

OR-9

FUNCTIONAL PROPERTIES OF SOY SUBSTRATES MODIFIED BY THE USE OF DIFFERENT ENZYMATIC TREATMENTS**M. M. Kamel, S. AS. Aboushanab, E. G. Kovaleva***Ural Federal University, 28 Mira St., Yekaterinburg, 620002, Russia.*

E-mail: mustapha.mohaab@gmail.com

Abstract. Consumers are increasingly becoming keen on healthy foods. Among them, soy protein products have been widely used due to its promising functional and nutritional values. Soy protein products are an ideal source of amino acids; however, they are exposed to harsh processing conditions such as heat, acids and may lose much of their functionalities [1]. Hence, extensive literature is available on the enzymatic modification of soy proteins from moderate to high degree of hydrolysis (DH), but the optimum conditions for hydrolysate production were so far neglected. Therefore, the current research was established to apply different enzymatic hydrolysis of soy proteins at different time. The novelty of the present work was to provide soy peptides with maximum and desired functionalities using microbial proteases [2]. Commercial soy protein product was treated using acidic protease from *Aspergillus niger* (520 U/ml)(Distizym Protacid Extra, Novozyme) and Neutral protease purchased in SibBioPharm Ltd (Russia). The hydrolysis was conducted at constant pH and temperature, and degree of hydrolysis (DH) was subsequently estimated and achieved at 30, 60, 120 and 180 minutes. The crude protein content, DH based on free amino nitrogen (FAN) and amino acid profile were analyzed using Lowry and Nanhydrin methods photocalometrically and LC-MS, respectively, and results were recorded.

The results revealed that DH for acidic enzymatic treatment were typically progressing over the time, which represented by FAN values. Neutral protease demonstrated higher DH values which were rather fluctuating. The maximum percentage of FAN was monitored at 180 min (1321.875 mg/l) and 120 min (2445 mg/l) by using acidic and neutral proteases, respectively. LCMS results exhibited the highest amino acids content at 120 min of hydrolysis. Interestingly, arginine, leucine, lysine and tyrosine were the most abundant amino acids according to HPLC results. Overall, the proteolysis percentage was promoted with an increase in time. Accordingly, approximately 120 min is an optimum time for enzymatic production of protein hydrolysate with potential functional properties. These results suggest that neutral and acidic microbial proteases are recommended for production of soy hydrolysate.

References

1. De Oliveira, C. F., Corrêa, A. P. F., Coletto, D., Daroit, D. J., Cladera-Olivera, F., & Brandelli, A. (2014). Soy protein hydrolysis with microbial protease to improve antioxidant and functional properties. *Journal of Food Science and Technology*. Vol. 52, Iss. 5, pp. 2668–2678.
2. De Castro, Ruann J. S., Sato, Helia H. (2014). Antioxidant activities and functional properties of soy protein isolate hydrolysates obtained using microbial proteases. *International Journal of Food Science and Technology*. Vol. 49, Iss. 2, pp. 317–328.

The authors are grateful to Ms. Darya Sabinina from the Institute of Immunology and Physiology, Ural Branch RAS for running LC-MS experiments.