

## **Characterization of cross linked *Burkholderia cepacia* lipase in alginate and $\kappa$ -carrageenan hybrid matrix**

### **Abstract**

Immobilization of lipases is gaining importance due to a broad variety of industrial applications for their catalytic efficiency. In this study, lipase from *Burkholderia cepacia* was first cross linked with glutaraldehyde followed by entrapment into hybrid matrix of equal amounts of alginate and  $\kappa$ -carrageenan natural polymers. Alginate and  $\kappa$ -carrageenan can be easily extracted from the local seaweeds of Malaysia thus making the process less costly and more environmental friendly. The effect of pH, temperature, reusability, enzyme leakage, solvent and storage stability on immobilized lipase were studied. An activity yield of 89.26% was observed after immobilization. The immobilized lipase also retained 84.02% of its initial activity following two weeks of storage at 4  $\pm$  8 C. After 10 cycles of reuse, the immobilized lipase showed 75.54% of residual activity. Comparative kinetic parameters  $K_m$  and  $V_{max}$  values were found to be 3.15 mM and 12.5 mM/min for free lipase and 4.17 mM and 11.11 mM/min for immobilized lipase respectively. A significant reduction of 65.76% enzyme leakage was observed with this hybrid matrix. Higher thermal stability, good storage stability, reduced enzyme leakage and better hydrolysis with olive oil were the salient features achieved by this method of enzyme immobilization