

P008 Enzymes in non-aqueous systems
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Enzymes are remarkable catalysts that are ideal for organic synthesis. *In vivo* enzymatic reactions occur in water, but there are problems with studying reactions in water, including poor substrate solubility and proteolysis. Studying enzymes in non-aqueous systems can provide novel information about enzyme reactions and allow impossible or marginal reactions to occur without side reactions. Studies of enzymes in organic solvents show enzymes can be active in non-aqueous solvents. Studies have shown ionic liquids have great potential as solvents for enzyme catalysis.

Ionic liquids are powerful solvents that are liquid at room temperature and composed only of ions. They lack vapour pressure, are generally polar with varying thermal stability, hydrophobicity and solvent miscibility. The characteristics of ionic liquids arise through the asymmetrical interaction of cations with delocalised charges and different anions. Ionic liquids can be tailored by altering the cation and anion, which allows the solvent to be designed around the enzyme of interest. Alcohol dehydrogenase (ADH) is a model cofactor requiring oxidoreductase that is easy to work with. It oxidises methanol to formaldehyde and requires NAD^+ .

The current aims are to study the activity and stability of ADH in different ionic liquids, study the structure of ADH in ionic liquids and the effect of water content upon enzyme structure and activity.