In vitro analysis of mucoadhesive properties of thermoresponsive systems composed of poloxamer 407 and Carbopol 974P or polycarbophil

Sabrina Barbosa de Souza Ferreira[1]; Lucas de Alcântara Sica de Toledo[1]; Hélen Cássia Rosseto[1]; Raphaela Regina Araujo Pereira[2]; Marcos Luciano Bruschi[1]

[1] State University of Maringa, Department of Pharmacy, Laboratory of R&D of Drug Delivery Systems, K80, Colombo Avenue, n. 5790, Maringá, Paraná, Brazil.
[2] Universidade Estadual Paulista "Júlio de Mesquita Filho", School of Pharmaceutical Sciences, Drug and Medicines Department, Postgraduate Programme in Pharmaceutical Sciences, Brazil.

Purpose: The present work describes the *in vitro* evaluation of mucoadhesive properties of thermoresponsive systems containing poloxamer 407 (P407) and Carbopol 974P (C974P) or polycarbophil (PCP), to be used as platform of new drug delivery systems. **Methods:** Ten binary polymeric systems were prepared containing P407 (15 or 20%, w/w) and C974P or PCP (0.10, 0.15, 0.20, 0.25 or 0.50% w/w). The mucoadhesive strength of the formulations was evaluated by measuring the force required to detach the formulation from a mucin disc using a TA-TX2plus Texture Analyser (Stable Micro Systems, Surrey, UK) in tension mode. Samples of each formulation stored at 37 °C, were placed under the analytical probe which was then lowered until the mucin disc was in contact with the surface of the sample. The force required to detach the mucin disc from the surface if each formulation was determined from the resulting force-time plot. The results were statistically evaluated by one-way ANOVA and $p < 0.05$ was taken to denote significance. **Results:** The effects of the increase of P407 and C974P or PCP concentrations were significant on the mucoadhesive strength of the preparations. Increasing the content of P407 increased the mucoadhesive property. However, increasing the content of bioadhesive polymers (C974P and PCP) decreased the force required to detach the mucin disc from the surface of each formulation. The polymeric blends containing P407 and C974P showed higher mucoadhesive strength than the polymeric systems containing P407 and PCP. **Conclusions:** The results indicate that the formulations containing higher P407 concentration presented increased mucoadhesive strength. Besides, the polymeric systems containing lower concentration of C974P and PCP showed higher mucoadhesive force probably due to the consistency of formulations interfere with the method as well as, the interaction between the bioadhesive and thermorresponsive polymers.

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