γ-PGA 對水產品加工特性之影響 = Effect of gamma polyglutamic acid(γ-PGA) on the processing property of seafood

林昭邦、柯文慶 ; 謝昌衛

E-mail: 9708428@mail.dyu.edu.tw

摘 要

γ-聚麩胺酸 (γ-polyglutamic acid, γ-PGA)為一種具水溶性、可食性、生物可降解性，和對環境與人體無害的物質，但是γ-PGA 及其衍生物在食品的應用實例非常少。本研究以鮮活吳郭魚為材料，經三片取肉，以未經去皮完整魚片及經去皮整形成長寬高分別為 3×2×1cm 的魚塊，浸漬於三種不同分子量及形式 γ-PGA 溶液，分別為 0.5% 之高分子量 Na 型(Na/HM)、中份子量 Na 型(Na/LM)和水膠 Na 型(Hy)，並浸漬同濃度之三聚磷酸鈉(P)及RO 水(R)為對照，比較不同浸漬液對貯藏期間魚肉外觀與魚肉鮮度品質之變化。依魚片及魚塊兩種樣品所得結果如下： 魚肉包冰方面，在全魚外觀結果以 Hy 0.5% 組包冰率最高，以 R 組看起來較為乾燥，其他則無明顯的差異；在魚塊部分，pH 值結果以 Hy 0.5% 組較易維持，TBA則顯示 γ-PGA 能有效的抑制魚肉的氧化；水分含量則以 Hy 0.5%組保水效果最好；而保水力時則以 HM 0.5% 組的保水力較R組和P組好。故 γ-PGA 包冰處理對吳郭魚貯藏期間鮮度與品質有好的保持。 魚肉煉製品方面，本實驗添加不同形態之 γ-PGA 分別為：Na/HM、Ca/HM、Ca/LM、Ca/SM 於市售旗魚魚漿中。結果如下：比較不同高分子量型態 γ-PGA (1,000,000以上)而言，添加 Ca/HM 型 γ-PGA (凝膠強度為835 g×mm) 比 0.2% 時 Na/HM 型(凝膠強度為 620 g×mm)有較好的凝膠強渡。比較同為 Ca 型的 γ-PGA 不同分子量產品添加差異，結果發現 Ca/HM (凝膠強度為830 g×mm)型比 Ca/LM (凝膠強度為680 g×mm)有較好的凝膠強度。由以上試驗可知，高分子量的 γ-PGA 較低分子量有助於魚漿凝膠強度之提升，Ca 型較 Na 型的 γ-PGA 有助於魚漿凝膠強度之提升。為了解 γ-PGA 促進凝膠的機制，分別以添加乳酸鈣作為對照組來探討凝膠強度與保水力的影響。在相同的濃度下，和控制組相比較 Ca/HM 組的凝膠強度可以提升到7倍。此結果對於往後推廣 γ-PGA 在魚肉加工中有很顯著的幫助。

關鍵詞 : γ-聚麩胺酸 ; 包冰 ; 魚漿 ; 凝膠強度

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