EVALUATION OF FILMS OF COLLAGEN AND PVA AS CONTROLLED DELIVERY SYSTEMS OF ANTIBIOTICS FOR THE TREATMENT OF ULCERATIVE KERATITIS IN DOGS
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Abstract. Ulcerative keratitis is an ocular disease of high incidence in domestic animals especially dogs. This disease is characterized by a corneal erosion of variable depth. Between the causes of such erosion are traumas, abnormal tear production, physiological deficiencies and anatomical factors such eyelid’s defects. Commonly, infection is present in the affected cornea difficulting the wound healing process. For that reason, the treatment with antibiotics is initiated as soon as the disease is diagnosed. Conventional ocular formulations as eye drops, ointments or gels are the first options to treat corneal ulcers, but due blinking eye mechanisms such as tearing the drug’s half-life is diminish and the therapeutic effect is reduced. The increase of the dosage frequency can solve the problem but commonly generates toxic effects and discomfort to the patient. The use of contact lenses, collagen shields and polymeric films to treat ulcerative keratitis is effective because they act as reservoirs that extent the contact time of the drug with the cornea. The objective of this work was to develop polymeric films that act as controlled delivery systems of antibiotics to treat the ulcerative keratitis in dogs. Polymeric films were obtained by casting of anionic collagen and polyvinyl alcohol in a mass proportion of 1:3 respectively. Three different anionic collagens designated as Col(24h), Col(72h) and Col(96h) were obtained by alkaline treatment of bovine tendon during 24h, 72h and 96h respectively. The antibiotics incorporated in such films were tobramycin sulfate and ciprofloxacin hydrochloride. It was observed that the in vitro delivery of those antibiotics was more controlled for the films containing Col(24h) compared with those containing Col(72h) and Col(96h), suggesting that, the first one could be the better option to be used in vivo. On other hand the total percentage of tobramycin released by the films was less than 50%, the retention of this antibiotic in the polymeric matrix was caused probably by the electric interaction between the anionic collagen and the cationic tobramycin. Implants of 0.05cm² made by cutting the films would deliver concentrations of each antibiotic that exceed the minimum inhibitory concentrations for bacteria of regular incidence in corneal ulcers such as Pseudomonas aeruginosa and Staphylococcus aureus.