Kjellin*, Ytkemiska Institutet (YKI, Institute for Surface Chemistry), Stockholm, Sweden. SNAP was created due to the vision that the industrial use of natural raw materials will and should increase and that surfactants derived from natural products will become common products, known for their unique properties as compared to petroleum-based surfactants. This vision is valid also today, and we see an increasing emphasis on "Green Chemistry" from consumers, industries, funding agencies and the society as a whole.

The Centre for Surfactants Based on Natural Products (SNAP) was in operation between 1995 and 2006. It was a Swedish joint project between academia, industry and the Swedish Agency for Innovation Systems (VINNOVA). A total of 13 industrial companies and 6 academic departments participated within SNAP (Figure 1). The core competence included organic chemistry, physical chemistry, surface chemistry as well as biochemistry. Besides being cross-disciplinary, it was also cross-technological since the industrial partners included raw material producers, surfactant producers and end-users of surfactants. 22 PhD-students graduated within SNAP.

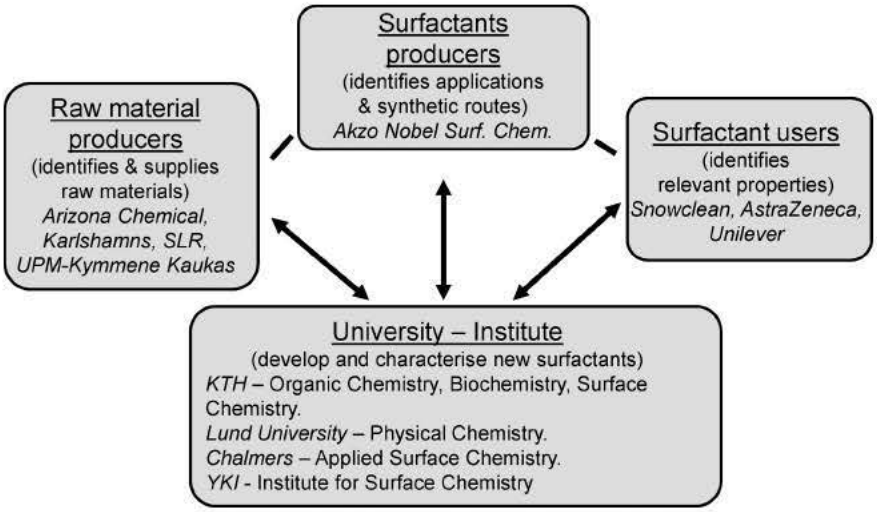


Figure 1 Partners in SNAP (Source: *M. Kjellin*, YKI)

One of the main objectives of the research carried out in SNAP has been to find and explain the special properties of surfactants where the hydrophilic group is based on polyhydroxy-containing compounds, like sugars. The sugar-based surfactants (Figure 2) were in many cases compared with traditional nonionic surfactants having poly(ethylene oxide) as polar groups. Furthermore, the interactions between polyhydroxy-based amphiphilic compounds and other surfactants or polymers have been studied. Some fundamental differences between polyhydroxy-based and poly(ethylene oxide)-based surfactants have been identified during the course of the project. For instance, differences in headgroup stiffness, refractive index and hydrogen bonding abilities are important for several properties and applications.

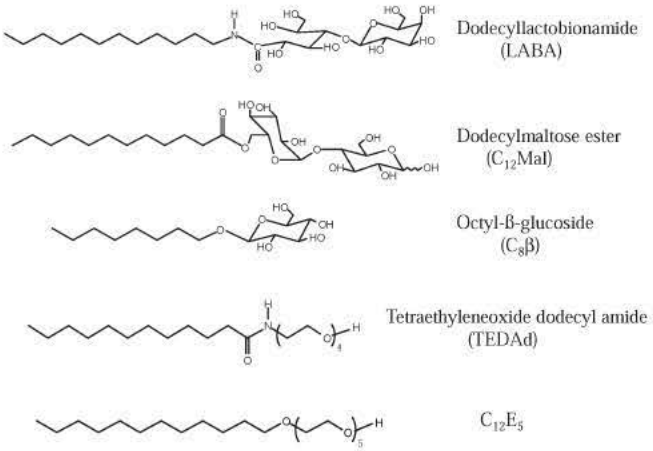


Figure 2 Sugar-based surfactants (Source: *M. Kjellin*, YKI)

The presentation described some of the new findings of the physical properties of surfactants based on natural products with a focus on sugar surfactants. These include phase behavior, adsorption properties, surface interaction forces (Figure 3), micellar properties, synergies, polymer-surfactant interactions, solubilisation, and hydrotropy. The work on ethoxylated surfactants with different hydrophobic groups such as fatty amides, phytosterol, cholesterol and dehydroabietic acid has been described as well.

A total of 28 centres similar to SNAP were started in many different scientific research areas. These academia-industry collaborations were mainly sponsored by the Swedish Agency for Innovation Systems (VINNOVA). During 2010 VINNOVA performed a study on the economic effects of some of these centres including SNAP.

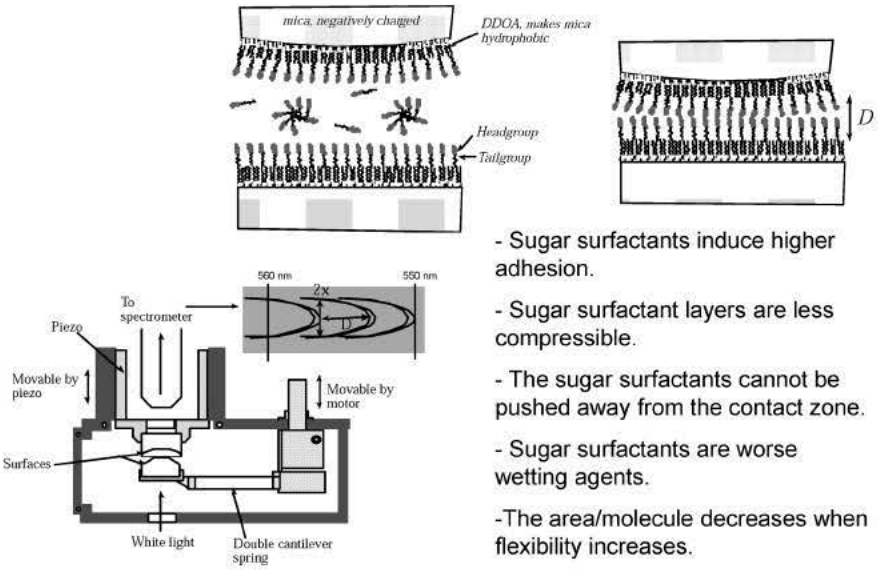


Figure 3 Sugar interaction forces (Source: *M. Kjellin*, YKI)

Biosurfactants, Hybrid Polymers

"New Surface-active Inositol Derivatives – Synthesis and Selected Properties" were described by *D. Blunk*, University of Cologne, Germany. Inositol is the common name for the family of the nine possible diastereomers of cyclohexane-1,2,3,4,5,6-hexols. They are naturally occurring compounds and possess the same elemental formula as common carbohydrates (hexoses) but a different molecular constitution. From that follows, that they retain certain interesting aspects of the related carbohydrates, as for example the hydrophilicity or biocompatibility. On the other hand, due to their differing structure, they also show deviant features as e.g. an enhanced chemical stability.

Nature employs amphiphilic inositol derivatives already for a long time as self-organizing amphiphilic structures in demanding environments, and during research in the last years this interesting family of multiols has been employed for the syntheses of new surfactants, too. It turned out that the hydrophilicity of the *myo*-inositol head group alone does not ensure sufficient water solubility of these surfactants. Therefore, to improve the water solubility, the hydrophilic head group has been modified by the introduction of tri(ethylene oxide) units. With this variation several new surfactant families were realized, differing in the arrangement of the hydrophilic building blocks (inositol and tri(ethylene oxide)) and the regiochemical position of the latter at the first. An overview was given on the syntheses of the new regio- and stereochemically defined inositol derivatives, their surface activity and amphitropic liquid crystallinity.

Our global awareness of the impact of petrochemically based technologies on our Nature increases constantly. "Latest Developments within Naturally Based Cleaning" were presented by *J. Mercanton*, AkzoNobel Surface Chemistry AB, Stenungsund, Sweden. Today most actors within the area of surfactants and polymers put a significant effort into developing naturally based solutions. This effort is a strive towards maintaining or even improving the efficiency of existing non-renewable products, while reducing and eventually in total remove the fossil-based parts. In this presentation one of the latest developments in this direction was covered. The focus on polymers with a significant (>50%) sustainable polymer part (Figure 4) has proven to bring new dimensions into applications. In recent years, this research has taken the form of increased performance while keeping the sustainable polymer portion constant, and maintaining performance while increasing the level of sustainable polymer. The technology presented is covered from the scientific perspective as well as from the perspectives of application in cleaning solutions, as a snapshot of ongoing further developments was taken.

