Generation of functional structural phospholipids from silkworm pupa oil and soybean phospholipids catalysed by lipases

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Introduction

With the increasingly serious shortage of resources in the world today, people are paying more and more attention to edible insect resources, such as silkworm pupa. Massive α-linolenic contained in silkworm pupa oil. To improve the α-linolenic in silkworm pupae oil, Soya phospholipid was employed as a carrier. The use of phospholipid skeleton will effectively improve the absorption of unsaturated fatty acids in the human body. But the natural phospholipids have a limited diversity of fatty acid compositions, which limited its applications. Hence, more and more studies are focusing on the modification of phospholipids to obtain more functional modified phospholipids. Therefore, Soybean phospholipids as a carrier of α-linolenic in silkworm pupa oil will be expected to expand the utilization of UFAs in silkworm pupa oil.

Methods

In this paper, modification of lipases with known protein sequences using rational design to alter their substrate chain length selectivity.

Results & Discussion

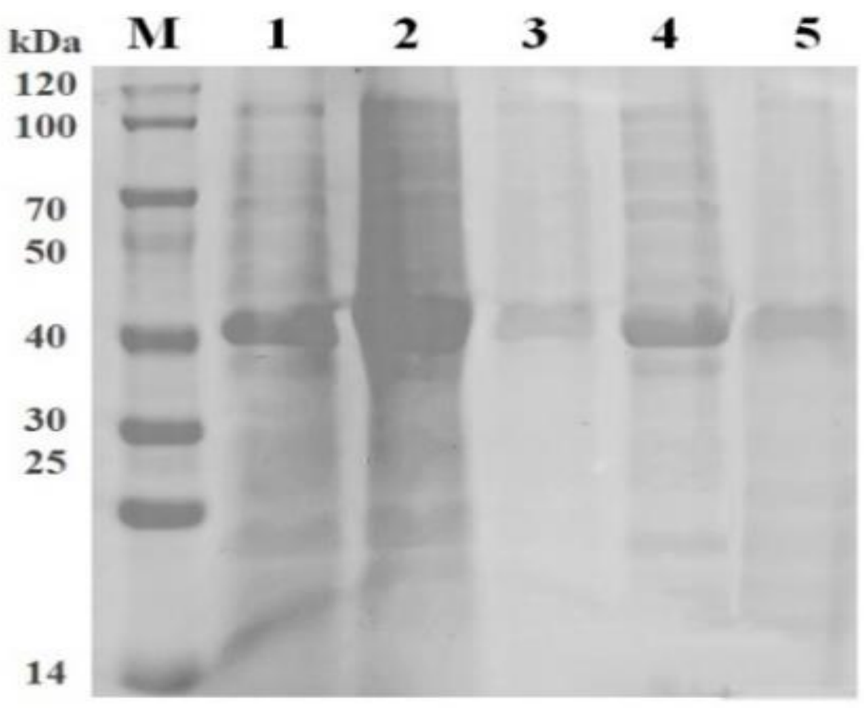

Figure 1 SDS-PAGE analysis of lipase 6A12 and mutants Lanes: M, Protein Maker of 120 kDa; 1, Lipse 6A12; 2, Lipase mutant G15R;3, Lipase mutant T17R; 4, Lipase mutant D357L; 5, Lipase mutant L359H

