

## ENZYMATIC SYNTHESIS OF PALM BASED FATTY AMIDES

A.B. Salleh, M. Basri, C.N.A. Razak, C.L. Yap,  
R.A. Rahim and Z. Kuang

*Enzyme and Microbial Technology Research,  
Faculty of Science and Environmental Studies  
Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor,  
Malaysia*

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### Introduction

Fatty ethanolamides are used in detergents, cosmetic, shampoos, bubble baths, corrosion inhibitors, biocides and lubricant industries. It has also been utilised as precursors for oxythylation. The synthesis of these speciality products using enzymes are non-toxic and environmentally friendly, green processes. Mild conditions are energy saving that also minimises the occurrence of off-colours and degradation products during amidation. The enzymatic synthesis of fatty ethanolamides was shown to be viable (Bistline et al. 1991). A technique for the synthesis of fatty ethanolamides at low temperature and ambient pressure using enzyme as the catalyst was developed. Palm oil fractions can be used as substrate to react with mono alcoholamines (Yap, 1998).

### Materials and Methods

Esterification: Palm oil fractions (palm kernel olein/pal kernel stearin) (4mmole) and monoethanolamine (4 mmole)

were mixed with hexane to a volume of 8 ml and 0.1 g lipase and reacted at 30°C with shaking at 150 rpm in a closed vial for 60 h. Analysis of products: Presence of products was visualised on TLC using 90% chloroform and 10% methanol as the solvent system. Further analysis was carried out on the Shimadzu 8A gas chromatograph using a non-polar SE-30 capillary column.

### Results and Discussion

A wide range of fatty mono and di- ethanolamides can be obtained at moderate yield. Apart from the fatty acids, natural oil-(palm oil fractions) may serve as the reactants. No prior hydrolysis or methylation is required. The reactivity and specificity of many types of lipases were also screened. The enzymatic synthesis of fatty ethanolamide using palm kernel olein (PKL) and monoethanolamine as substrates was investigated. Currently up to 80% conversion may be achieved. However, there is a need to optimise and scale up the process for commercial applications. Further studies in the product development are also required for application of fatty ethanolamides in various products.

### Conclusions

Fatty alkanolamides with different alkyl groups can be formed by enzymatic catalysis of palm oil fractions and monoethanolamides.

### References

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- Yap, C.L. 1998. Enzyme catalysed synthesis of monoethanolamides from palm kernel fractions. MS thesis, UPM.