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Short Communication
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Eudragit Coated Microspheres of Embelin for Treatment of Ulcerative Colitis

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Ulcerative Colitis (UC) is an inflammatory chronic disease primarily affecting the colonic mucosa; the extent and severity of colon involvement are variable. In its most limited form, it may be restricted to the distal rectum, while in its most extended form, the entire colon is involved. UC belongs to the Inflammatory Bowel Diseases (IBD), which is a general term for a group of chronic inflammatory disorders of unknown etiology involving the gastrointestinal tract. UC is usually associated with recurrent attacks with complete remission of symptoms in the interim. The commonly used drugs for UC are sulfasalazine, mesalamine,olsalazide, balsalazide, budesonide, etc. But these drugs show various side effects such as diarrhea, nausea, vomiting, which result in maximum removal of drug from body. Embelin (2,5-dihydroxy-3-undecyl-1,4-benzoquinone), a major constituent of Embelia ribes Burm., is a naturally occurring alkyl substituted hydroxyl benzoquinone. The plant is indicated in traditional medicine for the treatment of various diseases. The fruit is bitter in taste, used to treat fever, inflammatory diseases and a variety of gastrointestinal ailments for thousands of years. Embelin is reported to possess anti-inflammatory, analgesic, antioxidant and wound healing activities. It is also reported to impair the inflammatory signaling through inhibition of nuclear factor kappa B (NF-kappa B) activity. It is reported to possess potent antioxidant and anti-inflammatory activities. The present study is to develop pH-dependent sustained-release embelin-loaded microspheres prepared by using combination of cross linking technique and w/o emulsion solvent evaporation technique employing combined pHdependent, i.e., Eudragit S 100 and delayed release, i.e., ethyl cellulose hydrophobic polymers for the treatment of UC. The optimized formulation of embelin-loaded microspheres has shown significant sustained release of embelin. Further this formulation significantly reduced the ulcer activity score and oxidative stress, and attenuated the inflammatory changes. Thus it may be concluded that embelin-loaded enteric-coated microspheres have shown delayed release capacity than plain embelin and exerts colon ulcer protective effect in rats. The clinical, macroscopic, and biochemical evidence for the protective effect of embelin on acetic acid induced colitis in rats was well correlated by the histopathological studies. The histological science of inflammation such as leukocyte infiltration, edema and tissue injury was found to be low following the pre-treatment with embelin. The results obtained from embelin-treated acetic acid induced colitis in the present study are in well correlation with earlier results of its ability to inhibit carrageen, an induced paw edema in rats, inhibition of NF-kappa B activation, which makes it a potentially effective suppressor of tumor cell survival, proliferation, invasion, angiogenesis, and inflammation. In addition, embelin is known to suppress the NF-kappa B activation induced by TNF-α and various other inflammatory and carcinogenic agents. In the present study, combined pH-dependent and delayed release embelin- loaded microspheres were examined in vitro and in vivo to elucidate their gastrointestinal behavior. Therefore, present study emphasis on the use of embelin (2,5-dihydroxy-3-undecyl-1,4-benzoquinone) from herbal origin, which is reported to possess anti-inflammatory and antioxidant activities. Thus, embelin-loaded microspheres were developed by combining the concept of pH dependent and delayed release for targeting drugs specifically to inflamed local site of colon. In addition, particle size ranging 4 lm–15 lm is optimum, in order to achieve large surface area and prolonged residence time in colon. Embelin-loaded microspheres showed average particle size of 13.5 lm ± 1.2, which was considered to be suitable for macrophages to accumulate particles in the inflamed region. This study has demonstrated that embelin-loaded microspheres formulation could deliver drug specifically to colon. The drug release is pH- and time dependent. This approach produces time dependent and pH-dependent sustained release as compared to other conventional dosage forms. The study examined the application of micro particulate system in enhancing stability and controlled release with brightening results concerning the therapeutic efficacy using blend of both pH-dependent and time controlled polymers.

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