Optimization of the ultrasound-assisted of psoralen and bergapten from Brosimum gaudichaudii Trécul roots.

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Introduction: Brosimum gaudichaudii Trécul, known as "mama-cadela" or "mamica de cadela" is widely used as phytomedicine in the treatment of psoriasis, atopic dermatitis and vitiligo. These therapeutic actions are closely related to the presence of two linear furanocoumarins in its roots, psoralen and bergapten, which are considered chemical markers of this species (BARROSO et.al., Sistem. de Angios. do Bras (1) p 502. 2002). This study aimed to optimize the ultrasound-assisted extraction of psoralen and bergapten from the roots of B. gaudichaudii by using Response Surface Methodology (RSM).

Materials and methods: The roots of Brosimum gaudichaudii Trécul were collected in Jussára-Goiás-Brazil. It is geographically situated on 13°43'08.04"S 50°31'44.98"W. The herbal material were dried at 40°C in forced ventilation and ground in knife mill. The influence of ultrasound extraction of psoralen and bergapten yield was evaluation using a factorial drawing 3³ (Box-Behnken) with seventeen experimental runs, including five replicates at the center point. The effects of unexplained variability in the observed response due to extraneous factors were minimized by randomizing the order of experiments. The factorial design matrix contained the following factors: extraction time (X₁), particle size (X₂) and ethanol:water proportion (X₃).

Results and discussion: ANOVA showed that extraction time, particle size and ethanol:water proportion affected, at different levels, the efficiency of the process. From both chemical markers, the optimal set of conditions in the ultrasound-assisted extraction involves an extraction time of 25 min, a mean particle size of 100 µm and an ethanol:water proportion of 55:45 (v/v). RSM was successfully employed in the optimization of ultrasound-assisted extraction of psoralen and bergapten from the roots of B. gaudichaudii.

Conclusion: Moreover, ultrasound-assisted extraction proved to be an attractive and promising alternative to be used in the development of analysis method from B. gaudichaudii.