Studies on synthesis of trehalose-Lipoic acid ester and its free-radical scavenging ability / 謝書文 撰 .- 彰化縣大村鄉

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ABSTRACT

Sugar ester derivative, a non-ionic surfactant, can be synthesized as biosurfactant with amphiphilic nature, biodegradable, non-toxic and renewable functions by enzymatic methods. Such “ natural identical ” products are therefore of great interest in the food, cosmetic and pharmaceutical applications. To increase their application value and range, various sugars (i.e. trehalose) and fatty acids (i.e. lipoic acid) with specific biological function are therefore selected as materials to synthesize multifunctional products (i.e. trehalose mono- or di-lipoate) by lipase in this study. The actual structure of the novel trehalose ester derivative has been successfully identified by nuclear magnetic resonance (NMR) and the reaction condition will be further optimized and evaluated the interaction of reaction parameters including reaction time (1-6 days), reaction temperature (30-50oC), substrate molar ratio(trehalose: lipoic acid=1:1-1:5), and enzyme amount (0.01U-0.05 U), lipoic acid was added stepwise by 1mole Cosolvent ratio1:1-8:1(DMSO: DMSO:Ter-butylalcohol 、2M-2B、Acetonitrile、Hexane). The optimum synthesis conditions were as follows：Reaction temperature 40℃；Reaction time 4days；substrate molar ratio 1：4(trehalose: lipoic acid)；total enzyme activity 0.03U；lipoic acid was added stepwise by 1mole/day；cosolvent ratio was 8:1(DMSO：2M-2B).The actual experimental value was 66.82 ±.001%.For further industrial applications, the biological function assays and Molar conversion of trehalose ester of our pure product will be also established and discussed.

Keywords : Biosurfactant、Trehalose、Fatty acid、Esterification、Lipase、Nuclear magnetic resonance (NMR)、Optimization 、Biological function

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