

REACTIONS OF VAPORS USING "DRY" ENZYMES*

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ABSTRACT

Several different reactor schemes were used to investigate the effects of temperature and water activity (or relative humidity) on lipase catalyzed gas-phase transesterifications. The lipase was immobilized onto several supports with no free liquid and a controlled relative humidity (RH) and allowed to react vapors of vinyl acetate and isoamyl alcohol into isoamyl acetate and acetaldehyde. This "dry" enzyme was observed to be stable for weeks – far longer than aqueous lipase. In continuous tests, at very low relative humidity reaction rates increased with temperature up to 60°C, yet retained some activity even at 90°C; while at a higher RH, the activity was destroyed. We will present initial data on the rates, stability and competing reactions of this transesterification along with some data for another hydrolysis reaction. Additional parameters such as pH and sorption which impact the use of the "dry" enzymes will be discussed.

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