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Evaluation of local olibanum resin (*Boswellia papyrifera*) as microencapsulating agent for controlled release of Diclofenac sodium: Formulation, evaluation and optimization study

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The resin of *Boswellia papyrifera* was evaluated as a wall material for microencapsulation of diclofenac sodium using emulsion solvent evaporation method. Different formulations were attempted by varying polymer to drug ratio in order to evaluate whether the given concentration provided microcapsules. It was found that formulations with polymer to drug ratio ranging from 2:1 to 5:1 provided microcapsules as it was evident from optical microscope observations. The effects of other variables such as stirring rate, temperature and volume of dispersed phase, on characteristics of microcapsules were also studied. Preliminary studies revealed that the polymer to drug ratio and stirring rate are the primary factors which affect the response variables (encapsulation efficiency and release rate). Thus, Central composite design (CCD) was employed to optimize the encapsulation efficiency and release rate with respect to polymer to drug ratio and stirring rate.

The optimum formulation provided discrete, spherical and freely flowing microcapsules. The *in vitro* drug release exhibited minimum burst release with sustained release for 12 h. The kinetic study showed the optimized formulation followed Higuchi square root kinetic model with non-Fickian diffusion release mechanism. The FT-IR analysis indicated there is no incompatibility between diclofenac sodium and the resin of *B. papyrifera*. Thus, the resin of *B. papyrifera* could be a potential alternative wall material for microencapsulation.

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