

**EFFECT OF REACTION PARAMETERS ON ENZYMATIC
INTERESTERIFICATION OF VIRGIN COCONUT (*COCOS NUCIFERA*) OIL AND
SESAME (*SESAMUM INDICUM*) OIL BLEND USING LIPASES FROM
THERMOMYCES LANUGINOSUS AND *RHIZOMUCOR MIEHEI***

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ABSTRACT

Partial hydrogenation of vegetable oils is the major route of producing *trans* fats in human diet which is associated with several detrimental health effects. The application of enzymatic interesterification in producing structured lipids without generating *trans* fats is gaining popularity as an alternative technology for partial hydrogenation. This study was carried out to determine the effect of reaction parameters: enzyme load, reaction time and reaction temperature on the degree of interesterification (ID) of a binary blend of edible oils containing equal amounts of Virgin Coconut Oil (VCO) and Sesame Oil (SO). Two lipases: *Thermomyces lanuginosus* lipase (activity 100 000 U) and *Rhizomucor miehei* lipase (activity 30 000 U) diluted in phosphate buffer (pH 7) were studied. In order to monitor the ID, interesterified oil was separated into fractions using thin layer chromatography (TLC) and the resulting spots corresponding to various fractions were identified and fatty acid composition of separated fractions were determined using Gas-Liquid Chromatography (GLC). Blend of VCO and SO (50:50, w/w) was interesterified at 55 °C using *T. lanuginosus* (diluted 200 times) and analyzed for fatty acid composition of interesterified fractions by TLC and GLC. Based on the results, the spot corresponding to the interesterified portion was identified and used to monitor the ID of further studies. *T. lanuginosus* lipase diluted 1000 times was studied at 0.1, 1, 5, 10 and 15 % (w/w) and 10% produced higher ID than others. Considering the activities of both enzymes, *T. lanuginosus* lipase diluted 1000 times and *R. miehei* lipase diluted 400 times were compared at 10% (w/w) and higher ID was observed in the blend interesterified using *T. lanuginosus* than in the blend interesterified using *R. miehei*. Thus, *T. lanuginosus* lipase was used for further studies. Effect of different duration of reaction such as 3, 5, 12, 20, 24 and 48 h on ID was determined [VCO:SO; 50:50, enzyme at 10% (w/w),

temperature at 55 °C] and 24 h was found to be optimum. The effect of reaction temperatures (45, 55 and 65 °C) on ID was determined and higher ID was observed at 45 °C followed by 55 and 65 °C. In conclusion, the reaction parameters such as enzyme (*T. lanuginosus* lipase) load; 10% (w/w), time; 24 h and temperature; 45°C were identified as the optimum conditions for interesterification of VCO and SO.