

P006 The application of micro reactors for biocatalysis
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Conventional chemical processes require a series of complex chemical synthesis steps that use a great deal of energy and raw materials. Bio catalysis allows substances to be produced in a more efficient manner with the use of living cells or isolated enzymes. However, there are many characteristics that make the use of enzymes in organic media difficult, therefore the biocatalyst is often immobilised. This immobilisation helps in their economic reuse, and makes the enzyme more stable in relation to pH and temperature. By transferring bio catalysis with immobilised enzymes to a micro reactor, very small reaction volumes are required, which result in faster reactions and improved product yields, with greater product selectivity, compared to conventional bench top methodology.

This work has investigated the biocatalytic preparation of a series of esters, in particular methyl laurate, using *Pseudomonas cepacia* lipase, immobilised via a number of methods. A 1:1 acid: alcohol mixture was passed through a miniaturised packed bed continuous flow reactor (flow rates of 0.5–2 μ l min⁻¹) containing either *Pseudomonas cepacia* lipase cross linked in its crystal form, cross linked in its aggregate form, adsorbed onto ceramic particles or entrapped into a sol-gel, using pressure driven flow. Percentage ester conversion was determined at ten minute intervals from GC MS analysis of the product stream, over a 100 minute period.