Synthesis of structured phospholipids by immobilized phospholipase A2 catalyzed acidolysis - DTU Orbit (05/12/2018)

Synthesis of structured phospholipids by immobilized phospholipase A2 catalyzed acidolysis

Acyl modification of the sn-2 position in phospholipids (PLs) was conducted by acidolysis reaction using immobilized phospholipase A2 (PLA2) as the catalyst. In the first stage we screened different carriers for their ability to immobilize PLA2. Several carriers were able to fix the enzyme and maintain catalytic activity; however the final choice of carrier for the continued work was a non-ionic weakly polar macroporous polystyrene resin. Response surface methodology was applied to evaluate the influence of substrate ratio, reaction temperature and water addition during acidolysis reaction between caprylic acid and soybean phosphatidylcholine (PC). Reaction temperature and water addition had significant effect on acidolysis reaction, however no effect was observed for substrate ratio (mol caprylic acid/mol PC) in range tested. In general an inverse relationship between incorporation of caprylic acid and PC recovery was observed. Highest incorporation obtained during acidolysis reactions was 36%. Such incorporation could be obtained under reaction temperature, 45°C; substrate ratio, 9 mol/mol caprylic acid/PC; and water addition of 2%; 30 wt % immobilized enzyme; and reaction time, 48h. The yield under these conditions was however only 29%. Lysophosphatidylcholine (LPC) was the major by-product formed during the reaction. Incorporation of acyl donor into LPC was very low.

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