



University of Zabol

Graduate School

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Investigating the effect of different harvest dates and different drying methods on the quantity and quality of essential oil of the medicinal lemon plant (*Lippia Citriodora* Kunth palau)

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Abstract:

Considering the importance of the drying stage in the medicinal plant industry and the abundant use of dried Lemon verbena verbenaplant in the pharmaceutical and food industries, this experiment was conducted to investigate the different methods of drying the qualitative and quantitative characteristics of the Lemon verbenamedicinal plant. This experiment was conducted in a factorial form in the form of a randomized complete block design with 12 treatments and in 3 replications at the Agricultural Research Institute of Zabol University, located in Chahnimeh, Baqiyat al-Azam (AS). Different drying methods, which include: natural method (drying in the shade and sun), oven (at temperatures of 30, 40 and 50 degrees Celsius), microwave (100 and 300 watts) and freeze dryer (temperature -10 degrees Celsius and pressure 5 mm of mercury). The samples were dried and crushed by an electric mill to 40 mesh size. Then, the essential oil was extracted by steam distillation by Clonger for 3 hours, and it was stored in opaque glasses in a normal refrigerator at 4 degrees Celsius until the phytochemical tests were performed. Phytochemical traits such as (chlorophyll a, chlorophyll b, total leaf chlorophyll, total phenolic compounds were measured using Folin Ciocalto reagent method, total flavonoid using aluminum chloride colorimetric method and antioxidant activity using DPPH method. Also, the quantity of extracted essential oil was reported by volume/weight, and the components of the essential oil were identified using a gas chromatography device connected to a mass spectrometer (GC-MS). The results of this experiment were analyzed with the help of SAS statistical software version 9.1 and the resulting graphs were drawn with Excel software. In general, the results of the phytochemical analysis of the essential oil showed that the highest yield of the essential oil (88.6%) was obtained in the microwave drying method with a power of 300 watts and containing 12 secondary active compounds. The lowest yield of essential oil was obtained in the sun drying method (66.4%) with 12 bioactive compounds. The antimicrobial activity of this essential oil showed a dose-dependent inhibitory effect. As the concentration of essential oil increased from 1.5 to 100 mg/ml, the growth power of bacteria decreased significantly. The largest diameter of non-growth halo (53 mm) was obtained from Streptococcus pyogenes bacteria as a result of treatment with essential oil extracted from lemon verbenas dried in an oven at a temperature of 30 degrees Celsius. Also, the essential oil extracted from dried lemon verbenas exposed to the sun had no inhibitory effect on Staphylococcus aureus.