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Yara Peluso Cid

Federal Rural University of Rio de Janerio, Brazil

Pharmacokinetics of Fipronil and Fipronil-sulfone in dogs after oral administration of Fipronil tablets

Statement of the Problem: Increased human-pet interaction creates concern for the prevention and treatment of flea and tick infestations. Fipronil (FIP) is an insecticide belonging to the class of phenylpirazoles widely used in veterinary medicine. Ectoparasiticides products commercially available for pets are mostly in topical forms, however they are associated with owner's and environmental damage. Oral pharmaceutical forms for veterinary use have advantages related to convenience of administration, besides safety of human and environment.

Methodology & Theoretical Orientation: Plasma concentrations of FIP and SULF were analyzed by HPLC-UV after solid phase extraction (SPE) procedure using SPE Oasis HBL (Waters) cartridges and methanol as eluent. Chromatographic separation was performed using a Kromasil C18 100 x 4.6 mm x 3.5 µm column, mobile phase acetonitrile: water (60:40) with flow rate 1.0 mL/min. Construction of plasma concentration x time curve and pharmacokinetic parameters was performed using the Microsoft Excel macro PK Solver. The study used the non-compartmentalized mathematical model of extravascular administration.

Findings: The bioanalytical method was suitable for application in the pharmacokinetic studies, with LQ values of 0.1 µg/mL for FIP and SULF, which allowed the quantification of both in plasma until AUC0-t was greater than 80% of $AUC_{0-\infty}$. FIP presented a double-peak pharmacokinetic profile, which probably occurred due to the drug oxidative metabolism. FIP administered orally at the dose of 2 mg/kg reached the systemic circulation (C_{max}= 2.17µg/mL) and was fast absorbed (t_{max}= 2.67h) and metabolized, once its SULF metabolite presented C_{max}= 1.32µg/mL in a t_{max}= 3.5h. Both elimination, FIP and SULF occurred slowly (t1/2= 385.93h) and (t1/2= 385.93h) respectively, maintaining quantifiable plasma levels in the blood for up to 28 days after treatment.

Conclusion & Significance: The use of fipronil tablets for the control of ectoparasites in dogs may be a safer alternative for owners and the environment.

Biography

Yara Peluso Cid is professor at the Federal Rural University of Rio de Janeiro. Graduation in Pharmacy, Masters in Pharmaceutical Sciences and PhD in Science Technology and Innovation in Agriculture. Has experience in the area of veterinary drug design and pharmaceutical analysis applied to the physical-chemical quality control and studies of Pharmacokinetics, as well as expertise in the area of analytical and bioanalytical methods validation and Quality Assurance.

yarapcid@gmail.com

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