

Research Paper

Development and Composition of Skin Cream Utilizing Sesame Seed Oil

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ABSTRACT

Sesame seeds contain a wealth of nutrients that have numerous health-promoting properties for humans. It contains numerous unsaturated fatty acids, tocopherols, phytosterols, lignans, phenylpropanoids, and minerals. In traditional medicine, the oil of sesame seeds is used to treat rheumatism and lower blood pressure. In this study, biotechnological characterization of oil extracted from sesame seeds grown in Turbat, Baluchistan, Pakistan was carried out via UV-spectroscopy, RP-HPLC, and Aflatoxin test by ELISA assay, Gas Chromatography, and anti-microbial assays. UV spectrum of 80% ethanol extract of sesame seed oil showed λ_{\max} at 260 nm and 290 nm indicating the presence of phenolic compounds in this predominantly oil compounds mixture. RP-HPLC of 80% ethanol extract of sesame seed oil showed several peaks at 280 nm which was demonstrated by the presence of lignans and phenolic compounds. ELISA-based Aflatoxin test revealed the presence of <2 % aflatoxin. A sesame oil-based moisturizer was formulated comprised of sesame oil, natural honey, and beeswax.

KEYWORDS: Aflatoxin, Natural honey, RP-HPLC, Sesame seeds.

INTRODUCTION

The flowering plant Sesame (*Sesamum indicum* L.) belongs to the genus *Sesamum*. It is one of the earliest crops known to produce seeds and oil and is widely grown in tropical regions. Depending on the color of the germplasm, sesame can be classified as either yellow, black, or white. While white sesame is planted and distributed widely because of its high quality, and high oil content, black sesame has excellent growth potential and resistance to lodging, and drought resistance, making it a common and widely grown species. Yellow sesame, for example, is one of the variegated varieties in which most of the plants are branched. The proportion of oil decreases gradually as the germplasm becomes darker. Sesame oil contains oleic, palmitic, and stearic acids, but linoleic acid is the most abundant. These four fatty acids comprise most of sesame oil's total fatty acid composition. It helps to lower cholesterol, soften blood vessels, and prevent and treat vascular sclerosis-related

diseases [1]. Even though it only makes a small portion of the world's vegetable oil, sesame is the oldest known oil seed crop. Oils and fats contain nutrients that humans need. They carry fat-soluble vitamins and contribute essential fatty acids, all of which are crucial to numerous biochemical processes. Vegetable oils and fats have also been utilized as food ingredients in bakery and confectionery products, margarine spreads, and other foods. In frying and cooking oils, vegetable oils are also utilized as heat-transfer media and flavoring agents. Natural antioxidants, bioactive compounds, lignans, tocopherols, phytosterols, and other nutrients can be found in sesame oil. It has lipogenic, anti-degenerative, hypocholesterolemic, and health-promoting advancing properties, among other health benefits. Human bodies consume both essential and nonessential fatty acids. Sesame oil contains vitamin E, sesamol, and other natural products good for human health. Sesame is typically roasted at 180–220 °C to increase oil yield and flavor. However, at high temperatures,

certain nutrients, such as vitamin E, sesamol, and sesamin are quickly degraded, and certain carcinogens, such as benzopyrene and dioxin, are produced. Lowering the roasting temperature ensures the oil's safety and nutrition. Natural antioxidants, sesamin, sesamolin, and tocopherol homologs, can be found in sesame oil. Sesame seeds are abundant in phosphorus, iron, magnesium, calcium, manganese, copper, and zinc minerals. Sesame seeds are believed to be a significant wellspring of micronutrients. Sesame seed oil has been exploited by humans since the dawn of civilization and has been used as healing oil for thousands of years. It is used for about 65% of oil extraction and 35% of food preparation. Due to their nutritional content of fiber, vitamins, minerals, natural oils, and organic compounds, sesame seeds have numerous health benefits [2]. Natural sesame oil can be consumed without further purification and has a pleasant flavor when extracted from high-quality seeds. The oil is also used to make perfume, cosmetics skin conditioners and moisturizers, hair products, bath oils, hand products, and pharmaceuticals as a vehicle for the delivery of drugs, insecticides, and paints and varnishes in the industrial setting. Natural oil has a lot of natural antioxidants, which makes it very stable [3]. Sesame lignans have antioxidant and health-promoting activities [4]. Consuming sesame seeds appears to boost vitamin E activity and plasma levels of gamma-tocopherol, which are thought to reduce the risk of heart disease and cancer [5].

MATERIALS AND METHODS

Sesemum indicum (Sesame seeds) oil samples were collected from Dasht, district Turbat in Balochistan, Pakistan. Sesame oil was filtered with Waterman filter paper and extracts were prepared in several solvents

(80% ethanol, methanol, and n-hexane) to separate the hydrophilic and hydrophobic compounds. Following that samples were vortexed and centrifuged at 15000 rpm for 10 min. Supernatants were collected and kept in a desiccator for 48 hours [6,7].

Extract samples were also characterized via UV-visible spectrophotometer at several wavelengths (200 -310 nm). The presence of total aflatoxins in sesame oil was also detected via BZERO H2AFLA, an ELISA-based technique.

Seed oil extracts were also characterized by High performance liquid chromatography. Reverse phase column, C18 (50×4.6 mm, i.d. 5µm) from Phenomenex, Filter paper size 0.45 µm. The sesame oil sample was eluted in 36 min with 1.00 ml per mint flow rate and 280 nm was analyzed by HPLC with PDA detectors [8].

