Title: Surface activity of surfactin recovered and purified from fermentation broth using a two-step ultrafiltration (UF) process

Author: Isa, M.H.M., (Universiti Sains Islam Malaysia)
        Frazier, A.R., (University of Reading Whiteknights)
        Jauregi, P., (University of Reading Whiteknights)

Abstract: B. subtilis under certain types of media and fermentation conditions can produce surfactin, a biosurfactant which belongs to the lipopeptide class. Surfactin has exceptional surfactant activity, and exhibits some interesting biological characteristics such as antibacterial activity, antitumoral activity against ascites carcinoma cells, and a hypocholesterolemic activity that inhibits cAMP phosphodiesterase, as well as having anti-HIV properties. A cost effective recovery and purification of surfactin from fermentation broth using a two-step ultrafiltration (UF) process has been developed in order to reduce the cost of surfactin production. In this study, competitive adsorption of surfactin and proteins at the air-water interface was studied using surface pressure measurements. Small volumes of bovine serum albumin (BSA) and β-casein solutions were added to the air-water interface on a Langmuir trough and allowed to stabilise before the addition of surfactin to the subphase. Contrasting interfacial behaviour of proteins was observed with β-casein showing faster initial adsorption compared to BSA. On introduction of surfactin both proteins were displaced but a longer time were taken to displace β-casein. Overall the results showed surfactin were highly surface-active by forming a β-sheet structure at the air-water interface after reaching its critical micelle concentration (CMC) and were effective in removing both protein films, which can be explained following the orogenic mechanism. Results showed that the two-step UF process was effective to achieve high purity and fully functional surfactin.

Subject: Beta casein (β-casein); Bovine serum albumin (BSA); Critical micelle concentration (CMC); Surfactin

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