

**ANNUAL REPORTS
OF
INTERNATIONAL CENTER FOR BIOTECHNOLOGY
OSAKA UNIVERSITY**

VOL. 24, 2001

DIRECTOR/EDITOR	TATSUJI SEKI
EDITOR	TAKUYA NIHIRA
ASSISTANT EDITOR	KAZUHITO FUJIYAMA
	HIROKO NAKAGAWA
	HIROSHI KINOSHITA
	SHIGERU KITANI
SECRETARY	NAOKO OSE
	KUMIKO GOJO
	JUNKO ISOYAMA

The Annual Report is published to record the activity of the International Center for Biotechnology (ICBiotech) and issued once in each fiscal year. It contains scientific articles, progress reports, letters, and announcement from the Center. The editor welcomes the submission of appropriate articles from all persons who are concerned with the activity of the Center. All the contributions, however, will be reviewed by editors before their acceptance. The scientific paper herein should be treated as personal communications and not treated as original publications. The Annual Report is distributed upon request to the International Center for Biotechnology, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan (e-mail: info@icb.osaka-u.ac.jp). The editors are very grateful to Ms. Fumiko Sawazumi for her technical help.

CONTENTS

<u>Enhanced Adhesion of Endothelial Cells onto a Polypropylene Hollow-fiber Membrane by Plasma Discharge Treatment and High Inoculum Cell Density</u>	1
<i>M. Takagi, T. Haraguchi, H. Kawai, K. Shiwaku, T. Inoue, Y. Sawa, H. Matsuda and T. Yoshida</i>	
<u>Effect of Galactose Residue in Glycolipid Coated onto a Dish Ammonia Consumption Activity of Primary Rat Hepatocytes</u>	7
<i>M. Takagi, K. Toma and T. Yoshida</i>	
<u>Effects of Shifts Up and Down in Osmotic Pressure on Production of Tissue Plasminogen Activator by Chinese Hamster Ovary Cells in Suspension</u>	13
<i>M. Takagi, T. Moriyama and T. Yoshida</i>	
<u>Effects of High Concentrations of Energy Sources and Metabolites on Suspension Culture of Chinese Hamster Ovary Cells Producing Tissue Plasminogen Activator</u>	19
<i>M. Takagi, H. C. Hia, J. H. Jang and T. Yoshida</i>	
<u>Effect of Antioxidants on the Apoptosis of CHO Cells and Production of Tissue Plasminogen Activator in Suspension Culture</u>	27
<i>Z. Yun, M. Takagi and T. Yoshida</i>	
<u>Glycoproteins Secreted from Suspension-cultured Tobacco BY2 Cells Have Distinct Glycan Structures from Intracellular Glycoproteins</u>	33
<i>R. Misaki, Y. Kimura, K. Fujiyama and T. Seki</i>	
<u>In Vivo Conversion of a Glycan to Human Compatible Type by Transformed Tobacco Cells</u>	41
<i>K. Fujiyama, N. Q. Palacpac, H. Sakai, Y. Kimura, A. Shinmyo, T. Yoshida and T. Seki</i>	
<u>Identification of <i>Acetobacter</i> Strains Isolated from Indonesian Sources, and Proposals of <i>Acetobacter syzygii</i> sp. nov., <i>Acetobacter cibirongensis</i> sp. nov., and <i>Acetobacter orientalis</i> sp. nov.</u>	47
<i>P. Lisdiyanti, H. Kawasaki, T. Seki, Y. Yamada, T. Uchimura and K. Komagata</i>	
<u>Production and Characterization of Active Soluble Human β1,4-galactosyltransferase in <i>Escherichia coli</i> as a Useful Catalyst in Synthesis of the Gal β1\rightarrow4 GlcNAc Linkage</u>	61
<i>S. Shibatani, K. Fujiyama, S. Nishiguchi, T. Seki and Y. Maekawa</i>	

