

## **Production of Functional Kimchi with GABA Enriched by Fermentation Process of *Lactobacillus hilgardii* K-3**

**Mujo Kim<sup>1) 5)</sup>, Shinji Higashiguchi<sup>1)</sup>, Yoshitomo Iwamoto<sup>1)</sup>, Kiyoshi Hayakawa<sup>2)</sup>,  
Yoshie Ueno<sup>2)</sup>, Shi Yong Lee<sup>3)</sup>, Ui Chan Koh<sup>4)</sup> and Hong Yon Cho<sup>5)</sup>**

<sup>1)</sup>Pharma Foods International Co., Ltd.

<sup>2)</sup>Kyoto Prefectural Comprehensive Center for Small and Medium Enterprises

<sup>3)</sup>Pharma Bio Co., Ltd., <sup>4)</sup>Doosan Corporation

<sup>5)</sup>Korea University, Graduate School of Biotechnology

### **Introduction**

Kimchi is a traditional fermented food that contains capsaicin, vitamins and minerals as well as lactobacilli, fiber and other nutrients. Kimchi, consumed as every-day food for 1,300 years, is recently known to have some advantages in prevention of diabetes, heart disease and other obesity-related diseases. Although a traditional food in Korea, Kimchi became the most popular pickled vegetables in Japan and is now consumed 360,000 tons per year in Japan.

We have been studying new functionalities of Kimchi as Kimchi is more recognized as health food that benefits our health among Japanese people as well as Koreans.

Gamma aminobutyric acid (GABA) is nonprotein amino acid widely distributed in nature. GABA functions as suppressive neurotransmitter in living bodies and GABA also possesses inhibition effect of blood pressure rise and diuretic effect. We focused on certain strains of microorganisms that produce GABA and pursuit to identify the lactobacillus with high GABA production capability.

The main topic of this presentation is the new insight on a special lactobacillus that produces GABA (gamma-amino butyric acid) in kimchi.

### **Materials and Methods**

Various kimchi were collected and selected a high GABA productive Lactobacilli strain, and it was identified as *Lactobacillus hilgardii* K-3.

The kimchi fermented with *Lactobacillus hilgardii* K-3 was subjected to amino acid analysis. Each kimchi (50 g) was homogenized and centrifuged. The supernatant was analyzed by HPLC equipped with cation-exchange column (styrene-polymer), modified with o-phthal-aldehyde (OPA, post-column) and detected with fluorescence (Ex 348nm, Em 450nm). The elution was performed with citrate-Na buffer (pH 3.2) at a flow rate of 0.3 ml/min. The peak of GABA was detected at 49 min.

### **Results and Discussion**

Total 40 kinds of kimchi from Korean and Japanese markets were sampled and amino acid analysis was conducted and it was determined that difference in kinds of Lactobacilli attained from various kimchi affects the amount of GABA produced in kimchi. Based on the above findings, the effects of production conditions using *Lactobacillus hilgardii* K-3 on the amount of GABA produced in kimchi was investigated.