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Influence of experimental model, active substance and polymer type on mucoadhesive properties of buccal tablets

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Mucoadhesiveness is influenced by the presence of different excipients and active substances that increase or decrease the interaction strength between polymer chains and mucosal surface. Mucoadhesive properties of buccal tablets were determined by measurement of the work of adhesion required to separate the test formulation from the mucosa-mimetic material: mucin disc or mucin dispersion (TA.XT plus texture analyzer equipped with thermostated mucoadhesive rig) [1]. The aim of the present study was to compare the usefulness of mucin disc and 10% mucin dispersion and to determine the influence of the mucoadhesive polymers (PEO, HPMC) as well as propranolol hydrochloride (PR) on the mucoadhesive properties of buccal tablets. Both mucosa-mimetic models enable determination of mucoadhesiveness, however, the lowest values of work of adhesion were obtained using mucin dispersion. By analyzing of placebo tablets using mucin disc revealed a statistically significant difference only between the F1_p and F6_p formulations. These are tablets that contain the highest PEO polymer content and the lowest HPMC polymer content, respectively. Incorporation of PR into PEO based tablets led to a slight decrease in mucoadhesiveness, whereas in the case of HPMC based tablets an increase in mucoadhesiveness was observed. The highest W_{ad} was achieved with high concentration PEO (F1_p) tablets.

Mucin disc and mucin dispersion serve as suitable surrogates, however more measurements are necessary to obtain reliable results. Addition of PR led to increase in mucoadhesiveness in certain formulation, while the type of polymer didn't affect the mucoadhesive properties.

References

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