<u>Effect of α1,2-mannosidic Linkage in α1,3-branch of Man6GlcNAc2 Oligosaccharide on Enzyme Activity of Recombinant Human Man₉-mannosidase Produced in <i>Escherichia coli</i></u>	65
<i>K. Fujiyama, S. Sakuradani, D. G. Moran, T. Yoshida and T. Seki</i>	
<u>Identification of Putative Gene Encoded on ORF16 of the 81 kb Contig of <i>Arabidopsis thaliana</i> Chromosome III as α-Mannosidase</u>	69
<i>K. Fujiyama, Y. Kira, M. Iizuka, Y. Kimura and T. Seki</i>	
<u>Human <i>N</i>-acetylglucosaminyltransferase I. Expression in <i>Escherichia coli</i> as a Soluble Enzyme, and Application as an Immobilized Enzyme for the Chemoenzymatic Synthesis of <i>N</i>-linked Oligosaccharides</u>	73
<i>K. Fujiyama, Y. Ido, R. Misaki, D. G. Moran, I. Yanagihara, T. Honda, S. Nishimura, T. Yoshida and T. Seki</i>	
<u><i>Asaia siamensis</i> sp. nov., an Acetic Acid Bacterium in the α-<i>Proteobacteria</i></u>	79
<i>K. Katsura, H. Kawasaki, W. Potacharoen, S. Saono, T. Seki, Y. Yamada, T. Uchimura and K. Komagata</i>	
<u>Molecular Systematic Studies of Phototrophic Bacteria Using Farnesyl Diphosphate Synthase Gene</u>	85
<i>J. J. L. Cantera, H. Kawasaki and T. Seki</i>	
<u>A Complex Role for the γ-butyrolactone SCE1 in Regulating Antibiotic Production in <i>Streptomyces coelicolor</i> A3(2)</u>	93
<i>E. Takano, R. Chakraburty, T. Nihira, Y. Yamada and M. J. Bibb</i>	
<u>Identification of the <i>varR</i> Gene as a Transcriptional Regulator of Virginiamycin S Resistance in <i>Streptomyces virginiae</i></u>	107
<i>W. Namwat, C. K. Lee, H. Kinoshita, Y. Yamada and T. Nihira</i>	
<u>Gene Replacement Analysis of the Butyrolactone Autoregulator Receptor (FarA) Reveals that FarA Acts as a Novel Regulator in Secondary Metabolism of <i>Streptomyces lavendulae</i> FRI-5</u>	115
<i>S. Kitani, Y. Yamada and T. Nihira</i>	

<u>Multivariable Control of Alcohol Concentrations in the Production of Polyhydroxyalkanoates (PHAs) by <i>Paracoccus denitrificans</i></u>	123
<i>S. Chanprateep, N. Abe, H. Shimizu, T. Yamane and S. Shioya</i>	
<u>DNA Synthesis and Fragmentation in Bacteroids during <i>Astragalus sinicus</i> Root Nodule Development</u>	133
<i>H. Kobayashi, M. Sunako, M. Hayashi and Y. Murooka</i>	
<u>Heat Labile Ribonuclease HI from a Psychrotrophic Bacterium: Gene Cloning, Characterization and Site-directed Mutagenesis</u>	139
<i>N. Ohtani, M. Haruki, M. Morikawa and S. Kanaya</i>	
<u>Utilization of Cyanobacterial Biomass from Water Bloom for Bioproduction of Lactic Acid</u>	147
<i>S. Dwi, K. Hirata, Y. Asada and K. Miyamoto</i>	
<u>Review: Induction and Catabolite Repression Mechanisms of Cellulase in Fungi</u>	153
<i>M. Suto and F. Tomita</i>	
<u>H⁺-ATPase Defect in <i>Corynebacterium glutamicum</i> Abolishes Glutamic Acid Production with Enhancement of Glucose Consumption Rate</u>	161
<i>H. Sekine, T. Shimada, C. Hayashi, A. Ishiguro, F. Tomita and A. Yokota</i>	
<u>Establishment of a New Cross of the Rice Blast Fungus Derived from Japanese Differential Strain Ina168 and Hermaphroditic Rice Pathogen Guy11</u>	169
<i>S. Fukiya, M. Kodama, H. Kito, T. Sone and F. Tomita</i>	
<u>Identification and Characterization of Lactic Acid Bacteria in <i>Ragi</i> tape</u>	179
<i>N. Sujaya, S. Amachi, A. Yokota, K. Asano and F. Tomita</i>	
<u>Two RpoH Homologs Responsible for the Expression of Heat Shock Protein Genes in <i>Sinorhizobium meliloti</i></u>	189
<i>Y. Ono, H. Mitsui, T. Sato and K. Minamisawa</i>	
<u>DNA Sequence and Mutational Analysis of Rhizobitoxine Biosynthesis Genes in <i>Bradyrhizobium elkanii</i></u>	201
<i>T. Yasuta, S. Okazaki, H. Mitsui, K. Yuhashi, H. Ezura and K. Minamisawa</i>	

