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Development of stabilized mucoadhesive tablets for buccal delivery of curcumin

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Curcumin (cur), a natural compound elicit a spectrum of potent responses both locally and systemically. However its local effect in buccal conditions is largely hindered by its extremely limited water solubility, and its hydrolytic degradation in salivary pH. The aim of the present study was to develop buccal mucoadhesive tablets of cur with accepted release and stability at salivary pH as well as to design a simple *in vitro* dissolution test ensuring its stability. Chemical stability in phosphate buffer saline (PBS) pH 6.8 was tested using a group of stabilizers of which sodium lauryl sulfate (SLS) proved to be the most suitable. Different muccoadhesive tablets formulations were prepared by direct compression technique using a mixture of Hydroxypropyl methylcellulose (HPMC) K15M and Carboxymethylcelluose sodium (NaCMC) in different ratios with or without SLS as stabilizer, curas pure untreated drug or in the form of rapidly dissolving solid dispersion (SD) with PVP (Kollidon®25). Formulations were evaluatedfor mucoadhesive strength, *in vivo* and *in vitro* residence time, release studies and clinical evaluation of the selected formulation. The best mucoadhesive performance and *in vitro* sustained release profile (70% released over 12 hours) were exhibited by tablets containing HPMC.K15M: CMC sodium (5:1), SD (1:3) with 15 mg SLS. Salivary concentration (conc.) was significantly increased compared to undetectable conc. for pure cur due to poor solubility and SD without SLS due to hydrolytic degradation. Preliminary clinical study revealed an excellent anti-inflammatory and healing effect. Cur in this delivery system is an excellent candidate for local buccal delivery.

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