While in many application areas the use of biodegradable surfactants has been well established, the common raw material basis is still unchanged: the vast majority of about 80% of all surfactants today is made from non-renewable, fossil resources like crude oil. Thus, one challenge for our industry is to identify alternative surfactants that are based on renewable resources, are biodegradable, and that show reasonable cost-performance effectiveness. "Biosurfactants – Exotic Specialties or Ready for Applications?" asked *M. Dreja* (together with *Inga K. Vockenroth* and *Nicole Plath*), Henkel AG & Co. KGaA, Düsseldorf, Germany. Surfactants are the most important ingredients in laundry detergents, hand dishwashing liquids and shampoos. The worldwide consumption of surfactants only in the area of laundry and home care products in the year 2009 summed up to 5.7 million tons. Conventional surfactants are mainly produced by classical chemical processes, which usually start from petrochemical- or oleochemical-based raw materials that are converted *via* various energy consuming steps to the final surfactant. There is a growing demand to either enhance the sustainability profile of these processes or change to new, more sustainable surfactants. Some approaches in that direction are the use of biocatalytic conversion steps or processes based completely on white biotechnology.

Biosurfactants are produced by living cells such as microorganisms. Until recently, biosurfactants were hardly available, but the onset of commercial availability marks a change in the detergents market. Biosurfactants are mainly produced when microorganisms are growing on water-insoluble substrates such as natural oils. This process is usually running at low temperatures and without large amounts of waste or by-products, therefore complying with the rules of green chemistry and potentially resulting in a lower carbon footprint than conventional surfactants.

Among the most important classes of microbial surfactants are glycolipids, lipopeptides and lipoproteins. Based on literature studies, properties of biosurfactants can meet or even surpass those of conventional surfactants when it comes to properties like interfacial tension reduction and wetting. Furthermore, surprising effects and properties not known from conventional surfactants can be expected. First biosurfactants such as sophorolipids belonging to the class of glycolipids have become commercially available and are already used in different laundry and home care applications such as dishwashing detergents, glass cleaners and other specialty household cleaners as well as in cosmetic applications despite their relatively high costs. This illustrates a great application potential which is still not yet fully exploited. Taking into account that further optimization and tailoring of materials, unique physical-chemical properties and production processes are within reach, the future perspectives for the use of biosurfactants are bright. Biosurfactants are less exotic than one might think. Still, availability and cost-performance aspects are a challenge for the use of biosurfactants in large-volume applications such as laundry detergents. Here, more research for highly effective materials is needed. Synergisms offer huge unexploited potential. Regarding the feedstock the focus should be on non-food materials, biomass approaches are desired.

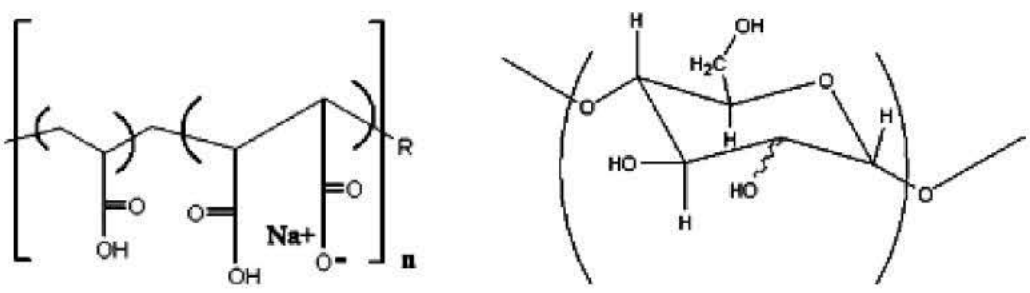


Figure 4 Marriage between synthetic polymers (left side) and biopolymers (right side) (Source: *J. Mercanton*, Akzo Nobel Surface Chemistry)

Young Researcher Prize 2011 awarded by the GDCh Division of Detergency and Formulations to Dr. Ingo Hoffmann

On the occasion of the 7th European Detergents Conference (EDC), the Young Researcher Prize 2011 of the Division of Detergency and Formulations of the German Chemical Society (Gesellschaft Deutscher Chemiker – GDCh) was awarded to Dr. *Ingo Hoffmann*, Grenoble, for his dissertation on "Aggregation and Adsorption Behavior of Polymer Surfactant Mixtures".

By his sound work *Ingo Hoffmann* succeeded in establishing a correlation between the molecular composition of surfactant polymer systems and the aggregation behavior in solution as well as the adsorption behavior on cotton fibers. Considering the complex problem he combined in his investigations scattering methods, rheology, calorimetry, and fluorescence spectroscopy. He interpreted the results in great detail and by means of theoretical models. The found connections enable a markedly better understanding of such polymer surfactant mixtures, especially for their applications in the field of laundry care.

From 2002 to 2007, *I. Hoffmann* studied chemistry at the TU Berlin and finished with a diploma thesis about "Aggregation and Solubilization Behavior of Polymer Surfactant Mixtures" in the group of *M. Gradzielski*. Afterwards, he did his PhD thesis in the same group from 2007 to 2010. During this work he spent time in the lab of *N. J. Wagner* (University of Delaware, 2008, 2009) and *K. Prochazka* (Charles University, Prague, 2009). Since 2011, he is a post-doc at the Institute Laue Langevin in Grenoble, France, working on neutron spin-echo spectrometer IN15. His current research is concerned with the dynamics of oppositely charged polyelectrolyte surfactant mixtures.

In his thesis he has developed a procedure for the measurement of polymer adsorption on arbitrary materials based on fluorescence labelling and tested it on cotton/polymer/surfactant systems. Despite the existence of many very accurate methods for the measurement on flat surfaces, the measurement on less well defined surfaces is still difficult. Furthermore, it is possible to observe the adsorption of a specific component in complex multicomponent systems. The adsorption behavior could be correlated with the formation of polymer-surfactant aggregates in solution.

I. Hoffmann delivered a short lecture on his outstanding work under the title

"Adsorption of Polymers on Cotton".

A novel method for the measurement of polymer adsorption on arbitrary materials has been presented. It is based on the use of fluorescently labelled polymers. Unlike many other methods available it is not limited to the use of flat model surfaces. As an example of great practical interest, e.g. as anti-redeposition agents, the adsorption of polysaccharide-based polymers on cotton has been measured.

J.-M. Aubry (together with *M. Durand, A. Lavergne, L. Moity, V. Molinier* and *Y. Zhu*), Université Lille Nord de France, USTL & ENSCL, France, presented "Chameleonic Solvents and Foaming Surfactants Based on Isosorbide, a Versatile Synthon Derived from Starch".

Considering the criteria of "sustainable development" the search for renewable raw materials for the production of solvents and surfactants is a research area of intensive interest. The demanded exigencies on the molecular structure of these compounds become even stricter if one wants to get a quality label for the final products. For instance, to get the "Ecocert" label for cosmetics or detergents, it is forbidden to use ingredients that have been obtained *via* some kinds of chemical reactions, among them ethoxylation. In this context, the potential of isosorbide, a bio-sourced building block derived from starch (Figure 5), was investigated to replace ethylene oxide in the preparation of a series of new solvents and new surfactants.

Short-chain ethylene glycol ethers C_iEO_j (i = 1–6 and j = 1–2) are sometimes called "chameleonic solvents" or

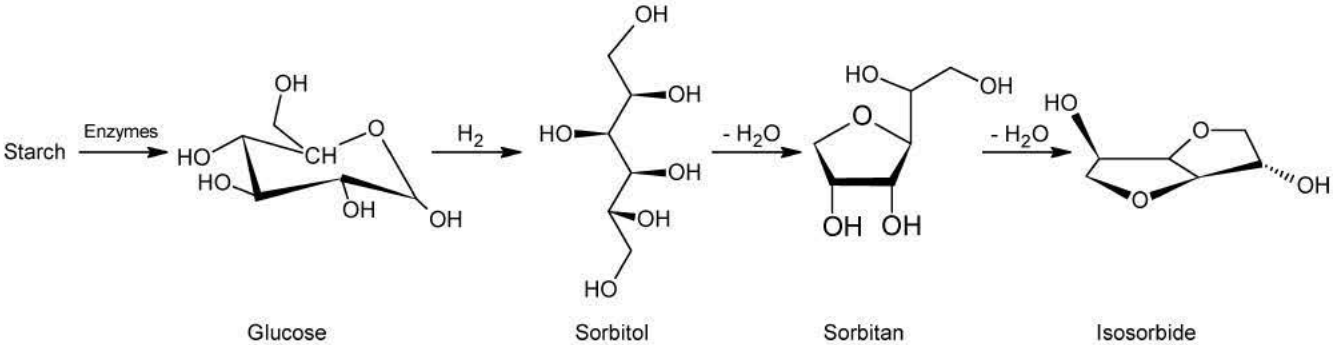


Figure 5 Isosorbide from starch (Source: *J. M. Aubry*, ENSCL)

"solvo-surfactants" since they are nonionic amphiphiles, exhibiting at the same time typical solvent properties (low molecular weight volatility, high dissolving power) and typical surfactant properties (surface activity, self-aggregation in water, co-micellization with surfactants, etc.) [1]. They are also used as additives for liquid detergent applications, where they enhance the solubility and increase the cloud point of nonionic-based systems, also retarding the formation of liquid crystalline structures. However, several short-chain members of this family are reprotoxic, and the market tends to stop using all of them. Therefore, there is a growing interest in looking for new classes of environmentally friendly solvo-surfactants. Some isosorbide monoalkyl ethers were found to be more effective than ethylene glycol and propylene glycol ethers in degreasing and solubilisation of organic compounds (fragrances, dyes, oils, etc.) in water [2].

