University of Brighton

# Final Year Project

Submitted for [MSc IPS year 1]

The formulation and evaluation of in- situ gelling liquid as a lubricant and protective layer in the management of Xerostomia.

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## Abstract

Xerostomia is a condition of mouth dryness; it can result from either salivary or non- salivary causes. Treatment of xerostomia should be considered in order to mitigate the symptoms and avoid any complications that arise from it. Although there are many medications available in the market for the management of xerostomia, the effect of these medications can persist only for short periods of time. The objective of this project was the formulation of oral mucoadhesive dosage forms for the management of xerostomia which can be in- situ gelation and thus prolonged retention. Oral mucoadhesive gels were fabricated from different polymers such as sodium alginate, high methoxy (HM) pectin, low methoxy (LM) pectin and hydroxypropyl cellulose (HPC). The retention and mucoadhesion of these gels were evaluated *in vitro* using a dynamic test system. Porcine oesophageal tissues were used as a model of human oral mucosa and physiological conditions of the oral cavity were mimicked in terms of humidity and temperature. Different concentrations of each polymer were assessed until the promising concentration found. Image analysis was conducted only for promising polymeric gels that have a good retention on porcine oesophageal tissue, image J was used to determine the area of gels distribution. In addition to aforementioned techniques, rheological evaluation was also conducted to investigate the rheological characteristics of the gels which represented by viscosity. From the results of gels evaluation, it was concluded that 2%w/v sodium alginate and 4%w/v HM pectin were a promising candidates for the fabrication of mucoadhesive formulation for the management of xerostomia, because they showed a significant retention, rheological behavior and distribution on the tissue in case of alginate, although distribution and spreading of HM pectin cannot be detected by image analysis. 4% w/v LM pectin and 7% w/v HPC were considered as less promising candidates due to excessive shear thinning of LM pectin under high shearing and high percentage of HPC gel recovery compared with others.



**Key words:**

Xerostomia, mucoadhesion, in- situ gelation, polymers, retention, image analysis, rheology.