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Abstract

Type 2 diabetes is a metabolic disease caused by genetic or many environmental factors. According to the annual reports from the Department of Health, the Executive Yuan, Taiwan, 2011, the mortality associated with diabetes are ranked as the fourth leading cause of death. Traditional hypoglycemic drugs can effectively improve blood glucose control, but are also associated with adverse effects which include weight gain and hypoglycemia. The new therapy is the use of incretin hormone to stimulate glucose-dependent insulinotropic action, reduce glucagon levels, extend gastric emptying, decrease appetite and increase β -cell proliferation. Incretin is rapidly degraded by dipeptidyl peptidase-IV (DPP-IV) and loss its activity; therefore, DPP-IV inhibitors have been developed for increasing the endogenous GLP-1 level in order to improve the symptoms of diabetes. Many bioactive peptides were found to possess the inhibitory effects on DPP-IV, and mostly the peptides comprised proline or alanine as the penultimate N-terminal residue. Atlantic salmon skin gelatin comprises high contents of proline, hydroxyproline, alanine, thus it could be a good source as the DPP-IV inhibitory peptides.

The aim of this study was to utilize flavourzyme to hydrolyze Atlantic salmon skin gelatin, and the *in vitro* DPP-IV inhibitory activities of the hydrolysates were determined. Then, the hydrolysates were fractionated by ultrafiltration with cut-off membranes of 2.5 and 1 kDa, and the < 1 kDa fraction showed the greatest DPP-IV inhibitory activity. The fraction was used as the sample (SSGH) to evaluate its antidiabetic effect in streptozotocin induced type 2 diabetic rats. The result showed that the administration of SSGH could significantly ($p < 0.05$) decrease DM rat's DPP-IV activity, and had a slight increase in the concentration of GLP-1. SSGH could also effectively improve the blood glucose control and increase glucose-dependent insulinotropic action after an oral glucose tolerance test (OGTT). Based on the above results, SSGH has the inhibitory effects on DPP-IV activity and antidiabetic effects in animal models.

Biography

Dr. Jao completed his doctorate in food science with the theoretical and practical combination of protein hydrolysis and purification technologies at the National Chung Hsin University in 2002. Dr. Hsu completed his doctorate in food science with the application of hydrostatic pressure on food processing also at the National Chung Hsin University in 2002. Dr. Hsu joined as an Assistant Professor in the Department of Health Diet and Restaurant Management, Chung Shan Medical University in 2004, and then served as an Associate Professor in Department of Nutrition, China Medical University in 2008. He went to the Faculty of Land and Food Systems, The University of British Columbia as a visiting Associate Professor to research the bioactive peptides derived from Atlantic salmon skin gelatin in 2010-2011, and he got the promotion to a professor in 2011. Dr. Hsu collaborated with Dr. Jao for the evaluation of the bioactive characteristics of peptides since 2008. They have successfully developed some peptides with various bioactive characteristics, such as antioxidative, antihypertensive and antidiabetic activities, from food processing by-products. They contributed to provide a new thought to change the valueless by-products to functional foods.