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Impact of Geographical Location and Extraction Process on Sandalwood Oil and Detection of Adulteration †

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Abstract: Sandalwood tree, also known as "Pride of India" is amongst the most valuable forest commodity. The essential oil extracted from its heartwood is much appreciated for its pleasant aroma and pharmacological activities. Sandalwood oil from different countries such as Australia and India differ significantly in quality, and the superiority of the Indian variety has been well established. Besides, the quality of essential oil also varies with the process of extraction. In the current study, samples of sandalwood were procured from three different Indian states: Mumbai, Orissa, and Mysore. The amount of essential oil extracted was 1.5%, 3.2%, and 5.1%, respectively. The chemical composition of oil as determined by gas chromatography-mass spectrometric analysis revealed that the total content of α and β-santalol (major bioactive and aroma providing sandalwood oil constituent) was 67.4%, 72.5%, and 75.9%, respectively. Therefore, this study establishes the quantitative and qualitative superiority of sandalwood oil from Mysore, suggesting the preferable suitability of Southern Indian climatic conditions. The Mysore sandalwood was further used to extract volatiles using different green extraction processes. Hydrodistillation, Liquid-CO_2, and supercritical-CO_2 resulted in 5.1%, 6.1%, and 7.9% extracts. The extraction time taken was the least for the supercritical-CO_2 process. The chemical composition of the oil did not vary significantly for different processes indicating these as effective green extraction methods to obtain precious sandalwood extract. The raised demand and price of sandalwood oil lead to adulteration with oil or chemicals of inferior quality. Detection of these chemicals is very challenging. This study detected the varying proportion of contaminants such as castor oil and polyethylene glycol 400 by thermogravimetric analysis.

Keywords: sandalwood oil; liquid-CO_2; supercritical-CO_2; santalol; adulteration.

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Conflicts of Interest

The authors declare no conflict of interest.