<u>Endophytic Colonization and In Planta Nitrogen Fixation by a <i>Herbaspirillum</i> sp. Isolated from Wild Rice Species</u>	213
<i>A. Elbeltagy, K. Nishioka, T. Sato, H. Suzuki, B. Ye, T. Hamada, T. Isawa, H. Mitsui, and K. Minamisawa</i>	
<u>Changes in Four Leghemoglobin Components in Nodules of Hypernodulating Soybean (<i>Glycine max</i> [L] Merr.) Mutant and Its Parent in the Early Nodule Developmental Stage</u>	223
<i>T. Sato, N. Onoma, H. Fujikake, N. Ohtake, K. Sueyoshi and T. Ohyama</i>	
<u>Rapid N Transport to Pods and Seeds in N-deficient Soybean Plants</u>	231
<i>N. Ohtake, T. Sato, H. Fujikake, K. Sueyoshi, T. Ohyama, N. S. Ishioka, S. Watanabe, A. Osa, T. Sekine, S. Matsuhashi, T. Ito, C. Mizuniwa, T. Kume, S. Hashimoto, H. Uchida and A. Tsuji</i>	
<u>Comparison of the Growth and Nitrogen Fixation Activity of the Hypernodulation Soybean Mutant NOD1-3 and Its Parent cv. Williams in Field Cultivation</u>	239
<i>T. Suganuma, H. Fujikake, N. Ohtake, K. Sueyoshi and T. Ohyama</i>	
<u>Denaturing Gradient Gel Electrophoresis Analyses of Microbial Community from Field-scale Composter</u>	249
<i>M. S. Pedro, S. Haruta, M. Hazaka, R. Shimada, C. Yoshida, K. Hiura, M. Ishii and Y. Igarashi</i>	
<u>Analyses of Microbial Community within a Composter Operated Using Household Garbage with Special Reference to the Addition of Soybean Oil</u>	257
<i>M. Aoshima, M. S. Pedro, S. Haruta, L. Ding, T. Fukada, A. Kigawa, T. Kodama, M. Ishii and Y. Igarashi</i>	
<u>Evidence for Polyphyletic Origin of the Members of the Orders of Oscillatoriales and Pleurocapsales as Determined by 16S rDNA Analysis</u>	263
<i>T. Ishida, M. M. Watanabe, J. Sugiyama and A. Yokota</i>	
<u>Intraspecific Diversity of <i>Oenococcus oeni</i> Isolated during Red Wine-making in Japan</u>	267
<i>H. Sato, F. Yanagita, T. Shinohara, M. Suzuki, K. Suzuki and K. Yokotsuka</i>	

