

## Special lecture

### 1. Freeze-Drying : A Combination of Physics, Chemistry, Engineering and Economics

Felix FRANK

## Articles

### 1. Relative Humidity Dependence of Single-Strand Breaks Induced by Drying in Plasmid DNA

Kazuyoshi YOSHIDA and Kotaro HIEDA

### 2. Role of Ethylenediamine Dihydrochloride in the Protection of Cell Membrane of *Aquaspirillum metamorphum* Subjected to L-Drying

Takeshi SAKANE and Akira YOKOTA

### 3. Vitrification of Bovine Blastocysts Obtained by In Vitro Culture of Oocytes Matured and Fertilized In Vitro

Masashige KUWAYAMA, Seizo FUJIKAWA and Seizo HAMANO

### 4. Mechanism on Successful Cryopreservation of Mouse Blastocysts by One Step Vitrification Procedure

Seizo FUJIKAWA, C. R. VALDEZ and Hiroshi KANAGAWA

### 5. Fracture Stress of Frozen Soy Protein Gel

Hisahiko WATANABE, Cun Qi TANG and Tomoo MIHORI

### 6. The Loss of Glycoprotein Ib from Platelet Membrane after Freezing and Thawing

Kimiko SEGAWA, Chiaki YAKUSHIJI, Ekkehard RICHTER, Tsuneo A. TAKAHASHI and Sadayoshi SEKIGUCHI

### 7. Effect of Treatment with Cell Wall Digesting Enzymes on the Tolerance of Cultured *Marchantia* Protoplasts to High Osmotic Dehydration

Yasutake SUGAWARA

### 8. Ice Crystal Growth in Various Solutions

Rikuo TAKAI, Shingo MATSUDA, Tsuneo T. KOZIMA, Tooru SUZUKI and Chifumi KAGA

### 9. On the Lewis Basicity of Water at Low Temperatures

Hitoshi KANNO

### 10. Application of "Freeze-Drying" into a New Field (No.4)

Freeze-drying of physiologically active fish peptide (1)

Takao MOMOSE, Katsuichi MATSUO, Shigeru YAMAZAKI and Atsushi YOKOYAMA

11. Application of "Freeze-Drying" into a New Field (No.3)

Degrees of alpha rearrangement and swelling of freeze-dried starch (2)

Takao MOMOSE, Sigeru YAMAZAKI and Kiyoko KUMAI

12. Solute Concentration in the Non-Frozen Liquid during the Frozen Layer Formation in Vertical Tube Freeze-Dryer -Continued Report on a Closed System for Freeze-Drying of Liquid-

Airu YAO, Konomi HARASHIMA and Masakazu KOBAYASHI

**Lectures presented at the Seminar of Japanese Society for Research of Freezing and Drying: "Low Temperature and Living Organisms"**

1. Structure and Characteristics of Glacier Ecosystems

Shiro KOHSHIMA

2. Aquatic Mosses in Antarctic Lakes

Hiroshi KANDA

3. *Escherichia coli* Mutants Responding Differently to Cold Temperature

Takeshi OHNO

4. Insect Hibernation and Ice Nucleation Active Bacteria in Insects

Jun'ichi KANEKO

5. Temperature Dependency of Gonadotropin Binding Reaction to Its Receptor in Poikilothermic and Homeothermic Vertebrates

Kaoru KUBOKAWA

6. Changes in Heart Function and Hibernation Specific Proteins Identified in Mammalian Hibernators

Noriaki KONDO

7. Mechanism of Chilling Injury in Plants

Shizuo YOSHIDA