



Area: ORG

Physicochemical evaluation of *Myristica fragrans* essential oil

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Highlights

The extraction time influences the essential oil's physical and chemical parameters. The density and refractive index comply with the Brazilian Pharmacopoeia. *Myristica fragrans* essential oil has potential as a natural preservative in food products.

Abstract

Essential oils are extracted from different parts of plants and are widely used in the food, cosmetic, and pharmaceutical industries due to their properties. The composition and quality of these oils can vary depending on the species, cultivar, and extraction method¹. In this context, the physicochemical parameters of essential oils are essential not only for assessing quality but also for ensuring purity control². This study evaluated the physicochemical parameters of the essential oil extracted from the seeds of *Myristica fragrans*, better known as nutmeg, to determine its quality and potential application as a natural food preservative. Parameters such as density, moisture content, yield, and refractive index of samples subjected to extraction at different times were analyzed, as shown in Table 1.

Table 1 – Physicochemical results of *Myristica fragrans* essential oil subjected to different extraction times.

Extraction time (h)	Density (g mL ⁻¹)	Humidity (%)	Performance (%)	Refractive index (nD)
1 h	0.865 ± 0.0014	9.84	4.51	1,489
2 h	0.889 ± 0.0019	6.83	4.21	1,482
4 h	0.926 ± 0.0040	6.85	4.49	1,483

Source: Own authorship (2025).

The results obtained for density and refractive index are similar to those described in the Brazilian Pharmacopoeia (2019)³. Regarding sample yield, variation was observed in relation to some authors, with results close to those reported by Kapoor *et al.* (2013)⁴. The variations observed in the parameters may be related to factors such as soil characteristics, environmental conditions and extraction methods⁵. The results indicate that nutmeg essential oil, regardless of the extraction time, maintained a physicochemical profile compatible with those described in the literature, evidencing its potential for applications in the food industry.

¹ BUDIASTRA WI *et al.* Physicochemical Properties of Nutmeg Oleoresin Obtained by Ultrasound-Assisted Extraction from Different Raw Material Qualities and Drying Methods. **International Journal on Information Technology**, vol. 11, n. 1, p. 229-235, 2021.

² ASHOKKUMAR K. *et al.* Nutmeg (*Myristica fragrans* Houtt.) essential oil: A review on its composition, biological, and pharmacological activities. **Phytotherapy Research**, vol. 36, p. 2839-2851, 2022. ³ ANIVSA. **Brazilian Pharmacopoeia**. 6. ed. Brasília: ANVISA, 2019. ⁴ KAPOOR SPI *et al.* Chemical Composition and Antioxidant Activity of Essential Oil and Oleoresins of Nutmeg (*Myristica fragrans* Houtt.) Fruits. **International Journal of Food Properties**, v 16, n. 5, p. 1059-1070, 2013. ⁵ TEIXEIRA *et al.* Myristicin contents in nutmeg (*Myristica fragrans*, Houtt) preparations. **Rev. Inst. Adolfo Luiz**, v. 67, n. 1, p. 39-35, 2008.

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