

## **Response surface methodology as a tool to study the lipase-catalyzed synthesis of betulinic acid ester**

### **Abstract**

**BACKGROUND:** The synthesis of betulinic acid ester using betulinic acid and oleyl alcohol catalyzed by Novozym 435 (immobilized *Candida antarctica* lipase) was carried out. Response surface methodology (RSM) based on a five-level, three-variable, central composite rotatable design (CCRD) was employed to evaluate the interactive effects of various parameters. The parameters were reaction time (8–16 h), temperature (20–60 °C) and enzyme amount (120–160 mg). **RESULTS:** Simultaneously increasing reaction time, temperature and amount of enzyme increased the yields of betulinic acid ester produced. **CONCLUSION:** The optimum conditions derived via RSM for the reaction were reaction time of 10.2 h, temperature of 53.1 °C and enzyme amount of 138 mg. The actual experimental yield was 48.5% under optimum conditions, which compared well with the maximum predicted value of 47.6%.

**Keyword:** betulinic acid ester, enzymatic synthesis, lipase, response surface methodology (RSM)