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Effects of some Interacting Variables on the Physical and Release Properties of Metronidazole Suppositories Formulated with Modified Natural Fatty Bases

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Abstract : The objective of this study was to assess quantitatively the independent and interaction effects of type of suppository base, concentration of drug and incorporation of Tween 20® as formulation variables influencing the physical and release properties of metronidazole suppositories with a view to enhancing these properties of the suppositories. The variables were investigated at "low" and "high" levels using a 2^3 factorial experimental design. Cocoa butter and shea butter modified with 20 %w/w beeswax were employed as bases in formulating 200 mg and 800 mg metronidazole suppositories with or without 4 %w/w Tween 20® using the fusion method. Physical and dissolution properties of the suppositories were determined by standard methods. The independent and interaction coefficients of the variables on physical and release properties of the metronidazole suppositories were calculated. The inclusion of Tween 20® in the formulations was the most influential independent variable that affected the rank-investigated release parameters of the metronidazole from the suppositories, while the highest dual interaction effect was that between the drug and Tween 20®. The effect of the base as an independent variable was less pronounced on the physical and release of the metronidazole suppositories. The effect of drug-base ratio was manifested by higher release of drug from 800 mg metronidazole suppositories than from 200 mg formulations. The interaction coefficients showed a departure from zero value, implying existence of interaction between the variables, thus suggesting the need for careful combination of the variables in order to obtain suppositories of desired physical and release properties.

Keywords: Metronidazole suppositories, formulation variables, interacting effects, physical and release properties.

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