Sodium lauryl ether sulfate is one of the most important synthetic anionic surfactants in volume today. The presence of 2–3 ethylene oxide (EO) units between the dodecyl chain and the sulfate polar head increases performance (lower cmc) and decreases skin irritation. When replacing the EO groups by an isosorbide moiety, two isomeric surfactants (2-*O*- and 5-*O*-dodecyl isosorbide sulfate) are obtained due to the asymmetry of this diol. 5-*O*-dodecyl isosorbide sulfate is the most water-soluble and the most efficient surfactant. It possesses a much lower cmc than sodium dodecyl sulfate, SDS, and requires a three times lower concentration to exhibit comparable foaming power [3].

Maria Rosa Infante[1] (co-authors: *L. Perez*[1], *R. Pons*[1], *A. Colomer*[1], *J. Morros*[1], *M. T. Garcia*[1], *A. Pinzo*[1] and *M. C. Moran*[2]), [1]Instituto de Química Avanzada de Cataluny, CID-CSIC, and [2]University of Barcelona, both of Spain, presented "Bio-based Surfactants from Renewable Resources". Significant advances made by the authors in the field of bio-based surfactants derived from amino acids and polysaccharide hydrophilic sources of different structure have been reviewed. The multidisciplinary approach included design, synthesis, adsorption at interfaces and self-assembly behavior, antimicrobial activity, and studies of biocompatibility including ecotoxicity, biodegradability and irritation effects. Considering the green chemistry principles, the synthesis contemplates the preparation of more efficient and safer surfactants using renewable raw materials for the synthesis of surfactants using bio-catalysis as condensating methodology, water media and designing for biodegradation. Also in order to increase the efficiency of these compounds, a complete characterization including self-assembly, ecotoxicity, biodegradability, and studies of mechanisms of toxicity has been carried out.

Microemulsions, Miniemulsions, Foam Films

Véronique Nardello-Rataj[1] (together with *E. Deniau*[1], *J.-M. Aubry*[1] and *B. Estrine*[2]), [1]Université Lille and ENSCL, and [2]Agro-industrie Recherches et Développement (ARD, Pomacle), both from France, described "Physico-chemical Properties and Microemulsion Behavior of New Amphiphiles Based on Terpene Alcohols as Hydrophobic Tails and Succinate, Azelate or Betaine as Polar Head Groups". Environmental constraints, economical factors and tougher regulations lead the authors to develop "greener" surfactants derived from natural renewable materials. Glycine betaine, obtained from sugar beet, is a cheap and still little developed by-product of the sugar-industry. Succinic acid, which is produced by fermentation of various renewable feedstocks, was among the top–12 value added chemicals from biomass published by the American Department of Energy in 2004. This bio-based molecule offers many potential applications in detergency, cosmetics, polymers, pharmaceutical products. Oleic acid, present in European vegetable oils, and its derivatives are also of great interest for the development of renewable materials. Oxidative cleavage of the double bond gives two useful products: nonanoic acid and azelaic acid, a dicarboxylic acid used as an effective anti-acne agent. Combined with a hydrophobic alkyl chain, these three natural building blocks can be used as polar headgroups for cationic and anionic surfactants. Thus, a new range of fully nature-based ionic surfactants derived from betaine, succinic or azelaic acids in combination with terpene alcohols as the hydrophobic alkyl chain have been developed. This amphiphile class is attractive not only for its "green" origin and its potential applications but also for its additional property as fragrance releasers resulting from the hydrolysis of the ester function. The terpene alcohols were chosen among pelargol, citronellol, menthol, borneol, rosalva and decanol as a reference. Such a series allowed the study of structural effects, i.e. ramification, unsaturation and cyclisation of the C_{10}-alkyl chain on the binary and ternary phase behavior of the amphiphiles.

The physico-chemical properties (Krafft point, cmc and kinetics of hydrolysis) were determined as well as their lyotropic aqueous phase behavior. The insertion of the ester function inside the hydrophobic tail considerably lowers the Krafft point from about 30 °C of the succinate derivatives compared to the carboxylates and delays the formation of the first mesophases. The betainate esters do not exhibit Krafft points. Surface tension versus concentration curves show that some of them behave as hydrotropes whereas others act as true surfactants. In all cases, critical aggregation concentrations were determined. Hydrolysis kinetics of esters was investigated at pH 5, 7 and 11 for several days showing a dependency on the structure of the terpene alcohol, on the pH-value and on the cmc value, as the hydrophobic environment of the micelle protects the ester function. The effect of chain length, ramification, unsaturation, cyclisation of the C_{10}-alkyl chains was discussed. Ternary phase behavior was then investigated. Fish diagrams, i.e. the amphiphile concentration versus a scan variable, e.g. nature of the oil or addition of electrolyte, were elaborated and the microemulsion systems were detected. The amphiphile/water/oil ternary systems were characterized through their optimal concentration C*, i.e. the minimal amount of surfactant required to obtain a one-phase microemulsion system.

The natural-based ionic amphiphiles derived from terpene alcohols and based on betaine, succinate or azelate as

Poster Prizes of the GDCh Division of Detergency and Formulations

Two First Poster Prizes were awarded to *Christoph Herfurth*, University of Potsdam, Germany, for his "Amphiphilic Star Polymers – One Step RAFT Synthesis and Properties in Aqueous Solutions & Microemulsions" and to *Maria Patitsa*, Katholieke Universiteit Leuwen, Belgium, for her poster "Detergent's Efficiency of Fatty Acid Multilayer Removal Followed on-line by Optical Fiber Sensor". *Hannah Blümke*, Rhine-Waal University of Applied Sciences, Kleve, Germany, received a Second Poster Prize for her work on "The Washing Machine as a Major Source for Microbial Contaminations at Domestic Laundry" as well as *Leonardo Chiappisi*, TU Berlin, Germany, for his investigation on "Structure and Properties of Oppositely Charged Mixtures of Chitosan and Alkyl Ethoy Carboxylates".

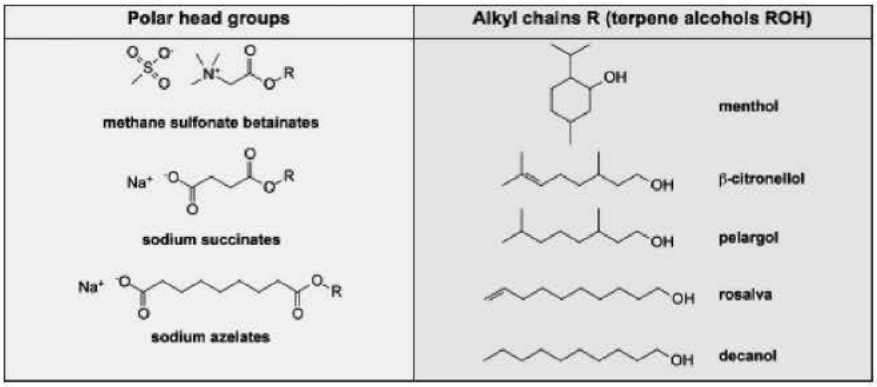


Figure 6 Amphiphiles derived from betaines, succinic and azelaic acids and terpene alcohols (Source: *Véronique Nardello-Rataj*, Université Lille and ENSCL)

polar headgroups (Figure 6) exhibit interesting properties as surfactants or hydrotropes. They form microemulsions. The controlled hydrolysis of the ester function depending on pH also makes them attractive as so-called cleavable surfactants either as fragrance releasers or for topical applications requiring a temporary effect of the surfactant.

Formal Address:
Mega Trend Resource Productivity

This year's Formal Address was delivered by Prof. Dr. Dr. h.c. *Ernst Ulrich von Weizsäcker*, Co-Chair, International Resource Panel, UNEP, Paris, France. The economic cycles over the last centuries, which can be divided in five phases, the so called "Kontratiev Cycles", were following a steadily climbing curve of prosperity for the population of the world by technical progresses and low-priced and easily accessible resources. From the beginning of the sixth phase the world seems to have reached a state of major concerns about long-term, or even the medium-term availability of many resources if it will not be possible to enhance for a manyfold the policy of resources. Oil, phosphates, rare earth metals, indium, gallium, ruthenium and other metals are becoming scarce. Substitutes are problematic. The best option would be a consistent strategy to steadily increase resource productivity. A saving of energy in the rich countries of 20% results only in one thirtieth for the population of the world. This will be only possible with a consistent strategy to steadily increase resource productivity. A fivefold increase of energy and resource productivity is technically feasible. Technical feasibility turns into economic feasibility only when frame conditions are changed. Notably, energy prices will have to be moved upwards. A long-term predictability of slowly rising energy prices would not hurt the economy but would still be highly effective. An EU harmonization would be desirable but some EU countries are likely to block such strategy.

