

Solubilization of hydrophobic soybean protein, oleosin

Hyun Kim, Nam Soo Han, Bernard Y. Tao

Department of Food Science and Technology, Chungbuk National University,
Research Center for Bioresource and Health, Cheongju 361-763, Korea

Tel. 82-43-261-2567, FAX 82-43-271-4412

Agricultural and Biological Engineering, Purdue University,
W. Lafayette, IN47907, USA

Abstract

Polysaccharides and lipids are stored in plants to support essential metabolism such as seedling growth during germination [1]. Vegetable oils are stored in spherical organelles called oil bodies with the size of 0.5-2.5 μm depending on their nutritional and environmental conditions [2]. Oleosins and a family of membrane proteins on the surface of oil bodies are expressed during seed development and maturation [3]. Oleosins are 15-30 kDa proteins containing a central hydrophobic domain of 68-74 residues which are embedded into a PL(phospholipid) layer [4]. Several studies of oleosin and oil bodies have been carried out lately. Tzen has used artificial oil bodies as an expression/purification system for producing recombinant proteins in plant seeds [5]. Molony MM has investigated the relationship between oleosin ER topology and its subsequent ability to target to oil bodies used as carriers for foreign proteins through the recent understanding of functional and structural characteristics [6]. The hydrophobic property of oleosin is the main obstacle in oleosin-related studies. This study examined detergents and chaotropes for solubilization of hydrophobic soybean oleosin proteins. SB 3-10, NP-40 and alpha-dodecyl maltoside were revealed to stimulate more effectively solubilization than other detergents. Urea, thiourea and reducing agents enhanced the effect of detergents. The best results were gained with 2.5 % of each detergent in combination of 4 M urea and 2 M thiourea at room temperature. The zwitterionic detergent, SB 3-10, was the best non-denaturant for solubilizing soybean oleosin and had the advantage of easy removal by dialysis.

Keywords: Hydrophobic protein solubilization/ Detergents/ SDS-PAGE strategy/ Oleosin

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