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Acetylated Cashew Gum-Based Nanoparticles: Drug Delivery of the Alkaloid Epiisopiloturine.

Natural products are the raw material most used in the production of biomaterials. The abundant availability, lower toxicity rate greater biocompatibility, and cost generally observed as a natural product characteristics make them promising sources of products of therapeutic interest. Epiisopiloturine (EPI) (Figure 1A) has been incorporated into a polymeric matrix of cashew gum acetylated (Figure 1B) [1]. The nanoparticles were prepared by dialysis technique, having nanometric sizes ranging between 108.6 and 154.4 nm and polydispersity index between 0.120 and 0.212. The zeta potential was negative for all formulations and systems showed incorporation efficiency from 33 to 55%. Morphological analysis by AFM showed nanoparticles with spherical shape and distributed in an aggregated manner. The results obtained by Nanoparticle Tracking Analysis (NTA) are in line with those observed by Light Dynamics Scattering (DLS) (Figure 2). In addition, the particle concentration ranged from 92.4×10^9 and 136.5×10^9 particles per mL. EPI nanoformulated showed a slow and gradual release profile, achieving balance around six hours of release and a mechanism for Fickian diffusion release.

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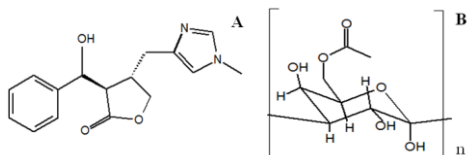


Figure 1. Chemical structure of epiisopiloturine (A) and acetylated cashew gum (B).

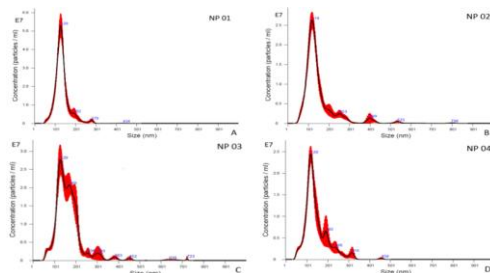


Figure 2. Quantitative particle size analysis by NTA. Merged results for samples (A) NP 01 (Mode: 128.0 nm; Concentration: 1.62×10^9 particles/mL) (B) NP 02 (Mode: 118.9 nm; Concentration: 1.14×10^9 particles/mL), (C) NP 03 (Mode: 128.3 nm; Concentration: 1.3×10^9 particles/mL), (D) NP 04 (Mode: 119.8 nm; Concentration: 9.84×10^8 particles/mL).

References

- [1] Dias, S.F., Nogueira, S.S., de França Dourado, F., Guimarães, M.A., de Oliveira Pitombeira, N.A., Gobbo, G.G., Primo, F.L., de Paula, R.C., Feitosa, J.P., Tedesco, A.C., Nunes, L.C., Leite, J.R., da Silva, D.A., Carbohydrate Polymers, 143(5) (2016) 254–261.