

December 2 (Monday)

Kagawa International Conference Hall & Exhibition Hall

15:00~16:30 Registration (Conference Hall) & Poster set up (Exhibition Hall)

December 3 (Tuesday)

Kagawa International Conference Hall

09:00~09:50 Registration (Conference Hall)

Opening Ceremony

09:50~10:00

Overall facilitator: Kazuya Akimitsu (Kagawa University, Japan)

Master of ceremony: Masaaki Tokuda (Kagawa University, Japan)

09:50~

Congratulation Remarks

Yoshiyuki Kakehi (President of Kagawa University, Japan)

Congratulation Remarks

Keizo Hamada (Governor of Kagawa Prefecture, Japan)

Welcome Address

Ken Izumori (President of International Society of Rare Sugars)

Keynote Address

10:00~10:30

Chair: Ken Izumori (Kagawa University, Japan)

10:00~10:30 Synergy between organic chemistry and biotechnology in rare sugars:
collaboration between the Universities of Oxford and Kagawa
George W.J. Fleet (Oxford University, UK)

Special Lecture

10:30~12:00

Chair Y. Tani (Allulose Working Group Chair, Calorie Control Council, USA)

10:30~11:00 "US Regulatory Considerations for the Global Market: Ingredient Labeling, Marketing Claims, and Safety Overview and Key Updates"

SI Jessica O'Connell (Former Associate Chief Counsel, Food and Drug Administration, USA)

11:00~11:30 "Sugar Reduction Initiatives in SEA Region - An Overview"

SII Pauline Chan (Director of Scientific Programs for the Southeast Asian branch The International Life Sciences Institute, Singapore)

11:30~12:00 "Health promotion policies and food labeling in Japan."

SIII Nobuo Nishi (National Institutes of Biomedical Innovation, Health and Nutrition, Japan)

Lunch

12:00~13:30

Special program

"Functional Sugars and Their Usage in Markets"

13:30~15:00

13:30~14:00 Session I: Market examples of functional sugars and their usages
Nate Yates (Ingredion Incorporated, USA)

14:00~15:00 Session II: Panel discussion ~A proposal for functional sugars in future~
Modulator:

Yuma Tani (AWDC, CCC, USA)

Panelists:

Erick J. Vandamme (Belgium)

George W.J. Fleet (UK)

Ken Izumori (Japan)

Saisamorn Lumyong (Thailand)

Chang-Su Park (Korea)
Jessica O'Connell (USA)
Pauline Chan (Singapore)
Nobuo Nishi (Japan)
Nate Yates (USA)

15:00~15:30 Coffee break

Session 1-1

Rare sugar production and their physicochemical properties (1)

15:30~17:00

Chair: Ken Izumori (Kagawa University, Japan)

- 15:30~15:44 Protein engineering for improving catalysis of natural to unnatural (rare)
S1 sugar.
Darshan H. Patel (Charotar University of Science and Technology, India)
- 15:45~15:59 D-Allulose production by alkaline isomerization and enzymatic
S2 epimerization methods.
Kouhei Ohtani (Matsutani Chemical Industry Co., Ltd., Japan)
- 16:00~16:14 Production of D-allose from D-allulose using commercial immobilized
S3 glucose isomerase.
Yeong-Su Kim (National Arboretum Baekdudaegan, Republic of Korea)
- 16:15~16:29 Heptose production by transketolase from *Arthrobacter grobiformis* M30.
S4 **Akihide Yoshihara** (Kagawa University, Japan)
- 16:30~16:44 One-pot multi-enzyme synthesis of rare sugars from glycerol.
S5 **Zijie Li** (Jiangnan University, People's Republic of China)
- 16:45~16:59 Bioproduction of rare sugars from whey permeate.
S6 **Zhixin Wang** (Cornell University, USA)

Reception Banquet

17:30~20:00

JR Hotel Clement Takamatsu

- 17:30~18:00 Welcome drink
18:00~20:00 Reception banquet

December 4 (Wednesday)

Kagawa International Conference Hall

Session 1-2

Rare sugar production and their physicochemical properties (2)

09:00~10:30

Chair: George W.J. Fleet (Oxford University, UK)

- 09:00~09:14 Stereoselective synthesis of α -D-tagatofuranosides using acetonide
S7 protection.
Atsushi Ueda (Nagasaki University)
- 09:15~09:29 Chemical synthesis of some rare sugars.
S8 **Masahiko Hayashi** (Kobe University, Japan)
- 09:30~09:44 Biocatalytic synthesis of the rare sugars Kojibiose and Nigerose: Enzyme
S9 engineering, process scale-up & application testing.
Koen Beerens (Ghent University, Belgium)
- 09:45~09:59 Molecular modification of D-allulose 3-epimerase to improve the catalytic
S10 activity and thermal stability.
Wanmeng Mu (Jiangnan University, China)
- 10:00~10:14 D-tagatose 3-epimerase enzyme production and producing allulose
S11 (psicose) from fructose.
Erva Parıldı (Adana Alparslan Türkeş Science and Technology
University, Turkey)

Coffee break 10:30~10:50

Session 1-3

Rare sugar production and their physicochemical properties (3)

10:50~12:00

Chair: Saisamorn Lumyong (Chiang Mai University, Thailand)

- 10:50~11:04 Comparison of the crystallinity kinetics of D-allulose, lactose and sucrose
S12 by using time domain (^1H) NMR.
Selen Guner (Middle East Technical University, Turkey)

