Environmental Engineering and Management Journal

March 2012, Vol.11, No. 3, Supplement, S53
http://omicron.ch.tuiasi.ro/EEMJ/

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EXPLOITATION OF STARCH INDUSTRY BY-PRODUCT TO PRODUCE BIOACTIVE PEPTIDES FROM RICE PROTEIN HYDROLYSATES

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Abstract

A significant growth of interest in new plant food ingredients was observed in recent years in food science. The improvement of their functional properties may increase their application in processed foods. Protein hydrolysis characterising both traditional and the industrial food, is recognised as responsible for many beneficial effects such as elimination of allergenicity, production of flavours or flavours precursors and improvement of sensorial or nutraceutical quality. Small peptides and free amino acids have the advantage of being absorbed in the intestine without any digestion in the stomach. This explains their use in many formulas such as diets for nursing infants or sick adults and as stimulants for people liable for allergy development. The most bioactive peptides are generally characterised by molecular weights lower than 10kDa. The production of peptides through hydrolytic reactions seems to be the most promising technique to form proteinaceous antioxidants since peptides have higher antioxidant activity than raw proteins. Recently it was reported that bioactive peptides, derived from enzymatic hydrolysis of various plant proteins, possess antioxidant activity. In our study, a rice starch industry by-product (provided by a local company "Amideria Il Cervo") was hydrolysed both with commercial proteases (alcalase, neutrase, flavourzyme, lypaine) and microbial enzymes from whole cells of *Bacillus* spp. SDS polyacrylamide gel electrophoresis showed the presence of a 15kDa peptide in the non-hydrolysed substrate. The hydrolysates obtained by alcalase (30' at 55°C and pH8) were characterized by two high molecular weight peptides of about 50 kDa, while those treated with neutrase (15, 30, 60 and 90' of hydrolysis at 40°C and pH 6.5) showed peptides with molecular weight lower than 10 kDa. Whole cell proteolytic activity was very low. Antioxidant activity was determined by ABTS method. According to our results the antioxidant activity of the small peptides (< 10 kDa) was higher in the hydrolysates obtained by whole microbial cells than in those obtained by commercial enzymes. Arginine was the most abundant amino acid in microbial hydrolysates, followed by alanine, tryptophan, valine, leucine and lysine.