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RESEARCH ARTICLE

Isolation and Characterization of *Dillenia* Fruit Mucilage: A Novel Polymer for Microspheric Delivery of Losartan Potassium

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Abstract: ***Objective:*** The present investigation was aimed to isolate, characterize and establish a natural polymer obtained from partially ripe and fresh fruits of *Dillenia indica* and its utility to deliver losartan potassium in a sustained manner from microspheric macromolecular dosage form.

Methods: All the microspheres were prepared by ionotropic gelation technique and investigated for various physico-chemical parameters along with *in-vitro* drug release studies to optimize the concentration of algino-Dillenia polymeric blend required to develop twice daily sustained release dosage form of losartan potassium.

Results: The functional characteristic studies and rheological behavior analysis suggested that extracted polysaccharide can be used as a viscosity modifying agent as well as sustain release ingredient. All the microsphere formulations exhibited excellent mucoadhesion properties and site-specific drug release. *In-vitro* studies revealed that the optimum concentration of algino-Dillenia polymeric blend is suitable to deliver losartan potassium in a sustained manner for a prolonged period of time. SEM study revealed that the microspheres were spherical in shape with a smooth outer surface having small cracks. XRD and DSC studies revealed that losartan potassium is present as an amorphous form in the prepared optimized microsphere formulation.

Conclusion: Thus, the present studies demonstrated that *Dillenia* fruit mucilage has an interesting rheological behavior which may be used as a viscosity modifying agent and exhibit promising properties of a sustained release dosage form to deliver losartan potassium from its microspheric dosage form.

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1. INTRODUCTION

The natural mucilaginous extracts represent one of the most abundant raw materials and have been the subject of intensive research due to their sustainability, biodegradability, biocompatibility and biosafety point of view. These natural gummy mucilaginous extracts are widely exploited in pharmaceutical research due to their diverse properties and applications. Plant mucilages are the important polysaccharides widely used as polymers, thickeners, binding agents, emulsion stabilizers, suspending agents, *etc*. in the formulation development research [1, 2]. They are also safe enough for oral consumption in the form of food additives or drug carriers and more preferred over synthetic materials due to their non-toxicity, low cost and wide availability [3]. Nowadays, naturally occurring polysaccharides are widely exploited as a polymer to develop controlled release microspheric drug delivery systems. However, the desired drug release and its reproducibility are not always obtained with a single hydrophilic swellable polymer obtained from natural origin. Therefore, it has been recommended that combinations of polymers are more likely to provide prolonged as well as desired drug release [4, 5]. From our laboratory, we have already reported that sodium alginate alone was not able to sustain the drug release for a prolonged period of time [4]. Thus, to prepare a twice daily sustained release dosage form of losartan potassium, a combination of polymers was required.

Losartan potassium is an imidazole derivative, potent, highly specific angiotensin II (type 1) receptor antagonist used for the management of hypertension [6]. It is readily absorbed from the gastrointestinal tract with an oral bioavailability of 33 % and plasma elimination half-life of 1.5 to 2.5 hours [7]. The short biological half-life and low bioavailability make losartan potassium an ideal candidate for being designed to sustained release drug delivery system. This system release the drug for a prolonged period of time and im-

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