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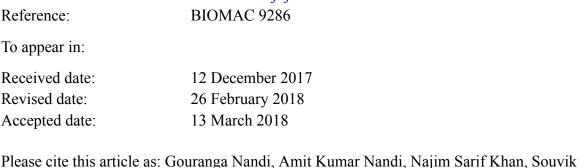
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**ACCEPTED MANUSCRIPT** 

Tamarind seed gum-hydrolyzed polymethacrylamide-g-gellan beads for extended

release of diclofenac sodium using 3<sup>2</sup> full factorial design

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**Abstract:** 

Development of tamarind seed gum (TSG)-hydrolyzed polymethacrylamide-g-gellan (h- Pmaa-

g-GG) composite beads for extended release of diclofenac sodium using 32 full factorial design is

the main purpose of this study. The ratio of h-Pmaa-g-GG and TSG and concentration of cross-

linker CaCl<sub>2</sub> were taken as independent factors with three different levels of each. Effects of

polymer ratio and CaCl2 on drug entrapment efficiency (DEE), drug release, bead size and

swelling were investigated. Responses such as DEE and different drug release parameters were

statistically analyzed by 32 full factorial design using Design-Expert software and finally the

formulation factors were optimized to obtain USP-reference release profile. Drug release rate

was found to decrease with decrease in the ratio of h-Pmaa-g-GG: TSG and increase in the

concentration of Ca<sup>2+</sup> ions in cross-linking medium. The optimized formulation showed DEE of

93.25% and an extended drug release profile over a period of 10 h with  $f_2 = 80.13$ . Kinetic

modeling unveiled case-I-Fickian diffusion based drug release mechanism.

**Key words:** Hydrolyzed-polymethacrylamide-g-gellan, tamarind seed gum, beads.

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