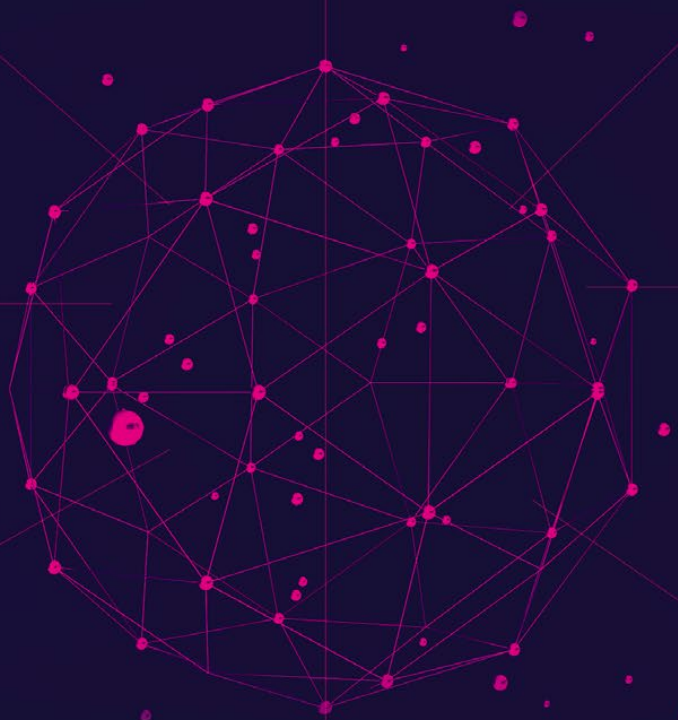
2018 KSBB International Academia-Industry Joint Meeting

2018 한국생물공학회 추계국제학술대회 및 산학연협력심포지엄

Corporate Special Sessions

기업 특별 세션

2018년 10월 10일 ~ 11일 서울 세종대학교 컨벤션센터



한국생물공학회
THE KOREAN SOCIETY FOR BIOTECHNOLOGY AND BIOENGINEERING

2018 KSBB International Academia-Industry Joint Meeting

Corporate Special Session

| 휴먼 마이크로바이옴 | 2018.10.10 16:35–18:20

CELL BIOTECH

ProBionic 프로바이오닉

MD Healthcare (주) MD 헬스케어

Advanced Protein Technologies Corp.

| 화 장 품 | 2018.10.11 09:15–11:00

L'ORÉAL

AMOREPACIFIC CORPORATION

LG생활건강

COSMAX THE SCIENCE OF KOREAN BEAUTY

| 바이오의약 | 2018.10.11 14:00–15:45

SAMSUNG BIOEPIS

코오롱생명과학

GC녹십자랩셀

Quegen Quegen Biotech Co., Ltd.

| 생 물 공 정 | 2018.10.11 16:00–17:45

Enzyme Techno

CJ 제일제당

GS 칼텍스

Ep Minerals A U.S. SILICA COMPANY

FILTROX

Innovations of Biotechnology in the Global Cosmetic Companies

October 11(Thursday), 2018 09:15-11:00

The cosmetics industry is growing at a fast pace all around the world. In the cosmetics industry, biotechnology is an indispensable technology regarding mass and sustainable production of natural ingredients. Also, in the near future, biotechnology is expected to contribute to the development of personalized skin and hair care in the field of cosmetics.

| 09:15-09:45 |

From biotechnology to sustainable innovation L'oreal approach

Dr. BOUVIER Delphine
Japan & Korea Advanced research head, L'Oreal 로레알

| 09:45-10:10 |

Application of cutting edge biotechnologies in cosmetic industry

Brian Byung-Fhy Vice President
AMOREPACIFIC R&D Center 아모레퍼시픽

| 10:10-10:35 |

Scale-up production of water-dispersed bacterial cellulose nanofibers and its application in cosmetics

Dr. Seung-Hyun Jun
Senior researcher, LG Household and Health Care R&D Center LG생활건강

| 10:35-11:00 |

Studies on the skin microbiome and solid state fermentation for cosmetic materials

Dr. Hyeonju Yeo
R&I Center Cell Science Team COSMAX BTI 코스맥스

■ Chair : Chang-Seo Park (Dongguk University)

October 11(Thursday), 2018 09:15-09:45

From biotechnology to sustainable innovation L'oreal approach

BOUVIER Delphine

Japan & Korea Advanced research head

The presentation will give an overview of How l'oreal is approaching sustainability through life cycle analysis from molecule design to cosmetic product development.