<u>Improved Survival of Nutrient-starved Cells of <i>Rhizobium tropici</i> CIAT899 in Acid Soil Associated with High Al³⁺ and Mn²⁺ Contents</u>	273
<i>B. Santasup, K. Senoo, A. Bhromsiri, A. Shutsrirung, A. Tanaka and H. Obata</i>	
<u>Methane Fermentation of Coastal Mud Sediment by a Two-stage Upflow Anaerobic Sludge Blanket (UASB) Reactor System</u>	283
<i>K. Takeno, Y. Nakashimada, T. Kakizono and N. Nishio</i>	
<u>Efficient Production of Cellulolytic and Xylanolytic Enzymes by the Rumen Anaerobic Fungus, <i>Neocallimastix frontalis</i>, in a Repeated Batch Culture</u>	289
<i>K. Srinivasan, M. Murakami, Y. Nakashimada, and N. Nishio</i>	
<u>A Complex of Perseitol and K⁺ Ion from <i>Scurrula fusca</i> (Loranthaceae)</u>	295
<i>T. Ishizu, E. Tsujino, H. Winarno, K. Ohashi and H. Shibuya</i>	
<u>Biodiesel Production from Crude Palm Oil and Evaluation of Butanol Extraction and Fuel Properties</u>	299
<i>E. Crabbe, C. Nolasco-Hipolito, G. Kobayashi, K. Sonomoto and A. Ishizaki</i>	
<u>Cloning and Expression of a Down-regulated Gene (<i>TrEnodDRI</i>) of White Clover Responded by the <i>nod</i> Genes Derived from <i>Rhizobium leguminosarum</i> bv. <i>trifolii</i> Strain 4S</u>	307
<i>A. Suzuki, F. Kobayashi, M. Abe, T. Uchiumi and S. Higashi</i>	
<u>Hydrolysis of Lignocellulosic Materials and Kraft Pulps by Xylanolytic Enzymes from Alkaliphilic <i>Bacillus</i> sp. K-1</u>	315
<i>K. L. Kyu, K. Ratanakhanokchai, M. Tanticharoen, T. Ratanarajmongkul and S. T. Chen</i>	
<u>Effect of Viscosity Agent on Bacterial Cellulose Gel Formation by <i>Acetobacter xylinum</i> DK in Agitated Cultivation</u>	329
<i>W. Krusong, A. Vongchareonsathit and T. Yoshida</i>	
<u><i>Acetobacter xylinum</i> DK: A Cellulose Gel Producing Strain with Two Distinctive Types of Colony for Agitated Cultivation</u>	335
<i>W. Krusong, A. Jindaprasert and T. Yoshida</i>	

<u>Biodiversity of Actinomycetes Isolated from Marine Organisms and Coastal Resources</u>	339
<i>C.J. Tan, E. Kavithambigai, S. Vikineswary and S. Parameswari</i>	
<u>Studies on the Possibilities of Using an Antagonistic <i>Streptomyces</i> sp. in the Biological Control of <i>Fusarium oxysporum</i> f.sp. <i>cubense</i> in Banana</u>	343
<i>K. Getha, S. Vikineswary and W. H. Wong</i>	
<u>Antagonistic <i>Micromonospora</i> Isolates from Mangrove Rhizospheres</u>	347
<i>Ismet Ara, Vikineswary, S., Sujatha, R. and Norhanum, A. W.</i>	
<u>The Effect of Dual Inoculation of OG-VA <i>Mycorrhizae</i> and <i>Rhizobium</i> on Promoting the Growth of Mangium and Sengon at Field Site Level</u>	351
<i>H. Sukiman, S. Lekatompessy, D. Ariani and E. Sukara</i>	
<u>Towards Identification of Host Legume Induces: Construction of <i>nod</i> Box-<i>lacZ</i> Fusion in <i>Mesorhizobium loti</i></u>	361
<i>S. Saengkerdsub, M. Itakura, H. Mitsui and K. Minamisawa</i>	
<u>Selective and Sensitive Detection of <i>Escherichia coli</i> in Composting Process by PCR Amplification of the 16S rDNA</u>	371
<i>C. Chanchitpricha, S. Haruta, K. Nakamura, M. Ishii and Y. Igarashi</i>	
<u>Cloning and Expression of the Pyruvate Kinase Gene from the Hyperthermophilic Archaeon <i>Thermococcus kodakaraensis</i> KOD1</u>	385
<i>R. D. Tambalo, H. Imanaka, T. Fukui, H. Atomi and T. Imanaka</i>	
<u>Purification and Some Properties of Thermostable α-Galactosidase from <i>Ganoderma lucidum</i></u>	401
<i>T. Sripuan, K. Yamamoto and H. Kumagai</i>	
<u>Targeting of Proteins to the Cytoplasmic Face of the Plasma Membrane of <i>Saccharomyces cerevisiae</i> and Its Application</u>	415
<i>H. D. Nguyen, N. Kato, W. Zou, M. Ueda and A. Tanaka</i>	
<u>Construction of Plasmids for Molecular Breeding of Biphenyl-utilizing Bacteria</u>	425
<i>H. Hai, H. Suenaga and K. Furukawa</i>	

