

## Comparison of mucoadhesive strength of different polymers in vagino-adhesive propranolol hydrochloride film

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**Background and Aims:** The conventional formulations of vaginal drug delivery systems (VDDS) are associated with poor retention due to self-cleansing action of vaginal tract, leading to poor compliance. To overcome this problem, mucoadhesive polymers can be used for the preparation of VDDS. The purpose of this study was to select the polymer with high mucoadhesive strength in vagino-adhesive film of propranolol Hydrochloride.

**Methods:** Vagino-adhesive films were prepared using the solvent casting method. To achieve this, various mucoadhesive polymers, including HPMC 15000 (0.5, 1% w/w), Eudragit RS PO (3.5, 5.5% w/w), Eudragit L100 (4% w/w) and plasticizer PEG 400 were utilized. The mucoadhesive strength of the films was assessed through the detachment force method on sheep vaginal mucosa in pH 4.5 citrate-phosphate buffer at 37°C. Freshly removed sheep vaginal mucosa fixed in place over the two cylindrical platforms. 1 cm<sup>2</sup> of the film was set between the two mucosa-covered platforms then a constantly increasing force was applied on the adhesive joint formed between the vaginal mucosa and the test film, by gradually the lower platform. This trend was continued until the contact between the test film and the mucosa was broken and the maximum detachment force measured.

**Results:** In case of formulations containing low concentration of hydrophilic polymer, there was an inadequate interaction between the polymer and the mucosal layer resulted in lower mucoadhesive properties. An increase in the concentration of the hydrophobic polymers such as Eudragit RS PO, Eudragit L100 led to a decrease in the mucoadhesive strength, hence the hydrophobic polymer as the base matrix and the hydrophilic polymer was used to provide the films with high mucoadhesive properties.

**Conclusions:** The formulation containing Eudragit RS PO (3.5% w/w), HPMC 15000 (1% w/w) and PEG 400 (40% w/w) showed the highest mucoadhesive strength among all the tested formulations.

**Keywords:** Mucoadhesive strength; Vaginal film