The aim of *M. Elgammal*[1] (together with *M. Gradzielski*[1] and *R. Schneider*[2]), [1]TU Berlin and [2]Institute of Textile Chemistry and Chemical Fibers, Denkendorf, Germany, was "Synthesis of Nano-scale Binding Agents through Miniemulsion Polymerisation and Their Application in Textiles". Figure 7 depicts miniemulsions *vs.* macro- and microemulsions. Miniemulsion polymerisation (Figure 8) was used to prepare nano-scale emulsion latices based on butyl acrylate (BA) and methyl methacrylate (MMA) monomers to be applied as binding agents for pigment coloration of different textile fabrics. Sodium dodecyl sulfate (SDS) is used as anionic surfactant, while hexadecane and cetyl alcohol are taken as solvent and stabilizer in the miniemulsion. The miniemulsification is done by the use of ultrasonic devices or by low energy techniques such as the Phase Inversion Concentration (PIC) method. The particle size and polydispersity of the obtained products have been investigated by Dynamic Light Scattering (DLS) and Small-angle X-ray and Neutron Scattering (SAXS, SANS). In addition, the structure of the latex particles was verified by Transmission Electron Microscopy (TEM). The parameters which may affect the latex particle formation and size such as surfactants, hydrophobe, sonification time, monomer composition and solid content have been varied in a systematic way in order to have optimized formulations for the desired particle size and shape. The monomer conversion has been calculated and the average molecular weights of the polymers contained in the latex were measured by Gel-Permeation Chromatography (GPC). The applicability of the prepared latices as binding agents for textile applications was examined by Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), mechanical as well as rheological studies. From these results it was concluded for which conditions miniemulsion derived latices have an advantage over conventional processes for pigment coloration.

D. Bockmühl, University of Applied Sciences Rhine-Waal, Kleve, Germany, was committed to "Antimicrobial Properties of Biosurfactants". Many amphiphilic substances made by living cells can exhibit comprehensive effects, especially on cellular systems. Consequently, a range of biosurfactants have been investigated for their antibacterial, antifungal or antiviral activity that is mostly based on the ability to destroy microbial cell membranes (Table 1). In addition, some of them are also able to inhibit the adhesion of microorganisms to surfaces and tissues, thus providing against biofilm formation or preventing the infectious process. Although these antimicrobial properties can generally be explained by a strong detergency effect of biosurfactants, there are several special mechanisms resulting in the damage of microbial cells, such as the interaction with membrane phospholipids or the alteration of the electrical conductance of membranes.

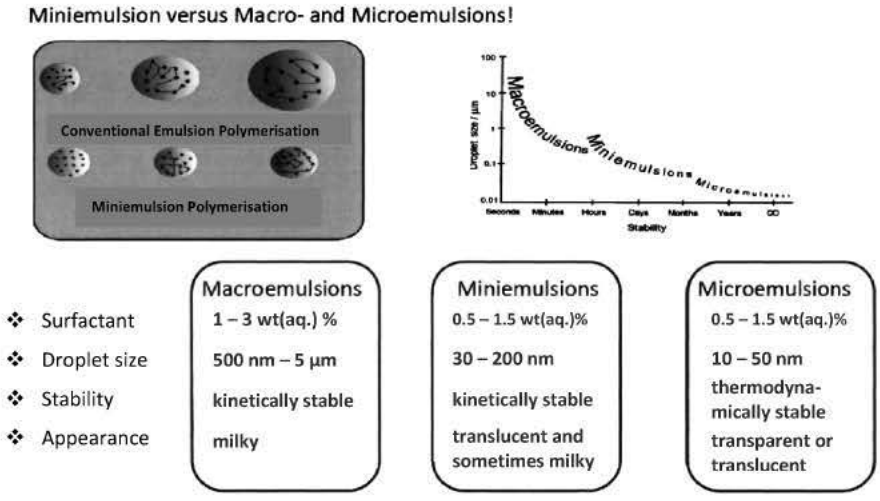


Figure 7 Miniemulsion *vs.* Macro- and Microemulsion (Source: *M. Elgammal*, TU Berlin)

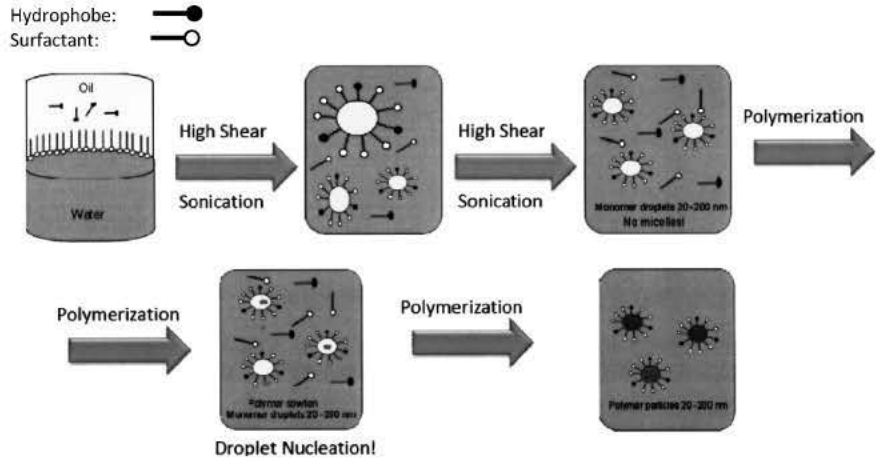


Figure 8 Mechanism of miniemulsion polymerisation (Source: *M. Elgammal*, TU Berlin)

	Glycolipids	Lipopeptides
Per application (cleaner)		
MIC	~ 100 µg/mL	~ 50 µg/mL
MBC	~ 10 mg/mL	~ 100 µg/mL
Per washload (laundry detergent)		
MIC	~ 1,5 g	~ 750 mg
MBC	~ 150 g	~ 1.5 g

Table 1 Biosurfactants as antibacterial agents for laundry and cleaning

Typically, antimicrobially active biosurfactants are glycolipids (e.g. rhamnolipids) or cyclic lipopeptides (e.g. Polymixin).

Moreover, further pharmaceutical effects, such as immunomodulation or an anti-proliferative activity, have been reported, making biosurfactants interesting as putative drugs. Since most of these substances have been available in larger quantities in the past, their potential applications in consumer products were not studied intensely, however, their versatility and the possibility of combining different properties, such as cleaning and antimicrobial effects, suggest a further consideration of biosurfactants even for the mass-market.

E. Carey (co-authors: *C. Ridings, G. Andersson* and *Cosima Stubenrauch*), University of Stuttgart, Germany, asked "Self-dissociation of Solvents and Ion-specific Effects in Foam Films? Water/Glycerol Foam Films Are Stabilized by Non-ionic C_{12}DMPO". The surface charge at the interface has a significant influence on both wetting and foam films, and thus in industrial processes such as froth and ion flotation. This charge can originate as a result of self-dissociation of solvents and/or ion-specific effects. In other words, charges in foam films can stem not only from the dissociation of the solute (e.g. electrolytes or ionic surfactants) but also from the self-dissociation of the solvent [4]. In foam films stabilized by nonionic surfactants it is only the self-dissociation of the solvent that can be the origin of charges. However, in the presence of electrolyte, both solvent dissociation and ion-specific effects may play a role.

In the present study free-standing foam films stabilized by the nonionic surfactant dodecyl dimethyl phosphine oxide (C_{12}DMPO) were investigated in the absence and presence of electrolyte. As solvent a mixture of water and glycerol was chosen with mixing ratios of water:glycerol = 1:0, 1:1 and 0:1. Fitting the obtained disjoining pressure isotherms with the DLVO theory made it possible to determine the surface charge. Hence, the effect of dissociated water on the surface charge was examined. Finally, ion-specific effects of aqueous foam films stabilized by C_{12}DMPO are examined. For this purpose, monovalent salts consisting of different anions (NaI, NaCl, NaF) were taken at an electrolyte concentration of 10^{-4} M. An increase in both the foam film thickness and foam film stability was observed with increasing anion size. Similar observations were recently made for the anionic surfactant sodium dodecyl sulfate (SDS) [5, 6]. This observation may be explained by a stronger tendency

Raw Materials Lecture: Oleochemicals – Still an Economic and Sustainable Feedstock for Surfactants?

Instead of the traditional market lecture, this year a raw materials lecture was hold by *Klaus H. Nottinger*, Oleo-Consult, Neuss, Germany. Since the late 18th century, when fatty acids and glycerol were discovered as the basis of oleochemistry, oleochemicals have been the key for leading the way for surface-active agents. The world consumption of 17 oils and fats is shown in Figure 9. Global food use growth (mainly from palm oil) accounts for 73 % of total growth 2010/11 (+ 4.9 million tons), industrial use for 27 % (+ 1.8 million tons).

