C017

Screening an Aerobic Beta-glucosidase Producing Bacteria from Environmental Sources for Microbial Transformation of Ginsenoside Rb1

Dong-Shan An[1*], Wan-Taek Im[1], Deok-Chun Yang[2], Jun-Woen Lee[2], and Sung-Taik Lee[1]

[1]Korea Advanced Institute of Science and Technology, [2]Kyung Hee University

In order to screen ginsenoside Rb1-metabolizing bacteria which can convert Rb1 to other gisenoside, 100 aerobic beta-glucosidase producing bacteria were isolated and identified preliminary from environmental sources, such as soil samples, sludge and human feces. Among them, 18 strains were found to be genomic novel genus or species with 90-97% 16S rRNA gene sequence similarity to that of validated type strains in the GenBank Among the 100 microbial strains screened in this study, one strains could metabolize Rb1 to Compound-k, 8 strains metabolize Rb1 to Rd, 7 strains metabolize Rb1 to unknown metabolites to be studied

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C018

Expression and Secretion of *Lactobacillus gasseri* Maltogenic Amylase in *Lactococcus lactis* MG 1363

Mi-Hyun Cho, Sang-Eun Park, and Cheon-Seok Park

Department of Food Science and Biotechnology, College of Life Sciences, KyungHee University

The maltogenic amylase gene of *Lactobacillus gasseri* was successively cloned and overexpressed in *Lactococcus lactis* MG 1363. The recombinant *Lactococcus lactis* showed a halo zone around the colony on starch-containing agar plate A maximum specific activity of 56 66U/μg was obtained after 24 hr cultivation. A single band of the estimated molecular weight of 65,000 Da was observed on a SDS-PAGE gel The enzymatic properties of the recombinant maltogenic amylase were almost same as those of authentic maltogenic amylase This work showed that a GRAS grade food microorganism, *Lactococcus lactis* MG 1363, could be employed for the expression of foreign proteins, which are applicable to food industry

C019

Biodegradation of Cyanide Compounds by a Filamentous Fungus *Alternaria brassicicola*

Eun Hwa Choi*, Seung Kon Hong, and Dong-Sun Jung

Department of Applied Microbiology, Seoul Women's University

During the screening antimicrobial metabolites, cyanide containing metabolite was detected in culture broth of *A brassicicola*. The metabolite inhibited the in vitro growth of phytopathogenic fungi such as *Penicillium*, *Rhizopus* and *Mucor* The metabolite has been identified as isocyanide compound, having the molecular formula of $C_{32}H_{48}O_{14}N_2$ and MW, 684 3,4-*O*-Diacetyl-1,6-*O*-di[(2*R*)-hydroxy-3-methylbutanoyl]-2,5-*O*-di(2-isocyano-3-methylbutanoyl)-D-mannitol. However, the growth of *A brassicicola* was not inhibited by KCN, rather than, stimulated by addition of 10 mM KCN in potato dextrose agar medium. *A brassicicola* was found to degrade KCN probably to utilize the reaction product as nitrogen source. We also found that *A brassicicola* possessed cyanide degrading enzyme activity Cyanide degrading enzyme, cyanide hydratase, activity also increased after KCN induction The maximal level of cyanide hydratase activity in *A brassicicola* was reached 8 h after treatment of 1 mM KCN. Purification and characterization of cyanide hydratase is now under progress

C020

Substrate-Dependent Formation of Magnetite Nanoparticles via Microbial Fe(III) Reduction Coupled to Oxidation of Organic Acids

Ji-Hoon Lee[1*], Yul Roh[2], and Hor-Gil Hur[1]

[1]Department of Environmental Science and Engineering, Gwangju Institute of Science and Technology, [2]Faculty of Earth Systems and Environmental Sciences, Chonnam National University

Microbial dissimilatory Fe(III) reduction in anaerobic environments is one of the most important processes in the geochemical iron cycle Now bacteria are believed to be involved in the deposition of magnetite in marine and subsurface sediments In an attempt to better understand Fe(III) reduction coupled to oxidation of organic matters in subsurface environments and to synthesize nano-sized magnetic particles by microbes for latter application purpose, we isolated iron-reducing bacteria with using poorly crystalline Fe(III) oxyhydroxide as a sole electron acceptor that was chemically synthesized in laboratory and lactate as an electron donor from ancient rock fragments of a tidal flat in Hae-Nam, Korea. Most of the isolated bacteria belonged to genus Shewanella We used formate as a sole electron donor to make nano-scale magnetic particles from the Fe(III) oxyhydroxide as an electron acceptor The isolate utilized pyruvate, formate, and lactate for the reduction of ferric iron to ferrous iron to form magnetite (Fe_3O_4) from poorly crystalline akaganeite (β-FeOOH) X-ray diffraction (XRD) data showed the transformed minerals were magnetite, siderite, or mixture of the two minerals By extended X-ray absorption fine structure (EXAFS) spectroscopic analysis, we obtained local structural information around Fe atoms of akaganeite and magnetite such as coordination numbers, bond lengths, and mean-square disorders of neighbor distances The average diameter of the magnetite particles was about 30 nanometers in ferrofluids by the dynamic laser scattering (DLS) spectroscopy SQUID magnetometer showed strong superparamagnetism of the magnetite nanoparticles which is of interest for in vivo applications Those characteristics of the magnetite nanoparticles can be applied to biomedicine such as magnetic-targeted drug delivery systems with more researches