Antioxidant Activities of Soybean Fermented with *Aspergillus oryzae* BCC 3088

Chirtchai Punjaisee[1], Wonnop Visessanguan[2*], Suchart Punjaisee[3] and Chaiyavat Chaiyasut[1]

[1]Department of Pharmaceutical Science, Faculty of Pharmacy, Chiang Mai University, Chiang Mai 50200, Thailand

[2]Food Biotechnology Research Unit, National Center for Genetic Engineering and Biotechnology (BIOTEC), Pathumthani 12120, Thailand

[3]Department of Clinical Microbiology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand

**Corresponding author. E-mail: wonnop@biotec.or.th*

ABSTRACT

The antioxidative activities of Thai native soybeans [Glycine max (L.) Merr. SJ2] fermented with Aspergillus oryzae BCC 3088 were investigated. Compared to naturally-fermented soybeans, the methanol extract of soybeans fermented with A. oryzae BCC 3088 was more effective in antioxidative activity by scavenging ability on 1,1-diphenyl-2-picrylhydrozyl (DPPH) radicals, inhibitory activities against linoleic acid peroxidation, Fenton reaction-induced breakage of DNA, and protein oxidation. The results suggest that the enhanced antioxidative activity of soybeans fermented with A. oryzae BCC 3088 observed in various antioxidative model systems could be related to the increased total phenolic and flavonoid contents, a significant bioconversion of the isoflavone glucosides (daidzin + genistin) into their corresponding bioactive aglycones (daidzein + genistein), and the formation of 8-hydroxygenistein (8-OHG). Fermentation of soybeans with A. oryzae BCC 3088 results in higher levels of isoflavone aglycones, which may enhance health benefits over naturally fermented soybeans.

Keywords: Fermented soybeans, *Aspergillus oryzae*, Isoflavones, Antioxidative activity

INTRODUCTION

Reactive oxygen species (ROS) formed in food systems and the human body not only induce oxidative stress that causes deterioration of foods but also causes oxidative damage to biomolecules, which are thought to be an important etiologic factor in carcinogenesis, formation of atherosclerotic plaques, aging, and development of chronic diseases (Steinberg, 1991; Jang et al., 1997; Moktan et al., 2008). Oxidative stress occurs when the formation of highly ROS increases, or when scavenging of ROS or repairing of oxidatively-modified molecules