The total industrial use of renewable raw materials (~ 9 million tons/year) is given in Figure 10. Today oleochemicals are finding an extensive use in the production and development of basic and speciality surfactants. In the different regions of the world oleochemicals have become an important part of the value chain for consumer products as well as industrial applications.

The diverse natural raw material base and the abundant feedstock availability in combination with the substantial increase in capacities and efficiencies made the world confident that oleochemicals will continue to suit the mega-trends wellness and sustainability and will remain an economic feedstock for the surfactant industry. The recent global trend of favoring renewable raw materials as feedstock for biofuels as well as biomass for bioenergy leads however to a more and more regulatory and legislative impact on renewable raw material's economics and availability. At the same time concerns are rising regarding sustainability, indirect land use change, CO_2 balance and climate change.

The presentation addressed key issues around these conflicts of interest with descriptions of recent trends in the market regarding prices, capacities, industry players and governmental impacts.

of the larger ions (which have a smaller effective size due to the smaller hydration shell) to adsorb at the surface, which is in line with molecular simulations [7].

Sugar-based "natural" surfactants are gaining growing environmental awareness. They are of low toxicity, biodegradable, and are widely used e.g. in protein solubilization and studies with cell membranes. *R. Krastev*, University of Tübingen, Reutlingen, Germany, presented "Single Foam Films

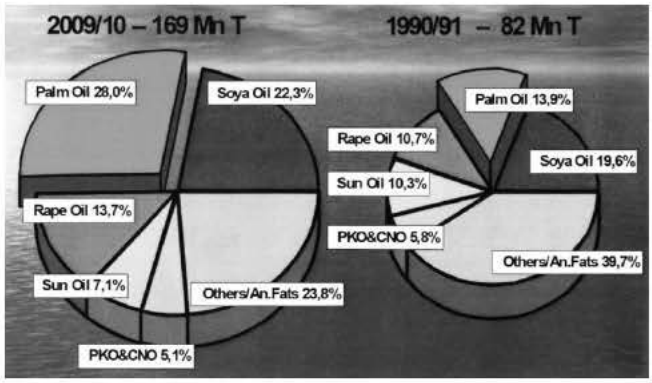


Figure 9 World consumption of 17 oils and fats (Source: *K.H. Nottinger*, Oleoconsult)

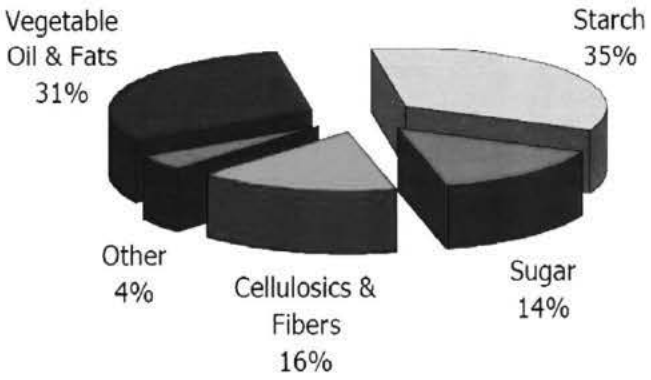


Figure 10 Total industrial use of renewable raw materials (~ 9 million tons/year) (Source: *K. H. Nottinger*, Oleoconsult)

from *n*-Dodecyl-β-maltoside". *n*-Dodecyl-β-maltoside ($C_{12}G_2$) is a typical nonionic sugar-based surfactant which finds application in different fields of science and techniques.

Many of the properties of the foams depend on the properties of the thin liquid lamellae (foam films), which separate the foam bubbles. An important basic property of foam is its stability. Many studies have been performed to investigate foam stability in short and long time periods. Short-term stability is governed by the dynamics of foam formation and drainage of the films, while long-term stability depends on the properties of the equilibrium foam films. The rupture of the films leads to the coalescence of the bubbles. The transfer of the gas between the bubbles (*Ostwald* ripening) is another factor that influences the foam stability.

The present work summarised the results of studies on foam film stability, film thickness, contact angle film-meniscus and gas permeability of foam films stabilised by $C_{12}G_2$. Routes for fine control of these parameters were presented. The influence of nano-sized particles in the film forming solution on the film drainage, stability and permeability was discussed.

The link between the properties of single foam films and bulk foams was presented and discussed in detail.

Detergents and Cleansers

K. Last, Follmann & Co. GmbH & Co. KG, Minden, Germany, presented "New Formaldehyde-free Stable Core/Shell Microcapsules for Industrial Applications".

Microencapsulation as a technology to increase efficiency and substantivity, especially in loading textiles with scent, entered the washing and cleaning detergents industry a few years ago, predominantly in the area of fabric softeners. Microencapsulation is the only method that generates the desired boost, guarantees the release of scent over a long period of time and makes the most efficient use of the expensive perfume oils while working on the basis of a mechanical release mechanism. The size of microcapsules is shown in Figure 11, examples of the morphology of different microcapsule systems in Figure 12.

The high demands on the chemical and physical resistance of the microcapsules in their end products usually worked in favour of core/shell capsules with walls made up of amino resins. Oil-in-water microencapsulation *via* polycondensation is depicted in Figure 13. All of the large manufacturers focus on this system as the industrial feasibility, stability and quality of the products represent the state-of-the-art. Due to the equilibrium within these polycondensation products, formaldehyde content is inevitable.

Now Follmann & Co. have managed to produce stable core/shell microcapsules that possess all the benefits of the amino resin microcapsules but without any formaldehyde content. The interaction of the suitable protective colloids with polyhydroxy compounds, e.g. phloroglucin and reactive dialdehydes such as glutaraldehyde, succinaldehyde and glyoxal, resulted in microcapsules that set new standards through their performance and characteristics. Toxicological evaluations and technical application tests show that these microcapsules might be interesting for various industrial areas, most of all the laundry, cosmetics, pharmaceutical, medical engineering and automotive industries.

- Nanocapsules < 0.5 µm
- Microcapsules > 0.5 µm – 1 mm
- Macrocapsules > 1 mm

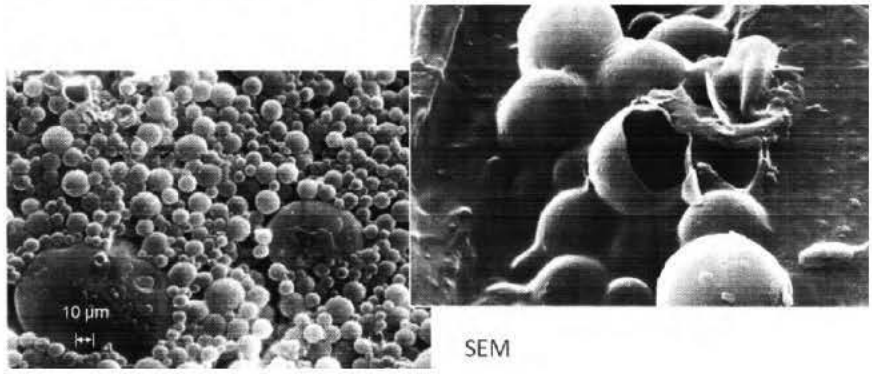


Figure 11 The size of microcapsules (Source: *K. Last*, Follmann)

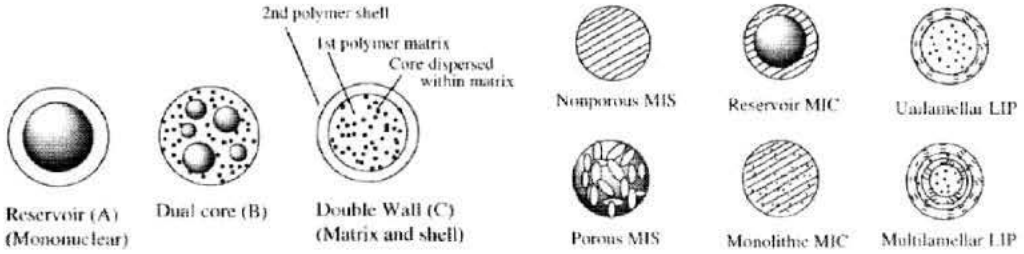


Figure 12 Examples of the morphology of different microcapsule systems (Source: *K. Last*, Follmann)

