

Special lectures

1. Ultrastructure of Microorganisms by Using Freeze Substitution Fixation Method in Electron Microscopy

Masako OSUMI

2. Applications of Liposomes as Microcapsules for Drug Delivery : Effects of Freezing and Drying on Liposomal Properties

Naoto OKU

Articles

1. Numerical Model for Freezing and Ice Crystal Formation in Food Materials

Osato MIYAWAKI, Toru ABE and Toshimasa YANO

2. The Dynamics of Unfrozen Heavy Water of Protein by ^2H NMR

Naofumi HANAFUSA

3. Freeze-Thawing Behavior of Saturated Saline Aqueous Solutions in the Presence of Dextran

Kazuhito KAJIWARA, Norio MURASE and Kinji GONDA

4. Ice-Nucleating Activity and Characterization of Ice-Nucleating Bacteria-

Hitoshi OBATA, Tsuyoshi NAKAI, Kouji HAYASHI, Junichi TANISHITA and Tai TOKUYAMA

5. Studies on Character of Probes in Fluorescence Polarization Measurement

Hiroshi SOUZU

6. Influence of Shift-Up of Growth Temperature on the Viability of *Escherichia coli* recA -deficient Mutants after Freeze-Drying

Hiroshi TAKEMURA and Mitsuo TAKANO

7. Relationship between Freezing Resistance and Cell Wall Regeneration in *Marchantia polymorpha* Protoplasts

Yasutake SUGAWARA and Masayuki TAKEUCHI.

8. Further Study on Freezing Tolerance in Edible Mushrooms

Seizo FUJIKAWA

**Lectures presented at the Seminar of Japanese Society for Research of Freezing and Drying :
"Physical Behavior and Biological Significance of Water in Freezing and Related New**

Technology"

1. Introduction: Physical Behavior of Water Molecules

Shozo KOGA

2. Characteristics of Protein Hydration

Naofumi HANAFUSA

3. Supercooled Water and Glassy Aqueous Solutions

Hitoshi KANNO

4. Freeze-Thawing Behavior of Gels and Heterogeneous Systems

Norio MURASE

5. Food Preservation and Water

Isao SHIBASAKI

6. Storage for Foods Utilized Artificial Permafrost

Kimitoshi RYOKAI

7. Water on Freeze-Drying of Pharmaceuticals-Stabilization of Pharmaceutical Products by Sugars and Sugar-Alcohols

Akira MIWA, Hidemi MINAMI, and Hideya TSUGE

8. Concentration Method of Enzyme Solution-Physiological Active Material: "Stability/New Technology"

Kazunori WAKIYA

9. Concept of Water in Biological Systems

Hisashi UEDAIRA

10. Survival Strategy to Freezing Temperatures in Plants

Akira SAKAI