Formulation optimization of palm kernel oil esters nanoemulsion-loaded with chloramphenicol suitable for meningitis treatment

ABSTRACT

Palm kernel oil esters nanoemulsion-loaded with chloramphenicol was optimized using response surface methodology (RSM), a multivariate statistical technique. Effect of independent variables (oil amount, lecithin amount and glycerol amount) toward response variables (particle size, polydispersity index, zeta potential and osmolality) were studied using central composite design (CCD). RSM analysis showed that the experimental data could be fitted into a second-order polynomial model. Chloramphenicol-loaded nanoemulsion was formulated by using high pressure homogenizer. The optimized chloramphenicol-loaded nanoemulsion response values for particle size, PDI, zeta potential and osmolality were 95.33nm, 0.238, -36.91mV, and 200mOsm/kg, respectively. The actual values of the formulated nanoemulsion were in good agreement with the predicted values obtained from RSM. The results showed that the optimized compositions have the potential to be used as a parenteral emulsion to cross blood-brain barrier (BBB) for meningitis treatment.