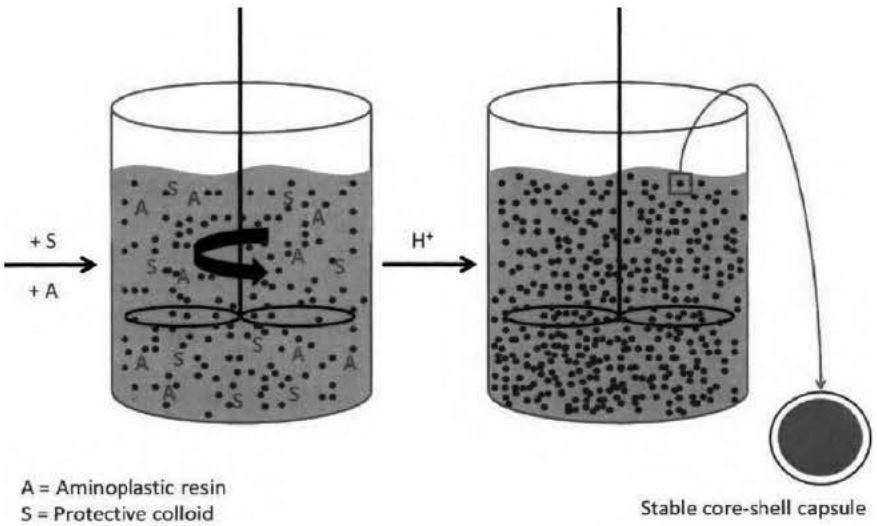


Figure 13 Oil-in-water microencapsulation via polycondensation (Source: *K. Last*, Follmann)

SEPAWA Awards

The First Prize of this year's SEPAWA Awards was given to *Susanne Gorny* for her Diploma thesis on "Comparative study of a concentrated rinse aid product to the reference rinse aid" (University of Bonn). Two Second Prizes were awarded to *Lisa Fleischmann* for her Bachelor work on "Investigations on essential oils on smell modulating ingredients" and to *Miriam Reineking* for her Bachelor work on "New film-forming systems for styling foams", both from the University of Applied Sciences, Eastern Westfalia-Lippe, Detmold. *Katharina Redecker*, also University of Applied Sciences, Eastern Westfalia-Lippe: Bachelor work on "Development of a test method for the quantitative determination of care polymers on hair surfaces" and *Sophie Ludwig*, London College of Fashion: Bachelor Thesis on "An *ex vivo*, comparative study of the tensile strengthening efficacies of protein-derived actives in the management of heavily, chemically bleached hair" received Third prizes.

Due to this year's great number of excellent applications two Promotion Prizes were conferred to *Johanna EL Andaloussi-Lilja*, University of Stockholm, for her PhD Thesis on "Activation and regulation of TRPV1-studies in recombinant human neuroblastome" and to *Regina Klein*, University of Regensburg, for her dissertation on "Choline applied as counterion – A study for the design of biocompatible surfactants and green ionic liquids".

"The Use of Beneficial Microorganisms in Controlling Stains, Odors, and Fouling: Interactions with Undesirable Microbes" was recommended by *J. Leder*, Novozymes Biologicals, Inc., Salem, VA/USA. Knowledge of microbial ecology and the human microbiome have increased greatly in recent years. This has led to a greater understanding of the positive role of microorganisms in relation to humans and our environment. Work was described which explores the interactions of beneficial microorganisms with undesirable (UD) species under laboratory and field conditions. Genetic analysis and other studies shed light on some of the mechanisms of activity. Finally, some potential applications of biocontrol organisms were discussed.

C. Werner[1] (together with *U. Freudenberg*[1], *Kati Schmidt*[2], *Heike Weber*[2], *J. Tropsch*[2] and *M. Hartmann*[2]), [1]Zeta SCIENCE, Dresden, and [2]BASF SE, Germany, reported on "Investigations on the Removal of Starch Containing Soils in Auto Dish Wash". The effective removal of starch containing deposits from ceramic surfaces often remains an unmet challenge in automatic dishwashing. Well defined and reproducible testing strategies are critically important for the successful development of effective cleaner systems. To address this need, a model coating system based on starch and casein has been introduced. The biopolymer preparations were deposited onto silicon oxide surfaces mimicking ceramic materials. Cleaning experiments were performed by applying a set of analytical methods to mechanistically investigate the removal of the model deposits. The applied methods include quartz crystal microbalance (QCM), ellipsometry and confocal laser scanning microscopy (C-LSM).

Based on this approach, it was possible to reveal the basic principles governing the adhesion of starch and starch-casein (protein) layers to silicon oxide surfaces and their removal. The influence of time, temperature, pH, ionic strength (water hardness) and the addition of different cleaning substances was systematically investigated. Emphasis was put on the impact of chelating agents and other builders. It was found that MGDA outperformed other chelating agents. The efficacy of MGDA can be further enhanced by combining MGDA with certain polycarboxylates.

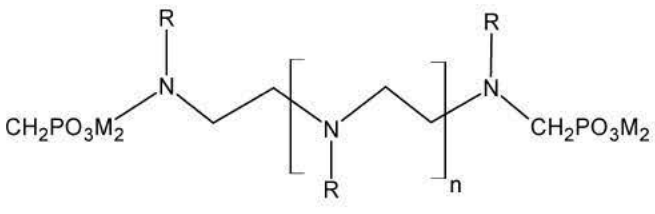
"The Microbial Quality Management (MQM) for the Production of Detergents and Cosmetic Products" was explained by *W. Siegert*, Schülke & Mayr GmbH, Norderstedt, Germany. To produce microbiologically faultless detergents and cosmetics an integrated quality management system is necessary, consisting of good raw material quality, hygienic design of production facilities, good production hygiene and a validated preservative system. Optimising the antimicrobial stabilisation of detergents and cosmetics by utilisation of synergistic effects, allows the sustainable use of preservatives.

Hazard analysis critical control point (HACCP) is a systematic preventive approach to safeguard microbiologically faultless quality. The requirements of ISO 22716 (Cosmetics – Good Manufacturing Practices (GMP) – Guidelines on Good Manufacturing Practices) were demonstrated for the production of aqueous products. Examples for proper hygienic design and adequate hygiene measures, as well as a raw material and finished product assessment according to ISO 29621 (Cosmetics – Microbiology – Guidelines for the risk assessment and identification of microbiologically low-risk products) completed the microbiological quality management (MQM) concept.

Silvia Werthmann (co-author: *M. Paladini*), Polygon Chemie AG, Olten, Switzerland, presented "HYDRODIS – Oligomeric Phosphonates for Universal Applications in Detergency". This new innovative chemical class of oligomeric phosphonates (Figure 14) combines the high dispersing power of polymers like polyacrylates with the intense substoichiometric threshold effect of monomeric phosphonates in *one* molecule. The result of this new tailored molecule is the gain of additional powerful properties for better performance and/or the handling in extreme external conditions like high pH, high temperatures and exceeding high water hardness. The use of oligomeric phosphonates reveals even a faster stop of crystal growth of calcium carbonate than monomeric phosphonates. Furthermore, oligomeric phosphonates are suitable to replace NTA and push up the performance of chelating agents. This is recommended for applications like tea, coffee and red wine stain removal. If neutral they do not require any labelling.

Sustainability (GDCh/LUV Conference)

Sustainable consumption is an overarching task for the whole company. It relates to corporate functions such as product design, material procurement, production, logistics, marketing, communication, customer service, repurchase



R = Rest, possibly $CH_2PO_3M_2$

Figure 14 Chemical structure of oligomeric phosphonates (Source: *Silvia Werthmann*, Polygon)

and recycling processes. "From Niche to Mass Market: Strategies for Sustainable Consumption" were presented by *N. Coles*, UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production, CSCP, Germany.

Many of the product's life-cycle impacts do not occur on the site it is produced. Many products have a high environmental footprint in the use phase. Increasingly, it is recognized that a disproportionate amount of time and effort has been spent addressing compliance issues in company owned production facilities. The focus in recent years has been shifting towards the more relevant aspects of (pre-)production and supplier issues. Now sustainability efforts involve also the use-phase. Sustainable consumption at the company level therefore means primarily to take a full life-cycle perspective in order to identify key areas for action and innovation.

The presentation referred to the differences in consumption patterns and lifestyles in developing and industrialized countries as well as in developing countries with consumers with "western" shopping budgets and preferences. These are of increasing importance. Against this background the presentation highlighted the following aspects: global value chains, drivers for buying decisions, sustainability labelling, the role of governments and civil society, the role of media, and the role of marketing.

The focus lies on the questions, how companies respond to the challenges outlined above and on what way they can enter the mass market with strategies for sustainable consumption.

"Between Missionary Zeal and Greenwashing, between Education and Kitsch: How Can Sustainability Be Communicated? asked *S. H. Siemer*, Ambulance for New Communication (AFNK), Lüneburg, Germany".

Based on an empirical study, this presentation explained what companies can do by means of communication or actions to become accepted as credible sustainability stakeholders. This approach is special. It is not an analysis of companies' actual sustainability activities or objective sustainability performance. Instead consumers are asked about their emotionally perceived perspective concerning sustainability reputation and emotionally perceived relevance of various forms of ecological and social commitment.

In a second step successful communication of this challenging topic has been discussed using concrete examples.

N. Hiller, Intechnica Consult, Nuremberg, Germany, interpreted "Sustainability for a Small and Medium-sized Enterprise (SME)".