L'oreal as worldwide cosmetic leader is having, since 2013, a very strong sustainable program with commitment across all division of the company. Specific indicators have been set to measure our progress and help us to eco-design our products. the presentation will explain the main criteria that applies to research and development.

In that domain, very naturally the development and utilization of biotechnologies and green processes is contributing to this company commitment.

L'oreal is therefore innovating via the creation of biomolecules issued from fermentation, cells culture, synthetic biology or green extraction. The presentation will give an overview of such molecules and processes that are unique to our company and which are contributing to our cosmetic business from Make up to skin and hair care.

■ Email : Delphine.bouvier@rd.loreal.com

October 11(Thursday), 2018 09:45-10:10

Application of cutting edge biotechnologies in cosmetic industry

Byung-Fhy Suh

Skincare Research Division,
AMOREPACIFIC R&D center

현대 화장품 산업에서 바이오테크놀로지는 천연 유래 성분의 scale up과 specify 측면에서 필수불가결한 기술 중 하나이다.

바이오테크놀로지는 성분을 추출하는 것에만 국한되지 않고, 소재 및 제품의 안전성 및 효능 테스트와 고객 연구에까지 널리 활용되고 있다.

예를 들면, 아시아의 전통의학에서 약 2,000년전부터 널리 사용되어온 인삼의 경우, 주요 metabolites 중 하나로 알려진 ginsenoside 류의 동정과 정제 및 피부 효능 연구 전반에 바이오테크놀로지가 활용되었다. 이를 통해 과거에는 알지 못했던 인삼의 피부 효능을 발굴하고, 성분을 identify하였으며 피부에 최적화된 성분을 정제 활용하기에 이르렀다.

최근 천연 지향과 케모포비아, 가성비 등 사회적인 트렌드와 이슈에 따라 안전하면서도 효과적인 제품에 대한 필요성은 더욱 증가하는 추세이고 계속될 것이다. 따라서, 화장품 산업 분야에서 바이오테크놀로지를 활용한 천연 성분의 확보 및 적합성 (효능, 안전성)을 확보하고자 하는 노력은 지속적으로 증가할 것이며, 향후 개인 피부특성 맞춤형 화장품과 후성유전학 등 보다 본격적인 바이오테크놀로지에 기반한 제품으로의 발전도 기대된다.

■ Email : sbf1101@amorepacific.com

October 11(Thursday), 2018 10:10-10:35

Scale-up production of water-dispersed bacterial cellulose nanofibers and its application in cosmetics

Seung-Hyun Jun

LG Household and
Health Care R&D Center

Celluloses are not only the most abundant natural biopolymers on the Earth, but also representatives of microbial extracellular polymers. Conventional celluloses from plant, such as natural cellulose, and chemically modified cellulose derivatives, have been used in cosmetic field. However, these celluloses have some kinds of drawbacks for use skin care due to its size and properties.

Bacterial cellulose (BC) has high purity in contrast to plant cellulose because of its production from bacteria directly. Moreover, BC exhibits unique physical, chemical, and mechanical properties including high crystallinity, large surface area, elasticity, and biocompatibility. However, despite the various advantages of BC nanofibers, their use on the skin has been limited in daily life because of their opaque form.

For applications to the skin surface, we synthesized Water-dispersed bacterial cellulose nanofibers were prepared via oxidation reaction using 2,2,6,6-tetramethyl-1-piperidine -N- oxy radical (TEMPO) as a catalyst. TEMPO-oxidized bacterial cellulose nanofibers (TOCNs) could have numerous advantages over those from plant cellulose. In the case of plant cellulose, a pre-treatment process is required to generate nano-meter size fibers, and it is difficult to form a network covered on the skin because the fiber could be excised randomly or into a short length during this process. BC, on the contrary, has not only a relatively constant length of the fiber that could be networked to the skin, but also excellent inherent physical properties.

In this work, we show that water-dispersed bacterial cellulose nanofibers obtained by oxidation of TEMPO reaction were produced at industrial scale and investigated in terms of physical properties such as increasing of the elasticity and water adsorption, and filtrating model particular matter on the skin. Characterization of the TOCNs on the skin surface offered insight into function of nanofibers at the skin, which is of importance for their applications in skin field. At the same time, it would provide a cornerstone for development of fiber-cosmetics.

