

Extraction and Characterization of Fenugreek (*Trigonella-Foenum Graecum*) Seed Oil

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Abstract: *Fenugreek (Trigonella foenum-graecum L.) is a leguminous herb with a long history of medicinal use, particularly for the treatment of diabetes and as a galactagogue. The seeds of fenugreek are rich in essential amino acids, dietary fiber, proteins, oils, and bioactive compounds such as steroidal saponins, making them valuable both nutritionally and functionally. Fenugreek seed oil, primarily composed of unsaturated fatty acids like linoleic, linolenic, and oleic acid, has gained attention for its health benefits and culinary applications. Traditional methods such as Soxhlet extraction with petroleum ether have been employed for oil extraction; however, subcritical butane extraction (SBE) is emerging as a promising alternative. This method offers several advantages over conventional techniques, including improved selectivity, better environmental compatibility, and the preservation of bioactive compounds. SBE also eliminates toxic residues and avoids the formation of harmful substances like benzopyrene, making it a safer and more efficient choice. This review explores the nutritional profile, health benefits, and extraction methods of fenugreek seed oil, with a particular focus on the potential of subcritical butane extraction as a superior method for obtaining high-quality oil while maintaining environmental sustainability. This abstract summarizes the key aspects of fenugreek seed oil and the novel extraction method, setting the stage for a more in-depth review.*

Keywords: Fenugreek, Seed oil, Subcritical butane extraction, Nutritional profile, Bioactive compounds, Functional foods, Soxhlet extraction