- 11:05~11:19 **S13** Characterization of D-allulose and soy protein isolate containing starch based confections by TD-NMR relaxometry, thermal gravimetric analysis and X-ray diffraction.
Mecit H. Oztop (Middle East Technical University, Turkey)
- 11:20~11:34 **S14** Electronic structures of supramolecular rare sugars and deoxygenated rare sugars.
Tomohiko Ishii (Kagawa University, Japan)
- 11:35~11:49 **S15** Heat capacity calorimetry on crystalline sorbose.
Kazuya Saito (University of Tsukuba, Japan)

Luncheon seminar

12:00~13:30

Chair: Kazuya Akimitsu (Kagawa University, Japan)

- 12:40~13:20 **L1** Single malignant cells in ascites of cancer patients visualized by 2-NBDLG, a fluorescently labeled L-glucose (fLG).
Katsuya Yamada (Hirosaki University, Japan)

Session 2-1

Rare sugars for medicine and health (1)

13:30~15:00

Chair: Masaaki Tokuda (Kagawa University, Japan)

- 13:30~13:44 **S16** Discovery of a promising compound for the study of rare sugars.
Ikuko Tsukamoto (Kagawa University, Japan)
- 13:45~13:59 **S17** Evaluation of the anti-proliferative activity of rare aldohexoses and structure –activity relationship study of D-idose.
Ryo C. Yanagita (Kagawa University, Japan)
- 14:00~14:14 **S18** Anti-tumor action of rare sugar D-allose on renal cell carcinoma.
Rikiya Taoka (Kagawa University, Japan)
- 14:15~14:29 **S19** Cancelled
- 14:30~14:44 **S20** Cancelled

- 14:45~14:59 D-Allulose, a novel GLP-1 releaser, effectively and safely corrects
S21 hyperglycemia.
Toshihiko Yada (Kansai Electric Power Medical Research Institute, Japan)
- 14:45~14:59 Naturally occurring rare sugars are superoxide scavengers and can
S ameliorate endoplasmic reticulum stress.
Masaaki Tokuda (Kagawa University, Japan)

Coffee break 15:00~15:30

Session 2-2

Rare sugars for medicine and health (2)

15:30~16:45

Chair: Koji Murao (Kagawa University, Japan)

- 15:30~15:44 Effects of D-allulose on the browning of beige cells.
S22 **Jingya Lyu** (Kagawa University, Japan)
- 15:45~15:59 Effects of a single intake of allulose on fat oxidation during exercise.
S23 **Yoshitake Yamaguchi** (Matsutani Chemical Industry Co., Ltd., Japan)
- 16:00~16:14 Effect of ingestion of rare sugar syrup on the blood glucose response
S24 in adult healthy humans. -A randomized, double-blind, placebo-controlled and cross-over trial-
Takako Yamada (Matsutani Chemical Industry Co., Ltd., Japan)
- 16:15~16:29 D-Sorbose, D-tagatose but not D-allose are absorbed via GLUT5 in the
S25 small intestine.
Kunihiro Kishida (Kindai University, Japan)
- 16:30~16:44 Sugar specificity and structural analyses of Na⁺/D-glucose co-transporters
S26 Could rare sugars be transported via SGLTs?
Kazuyo Kamitori (Kagawa University, Japan)

Session 3

Various usages of rare sugars for livings

16:45~18:00

Chair: Kazuya Akimitsu (Kagawa University, Japan)

- 16:45~16:59 Anti-Viral Activity of Rare Ketoses.
S27 Syed Muniruzzaman (Xavier University of Louisiana, USA)
- 17:00~17:14 Rare sugar-containing syrup inhibits malaria transmission.
S28 Meiji Arai (Kagawa University, Japan)
- 17:15~17:29 Effects of rare sugars on fermentation by acetic acid bacteria and lactic acid bacteria
S29 Masahiro Ogawa (Kagawa University, Japan)
- 17:30~17:44 Effects of Rare Sugars on *Caenorhabditis elegans*
S30 Masashi Sato (Kagawa University, Japan)
- 17:45~17:59 Effects and mode actions of rare sugars on plants.
S31 Kazuya Akimitsu (Kagawa University, Japan)

December 5 (Thursday)

Exhibition Hall & Kagawa International Conference Hall

Poster Presentation

09:00~12:00

Exhibition Hall

Poster presenters must stay and give a chance of discussion with audience in the front of each poster from 9:30 to 10:30 for odd numbered posters and 10:30 to 11:30 for even numbered posters.

Luncheon Award Lecture

12:00~14:00

Kagawa International Conference Hall

Chair: Kazuya Akimitsu (Kagawa University, Japan)

- 12:50~13:00 Award ceremony
13:00~13:40 Award winner lecture
13:40~13:50 Poster award

Closing Ceremony

14:00~15:00

Chair: Masaaki Tokuda (Kagawa University, Japan)

14:00~14:20 ISRS general meeting

14:20~14:50 Closing seminar

Erick J. Vandamme (Ghent University, Belgium)

14:50~15:00 Closing remarks

Ken Izumori (Kagawa University, Japan)

George W.J. Fleet (Oxford University, UK)

Erick J. Vandamme (Ghent University, Belgium)

Saisamorn Lumyong (Chiang Mai University, Thailand)

Chang-Su Park (Catholic University of Daegu, Korea)