■ Email : ngkang@lgcare.com

October 11(Thursday), 2018 10:35-11:00

Studies on the skin microbiome and solid state fermentation for cosmetic materials

Hyeonju Yeo

Material Lab, Cosmax BTI R&I Center

In the approach of cosmetic development, new material development, formulation, and efficacy measurement are required as well as new biological mechanisms of skin science. The increase in demand for cosmetics implies the necessity to develop the various cosmetic materials. Here, the skin microbiome and solid state fermentation (SSF) studies are conducted to develop the cosmetic material.

The human skin provides habitat to various microorganisms. These comprise the skin microbiome and provide numerous benefits to maintain a symbiotic relation. Various metabolites generated by the skin microbiome exert beneficial effects including anti-aging and anti-inflammatory functions. In this study, we collected skin samples from two different age groups. One group was in their twenties, and the other was in their forties. The younger group shown to have high % rate of special genus bacteria (Young Specific Bacteria, YSB) whereas the older group had very low % rate of YSB. Here, we isolated three genus bacteria of the YSB belong to the younger group. We also investigated the effects of three genus bacteria on skin anti-aging in vitro. Taken together, isolated three genus bacteria would be a potent ingredient for cosmetic product to improve skin anti-aging.

SSF is a process of cultivating microorganisms in the absence of free water with a solid substrate. In the development of eco-friendly cosmetic materials, the interest in SSF is gradually increasing since the SSF uses low energy, low carbon and less water compared with submerged fermentation as well as it is possible to obtain the physiologically active substrates. The SSF process involves to culture microorganisms with a non-dissolved biomass as a substrate and to produce the catabolic enzymes that degrades the biomass when the catabolic repression of the microorganisms is released. In this study, we have applied the SSF to increase the expression of enzyme and accordingly conversion into aglycon to develop the efficient cosmetic materials. In addition, the ponciretin and aglycon type of ginsenoside were produced by SSF using Trifoliate fruit and ginseng to enhance skin physiological activity as well as the cosmetic enzymes that have beneficial effects on skin and sebum were produced by SPF using wheat seed. According to the results, SSF would be a potent process to produce cosmetic enzymes that improve skin health.

■ Email : hjyeo@cosmax.com

Advances in Bioprocess Technology

October 11(Thursday), 2018 16:00-17:45

By combining our knowledge in living matter with modern engineering skills, bioprocess technology translates discoveries of life sciences into practical and industrial products that can serve the needs of society. Bioprocess technology is thus the backbone of the biotechnology industry that translates the research and development to the industries. In this session, eminent speakers from industry will discuss from practical viewpoints the key aspects of bioprocess technology, including enzyme technology, metabolic engineering, process engineering and product recovery.

| 16:00-16:25 |

Development of new hair dyeing with enzymes

Dr. Yoshihiko Hirose
Enzyme Techno, JAPAN

| 16:25-16:50 |

Sustainable growth based on Microbial fermentation : Methionine case

Dr. So Young Kim
R&D executive, CJ CheilJedang

| 16:50-17:15 |

2,3-butanediol production and its industrial applications

Dr. Hyohak Song
Team Leader, GS Caltex Corporation

| 17:15-17:45 |

Highly efficient single use cell culture clarification and filtration technologies utilizing cGMP-quality diatomaceous earth

Dr. Balwant Patel
EP Minerals, USA

Dr. Ze Yu Tan
Filtrox A.G., Switzerland

■ Chairs : Prof. Dong-Myung Kim (Chungnam National University), Dr. Seung-Goo Lee (KRIBB)

October 11(Thursday), 2018 16:00-16:25

Development of new hair dyeing with enzymes

Yoshihiko Hirose
Enzyme Technod, JAPAN

Current formulation of commercial hair dyeing products is very old and typical components are p-phenylenediamine as a dyeing agent, hydrogen peroxide as a oxidizing agent and ammonia solution as an alkali agent. It is well-known these agents show allergy or serious side effect.

In order to avoid these disadvantages, natural dyeing products with garlic acid are selling instead of p-phenylenediamine, however the effect is not good. Recently, a Japanese health care company launched new hair dyeing product using a natural coloring agent, 1,4-dihydroindole (DHI) which is a melanin precursor. This product uses no allergy materials, however dyeing effect seems to be not satisfied at once.

