大豆分離蛋白與幾丁聚醣交互作用之特性探討

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一、 前言

二、 水溶液中大豆球蛋白與幾丁聚醣複合凝聚物：電泳移動率和光散射研究

三、 大豆分離蛋白與幾丁聚醣複合凝聚物之凝聚現象探討

四、 大豆蛋白片段與幾丁聚醣間的組合交互作用： pH 、混和比例、熱處理及離子強度之影響

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摘要

蛋白質與多醣的組合已廣泛利用於食品工業中，大豆分離蛋白 (Soybean protein isolate, SPI) 其主要之蛋白質組成為 7S (β-conglycinin) 及 11S (glycinin) ，對熱凝集、凝膠及表面活性具有高功能性，具帶有負電的親水區，在 pI 以上時具有大量負電荷。幾丁聚醣 (chitosan) 為幾丁質去乙醯取得的陽性多醣。不同的環境因子會影響大豆分離蛋白的凝聚特性，如 pH 值、溫度、離子濃度及蛋白質表面電位皆會影響。添加幾丁聚醣於大豆分離蛋白中，可產生複合物，此複合物為幾丁聚醣胺基 ($-NH_3^+$) 與 SPI 羧基 (-COOH) 以靜電交互作用及氫鍵形成之多孔網狀結構，並由大小不均的空泡相互間隔之複合物，可增加熱焓使熱穩定性上升，提升大豆分離蛋白表面電位，使產生凝聚物所需之 pH 值增加。不同的 SPI/ chitosan 比例亦會影響複合物凝聚性質，其中以 $R_{SPI/Chitosan}$ 為 4 時具有最大混濁度及凝聚物產量。熱處理會促使大量帶電胺基酸暴露於複合物表面，在酸性環境下可形成大量可溶性複合物，減少凝集現象產生，但當 pH 提高，則會因高溫破壞複合物的氫鍵及靜電交互作用力，使凝聚物分解。添加 100mM NaCl 可明顯降低複合凝聚物的產量，原因為過量離子可藉由掩蓋聚合物電荷反應位，擾亂靜電交互作用，使混濁度及凝聚物產量下降，進而破壞凝膠穩定性。

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