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Topical Hydrogels to Improve Treatment of Cutaneous Leishmaniasis †

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Abstract: Leishmaniasis is a "neglected" disease and a priority public health problem for Salta and Argentina. In this work, alternative systems of amphotericin B (AmB) and poloxamers 407 and 188 are proposed to improve the treatment of cutaneous leishmaniasis. Hydrogels were loaded with 0.5 and 1.0% w/w of AmB. Rheological characterization, erosion, and AmB release experiments were performed from the hydrogels. The AmB-loaded hydrogels showed a lower gelation temperature (Tgel) than the one without the drug, where the hydrogel with 0.5% w/w AmB has a Tgel of 26.5°C, which makes it suitable for the proposed use. Also, a notable increase in complex viscosity (η *) and storage modulus (G') was observed for this formulation. In this context, when the temperature increased from 25 to 32°C, η* increased from 2.2 to 1442.8 Pa.s and G´ from 1.6 to 8560.5 Pa. Changes in these values were not as pronounced for the gel loaded with 1%. The drug release data were fitted with the Dual Release model with an $R^2 \geq 0.99$. The 0.5% AmB hydrogel showed the fastest release rate. The average erosion rate of gel without drugs was 153.6% greater than with AmB. These results suggest that AmB hydrogels can be considered a valuable alternative to improve the treatment of cutaneous leishmaniasis.

Keywords: leishmaniasis; amphotericin B; topical hydrogels.

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Conflicts of Interest

The authors declare no conflict of interest.