Small and mid-sized enterprises often are owned by families. This kind of companies usually shows sustainable thinking in any kind of their companies' strategy and philosophy by nature. The question mainly is how to bring it in a systematic structure to be able to analyse the gaps and also use it to promote the company's name as a sustainable brand. Social aspects like labour conditions and occupational health and safety are established by European legislation anyway. Systems like the SA 8000 (based on the Geneva Convention) as well as the newly published ISO 26000 and the OHSAS 18001 of occupational health and safety issues can be used for structuring the system. The economical side of sustainability is covered by usual financial reports, which should show corporate social responsibility against workforce, long-term planning of each activity and product development along life-cycle assessment.

The environmental aspects are totally involved in the environmental management system according to the European EMAS standard. Today the major focus for production and also for investment in buildings is energy and material efficiency as well as carbon footprint for products to fulfil a sustainable philosophy.

Finally, small and mid-sized companies should publish their sustainable activities for being respected on the market. Options are the environmental statement as part of the EMAS system and the standard of the global reporting initiative, called GRI-report.

Elke Wieczorek, DHB Network Household, Bonn, Germany, discussed "Sustainability from Consumer's View". Consumers will combine with the term "sustainability" at first the aspect of environmental care whereas the three columns ecology, social aspects and economy on which sustainability is supporting are rarely known by the public. The understanding of globalization, economical success, environmental contamination, protection of the resources, health, social relations und consumption is not well developed.

On the other hand the responsibly behaving consumer separates his garbage, avoids plastic bags and unnecessary packaging material when going shopping and takes the bicycle for fetching his rolls. Reports about bad situations in the industries for the production of clothes shake consumers up and raise people's awareness to take responsibility when purchasing such products.

The actual debate about energy focuses the attention on taking care and keeping of resources. But a sustainable development demands more, above all changing our lifestyle. In this connection the individual decisions of buying are very important. Sustainable consuming demands turning back the mind on quality and not on quantity.

The goal of the DHB network household in cooperation with further associations refers to bring up responsible consumers in his personal environment. Since 10 years, the "Forum Waschen" for example offers a platform of dialogue to the consumers. Sensitizing the consumer for a circumspect behavior with cleaning and washing detergents, an efficient use of electric energy and water will be reached.

"Communication to Consumers for Effectively Implementing GHS Labels" was the commitment of *P. Dekker*, Dutch Food and Consumer Product Safety Authority (VWA), Utrecht, The Netherlands, using a "*Study of Dutch consumer attitude and behavior towards household chemicals*".

The Globally Harmonised System of Classification and Labelling of Chemicals (CLP) introduced new safety labels for chemical substances and mixtures, including new pictograms and signal words. To prepare for the introduction of GHS labels the Dutch government commissioned a study to gain knowledge about consumers' understanding of safety information. The study addresses attitudes and behavior towards household chemicals among Dutch consumers and tested their understanding of and response to current and new labels.

The researchers used two methods: consumer focus groups (young adults, seniors, young parents staying at home, and handymen) and an online questionnaire about purchase and use behavior among a reasonable sample of the Dutch population.

Main conclusions are: consumers read labels, but take little note of the safety information, most current and new labels are poorly understood and consumers are more inclined to act upon warnings that are easier to implement.

The study resulted in recommendations for communication to consumers about the meaning of the new symbols and pictograms and the safe use of household chemicals. In 2009 the Dutch government started a long-term public communication programme on the basis of this study and the recommendations for communication.

(This research was carried out by Milieu Centraal and Schuttelaar & Partners with funding of the Dutch Ministry of Health, Welfare and Sports. Research commissioner: Dutch Food and Consumer Product Safety Authority.)

Anne Gautrais-Le Goff, European Commission – DG Enterprise and Industry, Unit G.2, Chemicals – Classification & Labelling, Specific Products, Competitiveness, Brussels, Belgium, highlighted "Sustainability Aspects in the EU Chemicals Legislation".

This presentation examined the main elements of a range of European Union legislation that affects the placing on the market and use of chemicals and their potential to increase sustainability. The analysis included, among others, Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACh), Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP), and Regulation (EC) No 648/2004 on detergents.

A. Stürer, Swiss Toxicological Information Center, Zürich, Switzerland, presented "Poison Centres' Data for Expert Judgement within Classification, Labelling and Packaging Regulation". The Regulation EC No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP Regulation) apply at the latest from December 1, 2010, for substances and from June 1, 2015, for mixtures (at present: preparations) and allows selling products manufactured before those dates for two further years. As compared with the formerly applied Dangerous Preparations Directive 1999/45/EC the CLP Regulations relies on much lower limits in the calculation of hazardous properties, e. g. for classification as corrosive or irritant to skin or eyes. Manual dishwashing products would be classified as "corrosive" when applying the results of the calculation method.

But appropriate labelling is a prerequisite for the best possible medical advice and treatment in cases of suspected poisoning. A labelling method which heavily over-emphasizes existing hazards cannot be basis for medical treatment.

The "expert judgement" in the CLP Regulation will be the instrument for arriving adequate classifications for an appropriate labelling. The experts have the possibility to resort data from several accident data base, epidemiological and clinical studies, and well-documented case reports and observations.

The Society of Clinical Toxicology (GfKT) with its 9 networked poisons information centres in Germany, Austria and Switzerland started on October 1, 2008, the MAGAM Study, in order to analyse human toxicological data from the past 10 years and to regard corrosive eye exposures to selected domestic products, e. g. machine dishwashing and other detergents, cleaning and maintenance products. From these results it is obvious that the calculating method has not been congruent with the results from the practice.

Maximiliane Schneider (together with *R. Stamminger*), University of Bonn, Section Household and Appliance Technology, Germany, analysed "Consumer Behavior in Dishwashing and Cleaner Consumption in German Households".

This survey gave an overview on the consumer habits in manual and automatic dishwashing and dishwashing cleanser dosing practise in German households. 2,567 questionnaires of German consumers were analysed reflecting washing-up behavior, cleaning products used and corresponding consumer satisfaction. Demographic data such as household size and household composition were included in the evaluation.

Different usage groups were classified using the frequency of utilisation of the domestic dishwasher. Additional parameters like pre-treatment or the amount of dishes are compared. Some user groups display a different behavior in the process of dishwashing. For example, "non frequent dishwasher users" have a significant higher share of manually cleaned items. All dishwasher user groups appear to use their dishwasher in an inefficient way.

These saving potentials show the importance of consumer information tailored to specific dishwasher usage to increase the understanding of sustainable behavior in every day life.

Surfactants for Natural Cosmetics, Phase Behavior

In the following section two lectures of the cosmetics program are mentioned which are of interest for the surfactant scene. "Surfactants and Surfactant Systems for Natural and Organic Cosmetics" were reviewed by *Ute Griesbach* (co-author: *Jessica Erasmy*), BASF Personal Care and Nutrition GmbH, Düsseldorf, Germany. The range of surfactants suitable for the formulation of authentic natural cosmetics is quite limited according to the NGO standards, e. g. NaTrue, BDIH and COSMOS (Table 2).

In addition to the origin of the raw material other criteria such as manufacturing processes, by-products, preservation systems, biological degradation and aquatic toxicity are now considered when deciding the suitability of a cosmetic ingredient. The INCI name does not give all of the required information.

There are surfactants which are accepted by all label organisations but there are still differences regarding the acceptance criterion. Similarities and differences were discussed.

Other topics included are the benefits of surfactant combinations and final product performance, which should be ideally the same as of a conventional market product. As a model the Formulation Assisting Software Toolkit (FAST) was demonstrated which enables to select suitable surfactant systems and to optimise existing formulations. Natural and economic formulations based on Coco-Glucosid (APG), Cocamidopropyl Betaine (CAPB) and Sodium Coco Sulfate (SCS) were recommended.

The influence of liquid-crystalline phases in cosmetic formulations increasingly gains in importance. *Petra Kudla* (together with *T. Sokolowski* and *B. Blümich*), Beiersdorf AG, analysed the "Phase Behavior of Liquid-crystalline Emulsion Systems", containing a surfactant, fatty alcohols

Surfactant class	Basic surfactant	Co-surfactant
Alkyl Glucosides	×	×
Alkyl Glutamates	–	×
Alkyl Citrates	–	×
Alkyl Lactylates	–	×
Alkyl Sulfates	×	×
Alkyl Tartrates	×	×
Protein derivatives	–	×
Soaps	×	–
Betaines, natural	–	×
Saponines	×	×

Table 2 Surfactant choices for cosmetics with a label for natural or organic claims

and water. Depending on the amount of surfactant, i.e. *N*-(3-dimethylaminopropyl) octadecane amide, the emulsion-like system forms different microstructures. With increasing surfactant content the formulation evolves from a system with lyotropic lamellar phases to a system with crystal layer phases. The lamellar system is highly sensitive to temperature and shear impact. Changes in lamellae distance were investigated by SAXS, in lamellae size and order by ^{13}C-CPMAS and ^{2}H-NMR.