We have investigated new hair dyeing with DHI by enzymes. After screening of enzymes, we found some tyrosinases could be applied for this purpose.

We selected two tyrosinases, a kind of laccases, bilirubin oxidase (BO3) from Myrothecium verrucaria and bilirubin oxidase (BOA) from Bacillus subtilis, among our library.

In order to show good activity of these enzymes under hair coloring conditions, we had to change the surface charge of enzymes into positive. We investigated some genetic and chemical methods and then optimized the condition using BO3 chemically modified with polyamine (PMO).

We have further developed using natural source of L-DOPA instead of DHI and they are expected as a safe and natural hair dyeing products in future.

■ Email : yohirose@octn.jp, or hirose2455@octn.jp

October 11(Thursday), 2018 16:25-16:50

Sustainable growth based on Microbial fermentation : Methionine case

So-Young Kim
R&D executive, CJ CheilJedang

Global Amino acid market was $14billion in 2017 and is projected to reach $20.4billion in 2020. Amino acid is the major product of microbial fermentation with 7.7milion tons of production per year. About half Amino acid is used for feed additives. Amino acid can be converted to protein very efficiently and has a benefit of lowering feeding cost and reducing the nitrogen content of the waste output compared to intact protein diet.

Lysine, threonine, tryptophane and methionine are major 4 amino acids used as feed additives. Among them, only methionine was made by chemical synthesis. Many companies has been tried to develop methionine bio-synthetic process using fermentation technology but could not find economical process.

CJ has developed economical two-step process which is comprised by the fermentation step for methionine-precursor and the enzymatic reaction step for methionine conversion. CJ has started the production of world 1st bio-methionine from 2014. Methionine two-step process will be one of the best examples of change of chemical process to the fermentation process.

■ Email : soyoung.kim@cj.net

October 11(Thursday), 2018 16:50-17:15

2,3-butanediol production and its industrial applications

Hyohak Song
Team Leader, GS Caltex Corporation

2,3-Butanediol (2,3-BDO) has been known as a valuable intermediate and raw material in the diverse industries, such as cosmetics, agricultural, food, and medicine areas. However, its production and usage has been strictly limited due to the high price of chemically synthesized 2,3-BDO. GS Caltex has carried out R&D on bio-based 2,3-BDO production since 2010 supported by the Ministry of Trade, Industry and Energy. The company has successfully developed the outstanding 2,3-BDO producing bacteria and the cost-effective recovery process. The process had been tested and verified at the pilot-plant for more than 4 years. As a result, the demonstration plant was designed and is going to be mechanically completed by the end of this year. Furthermore, the company has characterized the physiochemical properties of 2,3-BDO and revealed that 2,3-BDO has its own specific function depending on the isomeric types. This will give a deep insight to develop many eco-friendly products using bio-based 2,3-BDO as intermediate and raw material.

This work was supported by the Industrial Strategic Technology Development Program (No. 10050407).

■ Email : hyohaks@gmail.com

October 11(Thursday), 2018 17:15-17:45

Highly efficient single use cell culture clarification and filtration technologies utilizing cGMP-quality diatomaceous earth

Balwant Patel
EP Minerals, USA

Ze Yu Tan
Filtrox A.G., Switzerland

EP Minerals mines and manufactures engineered minerals that are used for numerous industrial-scale filtration applications. Many pharmaceutical companies use highly purified diatomaceous earth (DE) as a Bulk Pharmaceutical Excipient Filter Aid (cGMPs) for solid/liquid separation in manufacturing processes such as fractionation of plasma to obtain therapeutic proteins for parenteral administration. FILTROX A.G., a global technology leader in depth filtration, has developed a single use filtration system which utilizes high purity DE for the clarification of high-cell density cultures. The joint presentation between EP Minerals, and Filtrox, A.G., will discuss the following:

1. Mining and purification by EP Minerals of diatomaceous earth intended for use as bulk pharmaceutical excipient filter aids
2. Benefits of the use of high purity DE filter aids, without detectable crystalline silica, for medium to large-scale pharmaceutical manufacturing processes
3. Current post-bioreactor cell culture clarification techniques and trends
4. Benefits of employing alluvial filtration using high purity DE for cell culture clarifications

■ Email : balwant.patel@epminerals.com, z.tan@filtrox.ch