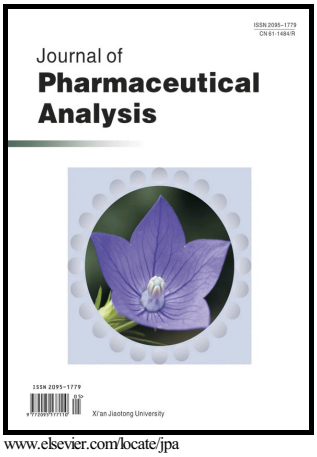

www.elsevier.com/locate/jpa

Chemical and microbiological characterization of tinctures and microcapsules loaded with Brazilian red propolis extract

Erika Tayse Cruz Almeida, Maria Cristina Delgado Silva, José Marcos Santos Oliveira, Regianne Umeko Kamiya, Rodolfo Elleson Santos Arruda, Danilo Abreu Vieira, Valdemir Costa Silva, Pierre Barnabé Escodro, Irinaldo Diniz Basílio-Júnior, Ticiano Gomes do Nascimento

PII: S2095-1779(17)30022-9
DOI: http://dx.doi.org/10.1016/j.jpha.2017.03.004
Reference: JPHA353

To appear in: *Journal of Pharmaceutical Analysis*

Received date: 5 May 2016
Revised date: 22 January 2017
Accepted date: 17 March 2017

Cite this article as: Erika Tayse Cruz Almeida, Maria Cristina Delgado Silva José Marcos Santos Oliveira, Regianne Umeko Kamiya, Rodolfo Elleson Santo Arruda, Danilo Abreu Vieira, Valdemir Costa Silva, Pierre Barnabé Escodro, Irinaldo Diniz Basílio-Júnior and Ticiano Gomes do Nascimento, Chemical an microbiological characterization of tinctures and microcapsules loaded wit Brazilian red propolis extract, *Journal of Pharmaceutical Analysis* http://dx.doi.org/10.1016/j.jpha.2017.03.004

Chemical and microbiological characterization of tinctures and microcapsules loaded with Brazilian red propolis extract

Erika Tayse Cruz Almeida[a,b], Maria Cristina Delgado Silva[a,b], José Marcos Santos Oliveira[a], Regianne Umeko Kamiya[a], Rodolfo Elleson Santos Arruda[a], Danilo Abreu Vieira[a], Valdemir Costa Silva[a], Pierre Barnabé Escodro[a], Irinaldo Diniz Basílio-Júnior[a,b], Ticiano Gomes do Nascimento[a,b*]

[a]Laboratório de Controle de Qualidade e Análise de Fármacos, Medicamentos e Alimentos, Curso de Farmácia, Escola de Enfermagem e Farmácia, Universidade Federal de Alagoas, Campus A.C. Simões, BR 104 Norte - Km 97, Maceió, AL. CEP:57072-970.

[b]Laboratório de Controle de Qualidade Microbiológico de Alimentos, Faculdade de Nutrição, Universidade Federal de Alagoas, Campus A.C. Simões, BR 104 Norte/Km 97, Maceió, AL. CEP:57072-970.

*Corresponding author. E-mail: ticianogn@pq.cnpq.br

ABSTRACT

The aim of this study was to characterize tinctures and microcapsules loaded with an ethanol extract of red propolis through chemical, physicochemical and microbiological assays in order to establish quality control tools for nutraceutical preparations of red propolis. The markers (isoflavonoids, chalcones, pterocarpans, flavones, phenolic acids, terpenes and guttiferones) present in the A and B tinctures were identified and confirmed using LC/ESI/FTMS/Orbitrap. Four compositions (A, B, C and D) were prepared to contain B tincture of the red propolis with some pharmaceutical excipients and submitted to two drying processes using spray-drying and freeze-drying to obtain microcapsules loaded with the red propolis extract. The tinctures and microcapsules of the red propolis were analyzed with total flavonoid content test, antioxidant activity. The antibacterial activity and minimum inhibitory concentration (MIC) were tested using *Staphylococcus aureus* ATCC 25293 and *Pseudomonas aeruginosa* ATCC 27853 strains. The tinctures and microcapsules presented high flavonoid quantities from 20.50 to 40.79mg of flavonoids / 100mg of the microcapsules. The antioxidant activity and IC_{50} were determinated for the A and B tinctures (6.95µg/mL and 7.48µg/mL, respectively), the spray-dried microcapsules (8.89µg/mL and 15.63µg/mL, respectively) and the freeze-drying microcapsules (11.83µg/mL and 23.36µg/mL, respectively). The tinctures and microcapsules proved to be bioactive against gram-positive and gram-negative bacteria with inhibition halos superior to 10mm at concentration of 200µg/mL and MIC values between 135-271 µg/well using gram-positive strain and 271-543 µg/well using gram-negative strain. The tinctures and microcapsules of the red propolis have a potential application for nutraceutical products.