Using a mixture of analytical methods, i.e. DSC and polarization microscopy, a phase diagram of this system could be derived. Moreover, additional rheometric investigations suggested major differences in the viscometric behavior and stability of the different mesophases. Consequently, the analysis of the ripening process of these systems showed changes in the structure formation within the first two weeks after production. High amounts of bound water lead to higher viscosities and a better sensory profile.

Forum for Innovations

Here is a selection of some Short lectures hold in the Forum for Innovations.

Surfactants, Builders, Silicones

According to *in vivo* dermatological and sensoric trials performed by *I. E. Held, M. Husmann, U. Heinrich* and *H. Tronnier*, Schill & Seilacher, Böblingen, sodium cocoyl glutamate and sodium lauroyl sarconisate are mild and eudermic surfactants for daily cleansing. Glycereth-7 Caprylate/Caprate, developed by *E. Barrientos*, Kao Chemicals Europe, is a highly versatile (cold) emulsifier and has excellent properties in shower creams. *Regina Walther*, PERA Ingredients, presented *Quillaja saponaria* extract, which is not only a traditional surfactant, especially in Chile, but also a highly bioactive substance that addresses pre-damaged skin.

The Cocohydroxysultaine surfactant shows a significant performance benefit compared to alkyl- and amidopropyl betaines and amphoacetates in HI&I and personal care products, said *J. Hibbs*, Rhodia Novecare.

Maya Mokus, Wöllner France, recommended new kinds of silicate granules with optimised dissolution properties as builders for environmentally friendly detergent formulations: NABION products for laundry detergents, SIMET versions for ADW applications.

"Total Fabric Care from Novel Protein-Silane Copolymer Technology" was presented by *M. Goodwin*, Croda International Plc, U. K. The new copolymer technology sold under the brand name Coltide HSi which is substantive to fabrics and has the ability to crosslink to form a polymeric film enables a range of perceivable benefits including fiber/fabric preservation, color protection, reduced wrinkling of garments and ease of ironing.

B. Hénault[1] (together with *H. Dihang*[1], *C. Simon*[2], *C. Freitas*[2] and *Y. Cortes*[3]), [1]Dow Corning Europe, [2]Dow Corning do Brasil and [3]Dow Corning France, recommended a "New Silicone Technology for Rinse Aid Fabric Softeners Contributes to Water Savings". Considering the different world consumer washing habits and the need for water saving the evaluation and superior performance of Dow Corning® AC-8066 Antifoam as fabric conditioner rinse aid additive in a variety of laundering processes compared with existing solutions were described.

According to *M. Schöppner*, Evonik Degussa, "A Membrane-active Biodegradable Amphoteric Biocide – REWOCID WK 30" will be the only microbicidal amphoteric active registered under the Biocidal Product Directive. It shows excellent biodegradation rates and a broad spectrum of efficiency against the most types of microorganisms.

"A New Eco-friendly Cleaning Booster – TEGOTENS SD 100" was described by *M. Fender*, Evonik Degussa, as a new low foam sorbitan ester with outstanding wetting and cleaning performance, purely based on renewable raw materials.

C. Kolano, Kolb Distribution, Switzerland, explained "Kolb's Approach to Use Renewable Raw Materials: Methyl Ester Ethoxylates". The new Greenbentin® product line is based on at least 30 w/w.% of renewable raw materials. Transesterification and direct ethoxylation are suited best for industrial synthesis.

Enzymes

"A High-performance Automatic Dishwash Protease with Consistent Performance" was introduced by *P. Skagerlind*, Novozymes. This new low-dosage protease with superior storage stability also allows detergent manufacturers to produce more environmentally friendly products by enabling phosphate-free formulations.

L. B. Mathisen, Novozymes, said that "Cellulase Can Help Clean, Maintain, and Repair Clothes". Cellulases can be used to "polish" the cotton fiber so to become more resistant to dirt and to look brighter and whiter (deep cleaning of particulate soil).

DGP Session: Game Changers

In her lecture on "Co-creating a Sustainable Future" *Bérangère Magarinos-Ruchat*, Firmenich, Geneva, Switzerland, stressed the importance of a close cooperation of the company's representatives and the people in different countries to achieve a balanced economic, ecological and social development. Examples are the vanilla production in Uganda connected with the fight against HIV and malaria, the vetiver production in Haiti and the isolation of copaiba oil in Amazonia. An important motto is T.R.A.C.E. – Transparency – Results – Availability – Collaboration – Empowerment.

In an enthusiastic lecture *R. Goldschmidt*, Goldschmidt & Friends, Cologne, Germany, analysed "The right Mix of Career, Love and Lifestyle". Shown here is his Balance Model of seven fields of life.

Microemulsions

L. Wolf and *H. Hoffmann*, University of Bayreuth, characterised microemulsions with a mixture of isotridecyltriethyleneglycolether ($C_{13}E_3$)/magnesium-dodecylsulfate and decane. They found between the L3 phase and the sample with 6% oil a "High Internal Phase Microemulsion" (HIPME). The conductivity decreases 3 orders of magnitude. The viscosity shows a strong maximum at the transition from a bicontinuous structure to a w/o structure. Water is contained inside a polyhedral foam-like structure (20–100 nm).

Thickeners

Evonik Goldschmidt has developed a new liquid monoalkanolamide with multifunctional properties for shampoos and shower gels: ANTIL® SPA 80 (INCI: Isostearamide MIPA; Glyceryl Laurate), PEG-free, cold processable and free of secondary amines. According to *P. Schwab* it also functions as a suspending aid for particles like pearlizers and Zink Pyrithione.

The Center of Applied Nanotechnology (CAN) introduced an interlinked acrylate polymer emulsion (can® T 167) for the manufacture of crystal-clear surfactant bases for laundry, care and cleaning products. *T. Frahm* said that clear formulations are achievable at pH > 6. can® T 167 and different salts show a synergistic thickening action.

Formulations

The performance of different cleaner formulations including Glucopon® types and Tinosan® HP 100 was evaluated by *M. Hazenkamp, D. Ochs, Josefine Schröder* and *Sabine Both*, BASF SE. The results demonstrate that it is possible to optimise use of antimicrobial cleaning products without compromising cleaning benefits including long-lasting properties on the treated hard surfaces.

A. Behler, Jutta Stute and *Claudia Brunn*, BASF SE, recommended "Dehydol® Ultra – A New Ecological Surfactant for Liquid Detergents". Renewable, vegetably derived methylester can directly be converted with ethylene oxide to a new nonionic surfactant using an innovative catalyst. Dehydol® Ultra shows an optimised balance of hydrophobic and hydrophilic parts and provides a product with high detergency in liquid laundry detergents especially at low washing temperatures.

"Going P-free for Multifunctional ADW Products: No More Compromise for Performance Needed!" was requested by *Catherine Breffa, Sabine Both, Heike Weber* and *J. Tropsch*, BASF SE. The performance of multifunctional ADW formulations without phosphate containing specific rinse and surfactants such as Dehypon® E127 and Dehypon® GRA, a complexing agent like Trilon® M, and special (antiscaling) polymers such as Sokalan® types designed for multifunctional autodish products were evaluated. The results clearly demonstrate an excellent performance without phosphate.

C. A. Prieto[1], *F. Andújar*[1], *M. J. Escudero*[1], *I. López*[2], *E. Delgado*[3], *R. Escudero*[3] and *M. Osset*[3], [1]CEPSA Research & Development Center, [2]CEPSA Chimica and [3]LEITAT Technological Centre, all of Spain, analysed the "Formulability and Detergency of Superconcentrated HDLs". The developed superconcentrated formulations based on optimised surfactants such as novel LAS prototypes and additional ingredients were able to compete in stain removal performance and cost against relevant European market products.

Sweat Odour on Textiles, Degreasing

An artificial sweat odour was developed at the Hohenstein Institutes which allows the examination of adhesion and detachment of sweat odour molecules to and from textiles. *G. Hohn* and *D. Höfer* declared that among the substances responsible for the smell of sweat are mainly short-chain fatty acids, sulfur-containing compounds and steroidal substances. Intensity and characteristics of sweat odour are defined by the activity profile of the individual, sweat fluid production and especially the composition of the individual skin flora.

C. Ernenwein[1], *Vianney Fréville*[1], *Elisabeth van Hecke*[2], *Isabelle Pezron*[2] and *P. Lapeyne*[3], [1]ARD, [2]Université de Technologie de Compiègne and [3]Wheatoleo, all of France, presented an "Evaluation of Alkyl-Poly-Pentosides as Degreasing Agents". In terms of degreasing efficiency, Radia Easysurf 6781 gives the lowest interfacial tensions and generates detachment of oil droplets at low concentration.

SEPAWA and European Detergents Conference 2012

Mark your calendar: The 59th SEPAWA Congress including the 8th European Detergents Conference (EDC) will take place on October 23th–25th (Tuesday to Thursday!), 2012, in the Esperanto Hotel & Congress and Cultural Center, Fulda, Hesse. The focus of the 8th EDC will be on "Liquid Foams – Theory, Application & Control".

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