

Buccal peptide delivery using polymeric films: Exploring the role of glycerol

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INTRODUCTION

- Peptides face challenges in oral delivery due to degradation and poor
- Adhesion measurements were performed in solution using QCM-D.
- Mucoadhesion was observed for pectin, and not observed for the solutions with high glycerol content.

3% pectin control

5% glycerol control



- absorption.
- Buccal drug administration bypasses degradation in the GI tract and hepatic metabolism, improving patient compliance, enhancing peptide bioavailability and dosage control.
- The study aims to develop a buccal patch for peptide delivery and explores the effects of glycerol on film properties and drug release.

Mucoadhesive, active, backing layer



METHODS

Buccal films with varied glycerol content were successfully fabricated using slot die coating, with a consistent thickness (<200µm).



- Adhesion measurements of the films were performed on an artificial mucosal surface.
- Films 0, 5 and 10% showed 2.8, 2.9 and 2.8 mN of maximum adhesion force; while 20% showed the highest with a maximum adhesion force of 3.1 mN.



RESULTS

- The nondestructive strain percentage in the linear viscoelastic region was 2% for all solutions.
- Solutions 0, 5, and 10% behaved more liquid-like whereas 20% samples were more solid-like.
- The viscosity increased with increased glycerol concentration.
- All materials were classified as non-Newtonian, with a shear thinning behavior • and more than 100% regeneration capacity.



- Submerged in artificial saliva to mimic oral conditions, the cumulative drug release profile for 60 minutes showed zero-order release for 5 and 10%, and first-order release for control and 20%.
- Higher glycerol content resulted in a more sustained release pattern and prolonged disintegration times for the films: less than 20 minutes for control and 5%, 30 minutes for 10%, and up to 40 minutes for 20%.



Time (s)

Glycerol concentration (%)

Sample	Nondestructive strain (%)	Yield point/Flow point	Zero shear viscosity (Pa.s)
Control	2	Yes/No	7.0
5 %	2	Yes/No	15.4
10 %	2	Yes/No	17.7
20 %	2	Yes/Yes	53.3

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CORRESPONDENCE





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