

Danoonart Pikul 2014: The Preparation of Eggshell Membrane Protein Hydrolysate using Combination of Acid and Reducing Agent at High Temperature. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Wunwiboon Garnjanagoonchorn, Ph.D. 119 pages.

Utilization of eggshell waste was emphasized in this study. The research aimed to study the condition for eggshell membrane (ESM) separation and develop a process to hydrolyze ESM. ESM was separated by soaking eggshell in 0.5 M acetic acid at 28°C for 72 hr. The resulting ESM had high protein 41.90% (wet basis). The microstructure of separated ESM examined under Confocal Laser Scanning Microscope revealed that ESM soaking in acetic acid or in water have similar structures with minimal changes. Protein fibers remained in intact structure. ESM 1.5 g was hydrolysed with 10% acetic acid, 80 ml with the addition of reducing agent L-cysteine hydrochloride monohydrate (C) at 0.9 mg/g protein or 2-mercaptoethanol (M) at 9.22 µl/g protein or no reducing agent (NR) then heated for 8 h at 90 or 120°C, 20 psi. The results showed that low solubilisation occurred after ESM hydrolysis at 90°C meanwhile clear solutions were obtained at 120°C for all C, M and NR. The microscopic observation of hydrolysate (digested at 120°C) indicated that there were small transparent particles suspended in solution. The average diameter of particles were 0.74, 0.69, 0.80 µm, in C, M and NR respectively. Hydrolysis showed percent soluble solids and percent yield of 1.16 1.08 and 0.96; 94.64, 88.45 and 80.25 in C, M and NR respectively. Treatment of NR showed the lowest ($p \leq 0.05$) percent soluble solid. Hydrolysates contained protein content of 13.13, 10.76 and 11.66 mg/ml hydrolysate, respectively (Lowry method). Furthermore, SDS-PAGE of all three liquid hydrolysates contained peptides of less than 6.5 kDa. Thus the use of acetic acid plus heating at 120°C (20 psi) was suitable for the production of ESM hydrolysate.

Student's signature

Thesis Advisor's signature