<u>Genetic Explanation of <i>sym</i> Plasmid of <i>Mesorhizobium huakuii</i> subsp. <i>rengei</i> Strain B3 Which Forms Nodules on <i>Astragalus sinicus</i> (Renge-soh)</u>	435
<i>D. Balachandar, H. Ono and Y. Murooka</i>	
<u>Induction of Bioactive Secondary Metabolites in Plant Cell Culture by Chemical and Biological Stimulations</u>	445
<i>H. Sophorn, S. Kajiyama, A. Okazawa, E. Fukusaki and A. Kobayashi</i>	
<u>Taxonomic Study of Bacteria Isolated from Nodules of Leguminous Plant (<i>Aeschynomene</i>)</u>	453
<i>E. Triana, H. Kawasaki and T. Seki</i>	
<u>Manipulation of Plant Chromosomes in Yeast as a Cell Factory</u>	471
<i>Y. H. Kim, Y. Kaneko and S. Harashima</i>	
<u>Investigation of Growth Acceleration Factors by Use of DO Signal</u>	481
<i>B. Batjargal, M. Nakajima and T. Yoshida</i>	
<u>Effects of Initial Addition of Nisin on a Mixed-culture System Consisting of <i>Lactococcus lactis</i> and <i>Kluyveromyces marxianus</i></u>	491
<i>L. Chuanbin, H. Shimizu and S. Shioya</i>	
<u>Co-expression of β-subunit with Other Subunits of QB Replicase</u>	503
<i>W. Dong, H. Kita, E. P. Ko-Mitamura, Y. Shima, T. Yomo and I. Urabe</i>	
<u>Visualization of Specific DNA Sequences on Chromosomes and Extended DNA Fibers</u>	511
<i>J. A. Cartagena, E. Sykorova, J. Sykorova, J. Fajkus, L. Haibo, N. Ohmido, M. Ito and K. Fukui</i>	
<u>Endophytes – New Potential Resources for Useful Enzymes</u>	523
<i>F. Tomita, M. Tanaka, M. Takebayashi, M. Yoshimura, T. Anindyawati, K. Asano and A. Yokota</i>	
<u>Development of Novel Water Treatment System Using Bio-mat of Microbial Consortium of Cyanobacteria and Aerobic Bacteria</u>	537
<u>I. Development of Biomass for Water Treatment in Shrimp Pond with Less Water Exchange: Present Status and Researches in Thailand and Japan</u>	
<i>C. Wantawin, S. Siriraksophon, M. Ruengjit-Chatchawalya, D. Inthorn and A. Mimura</i>	

<u>Screening for High Mercury, Cadmium and Lead Removal Microalgae Strains</u>	544
<i>D. Inthorn, N. Sidtitoon, C. Wantawin, M. Ruengjit-Chachawalya and A. Mimura</i>	
<u>Utilization of Tropical Biomass from Plantations to Produce Useful Materials for Sustainable Development of Indonesia</u>	551
I. <u>Biomass Utilization of Oil Palm Plantations in Indonesia: Present Status, Problems and Prospects</u>	
<i>A. Mimura, T. Ohtsuki, Suyanto, S. Ui, M. A. Subroto and Koesnandar</i>	
<u>Development of Rhizobial Inoculant Production and Formation: Carbon Sources Utilization and Sugar Production from Various Raw Starch Materials by Using Amylase-producing Fungi</u>	558
<i>P. Tittabutr, W. Payakapong, N. Teaumroong and N. Boonkerd</i>	
<u>Mushrooms Capable of Lignin-degradation Isolated in Thailand</u>	565
<i>L. Chitradon, P. Poonpairoj, S. Sudkaew, O. La-Ongkham and J. Izaki</i>	
<u>Fermentation of Palm Oil Waste by <i>Aspergillus oryzae</i> and <i>Rhizopus oryzae</i></u>	567
<i>Y. Widyastuti, A. Rakhmawati, W. Mangunwardoyo and S. Ratnakomala</i>	
<u>Activities of ICBiotech</u>	577
INDEXES	
<u>Author Index</u>	599
<u>Subject Index</u>	603