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Development and characterization of lysozyme loaded gum arabic as innovative oral films

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Up to date, the administration of a biological macromolecular drug by a route other than the traditional invasive one represents a challenging goal [1]. Buccal films represent an innovative carrier system with well-established advantages. The present study aimed to develop lysozyme-loaded gum arabic (GA) films and evaluate their suitability for both the buccal application and coating process. The loaded-films were produced by solvent casting method according to 2³ full factorial design; propylene glycol (PG), citric acid (CA), and GA quantities were used as investigated factors while the biological activity, tensile strength, mucoadhesivity, and other physical properties were applied as the responses. In addition, the investigation of minimum film forming temperature (MFFT) and thermal behavior, Raman mapping, and FT-IR measurements were also performed. GA demonstrated a conformation stabilizing property; therefore, the obtained films demonstrate a considerably high biological activity, which agrees with the literature. The samples present excellent mucoadhesive property and tensile strength with an obvious elasticity, considerable thermal stability and low value of MFFT. The samples elicit high water-absorbing capacity and short disintegration time which is associated with an initial burst release followed by an extended-release step. It could be concluded that GA represents an innovative carrier system for biopharmaceuticals with novel properties such as pronounced mucoadhesivity and stabilizing property for developing either oral mucoadhesive films or as subcoating/coating process.

References

1. YHEY, Ibrahim et al., EJPS 146, 105270 (2020)