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Cholesterol Reduction of Cream by Using β-Cyclodextrin

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A process to reduce cholesterol in cream using β-cyclodextrin (β-CD) was optimized by response surface methodology, based on cholesterol reduction (%). For determining the influence of five factors (β-CD concentration, mixing time, mixing temperature, mixing speed and centrifugation speed), a five level rotatable central composite design was used. From analysis including all data, only three independent variables (β-CD concentration, mixing time and mixing speed) appeared to influence responses. When β-CD concentration was fixed as 5%, none of other factors affected the cholesterol reduction with an average reduction of 80.17%. With 10% β-CD addition, mixing time and speed were shown to be effective. The highest reduction values were 89.02% at 10 min and 94.42% at 30 min when the samples were mixed at 1330 rpm of speed. With 15% β-CD addition, the average reduction was 93.85%. When mixing time was fixed at 10 min, both β-CD concentration and mixing speed influenced significantly ($p<0.05$) and an interaction also existed. The effect of β-CD was greater compared with that of mixing speed. At 530 rpm mixing, 75% cholesterol reduction was shown with 5% β-CD, in contrast, 94.81% of cholesterol was reduced by 15% β-CD addition. When mixed for 20 min as a fixed variable, 15% β-CD addition showed a maximum cholesterol reduction of 97.99%. Also, with 1200 rpm mixing speed, 15% β-CD addition resulted in a maximum reduction of 97.82%. The present results indicated that although percentage of cholesterol reduction varied with different factors and conditions of processing, above 94% of cholesterol in cream could be removed, and β-CD concentration may play the most important role in the cholesterol reduction process among other factors.