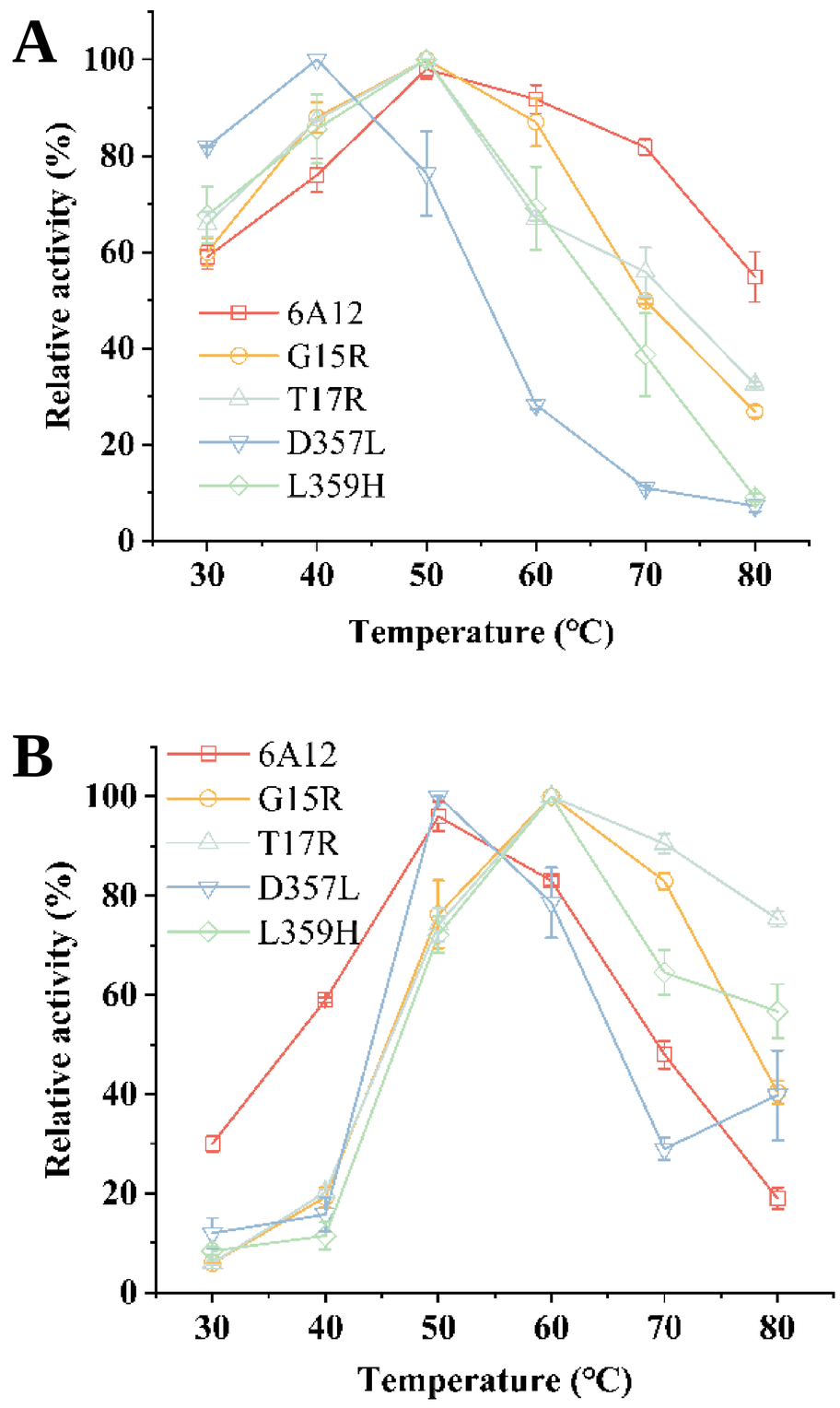

Figure 2. The optimum temperature of lipase 6A12 and mutants G15R, T17R, D357L, L359H. (A) The optimum temperature for hydrolysis of C18 substrate by lipase 6A12 and mutants G15R, T17R, D357L, L359H; (B) Optimum temperature for hydrolysis of C16 substrate by lipase 6A12 and mutants G15R, T17R, D357L.

Conclusion

In summary, in addition to altering the optimum temperature for hydrolysis of the substrate, the mutant also increased its affinity for the C18 substrate compared to the wild type. Therefore, the use of the mutant to catalyse the synthesis of structural phospholipids with higher linolenic acid content using silkworm pupa oil and soybean phospholipids is likely.

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