Gas Chromatography (Shimadzu GC-17A) was also utilized for the analysis of Sesame oil samples. Extraction of honey proteins was made by diluting honey sample up to 50% (v/v) in distilled water then 400 ml of chilled acetone was added, vortexed, and incubated at -4 C for 1h. The mixture was centrifuged at 13000rpm for 10 min and a pellet of protein was dissolved in 0.5ml of Tris-HCl (20mM) buffer, vortexed, and stored at -4 C [9].

The antimicrobial potential of sesame seed oil extracts and natural honey was also determined against seven bacterial cultures *E. coli* *S. typhi*, *S. aureus*, *Bacillus cereus*, *Pseudomonas aeruginosa*, *Klebsiella spp* via 96 well plate method [10].

Sesame oil-based hand cream was prepared by mixing 70 ml of sesame oil, 10 g of beeswax, and 10 ml of honey. Beeswax was melted at 62 °C on the magnetic hot plate and sesame oil and honey were homogenized with homogenizer and transferred into small jar.

RESULTS AND DISCUSSION

In this study, biotechnological characterization of Sesame seed oil produced in Turbat, Baluchistan was carried out using an array of bioanalytical techniques.

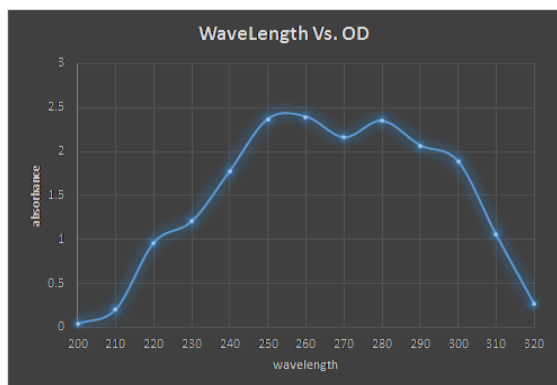


Figure 1: The UV spectrum of ethanol extract of sesame oil at different wavelengths.

The phytochemical compounds in the ethanolic extracts of sesame oil were analyzed by UV spectroscopy at 260 nm to 310 nm (Figure 1).

In this study, sesame oil was checked for aflatoxin by the BZERO H2AFLA kit. ELISA being a qualitative technique is used to analyze total aflatoxins. Aflatoxins are a group of toxins that are made by certain fungi and can be found in cottonseed, tree nuts, maize (corn), peanuts, and cottonseed. The fungi that produce aflatoxins are *Aspergillus flavus* and *Aspergillus parasiticus* which grow in warm and damp areas [11,12]. The sesame seeds showed <2 % of aflatoxin which indicated that the sesame seeds were not affected by *Aspergillus* and other fungi.

HPLC of Ethanolic Extract of Sesame Oil

HPLC was performed after UV spectroscopy optimization. HPLC sample subjected to TFA buffer and ACN shown in the following peaks at 280 nm and 290 nm

(Figures 2 and 3). This is approximately shown in the presence of lignan compounds which are fiber-associated [13,14].

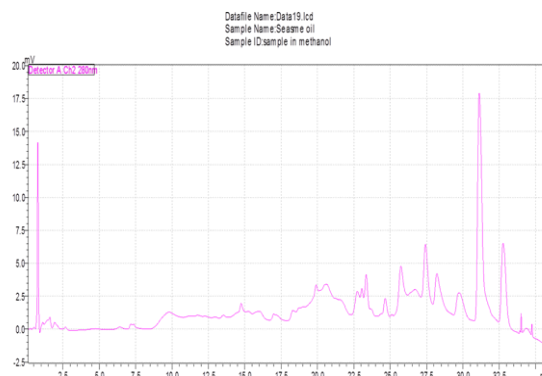


Figure 2: HPLC of Ethanolic Extract of Sesame Oil (Abs. at 280 nm).

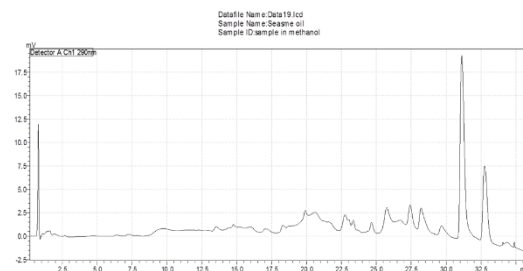


Figure 3: HPLC of Ethanolic Extract of Sesame Oil (Abs. at 260 nm).

Gas Chromatography of Sesame Oil

Gas chromatography of sesame oil sample was by GC-17A Shimadzu equipped with Flame Ionization Detector (Figure 4).

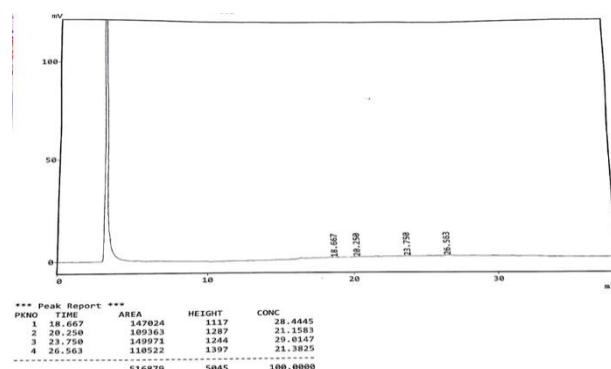


Figure 4: Gas Chromatogram of Sesame Oil.

CONCLUSION

From this study, it has been concluded that sesame oil exhibited potential biotechnological applications. Sesame oil is thought to have significant health benefits, including the provision of healthy fats for the heart, the reduction of inflammation, and the prevention of sun damage to the skin. Further studies are needed to determine whether *Sesame indicium* has antioxidant and anti-inflammatory properties.

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