

Beneficial properties of olive tree leaves concerning personal care ingredients: Herbal tincture

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ABSTRACT

Background: The skin is essential for our survival and daily functioning. Everyday use and constant exposure to a wide range of personal care products and different types of chemicals coming from various sources may cause serious problems. Therefore, the use of natural and organic cosmetics becomes increasingly essential. The olive tree is one of the oldest cultivated fruit trees and has been used in cosmetics for centuries. This study aimed to present a method for the easy preparation of an olive tree leaf tincture that may be incorporated into a cosmetic product and reproduced in a domestic environment. **Materials and Methods:** All equipment employed was cleaned and disinfected beforehand. Fresh olive tree leaves were ground to a powder. A 20% olive tree leaf tincture was made. Olive tree leaves and alcohol were mixed in a sterilized jar. The mixture was shaken daily for two weeks. **Results:** The pH of the olive tree leaf tincture was determined with pH stripes and was in the range of 5.5 to 6.5. This may impact how much of the tincture will be used and how it will be used. For this reason, we suggest using it at a concentration of 1%. The chosen herb-to-solvent ratio of 1:5 (w/v) yielded a concentrated tincture with enhanced potency. A higher concentration of active constituents in the tincture is expected to offer a more potent and effective form of herbal extract. **Conclusion:** The findings in this study supported the potential of olive tree leaves as a valuable resource for developing natural and sustainable interventions targeting DNA damage and related health conditions. Continued research in this field will contribute to a better understanding of the therapeutic potential and applications of olive tree leaves in the field of natural cosmetics and medicine.

Key words: Olive Tree Leaves, Herbal Tincture, Natural Cosmetics, Natural Ingredients

INTRODUCTION

Our skin is a beautiful mystery, shrouded in feelings, opinions, and questions. It has a multitude of functions not covered by others, from survival to social communication. The skin is both a barrier against the outside world and a bridge to our own being. How others perceive our skin may affect our mental health. The skin is essential for our survival and daily functioning [1].

People are exposed to various chemicals in daily life, most of which occur naturally in the environment. Still, others originate from human activities and are present in food, water, and various products of daily use. Since our skin is the body's largest surface area that interacts with the external environment, it is

exposed involuntarily to abiotic and biotic factors and voluntarily through personal care and cosmetic products [2]. Everyday use and constant exposure to a wide range of personal care products and different types of chemicals coming from different sources may cause the so-called “cocktail effect” due to the synergistic interaction of other substances, as well as the “additive effect” due to the presence of the same ingredient in numerous products [3]. Therefore, the use of natural and organic cosmetics becomes increasingly essential.

Olives

Olives (*Olea europaea*) are the fruits of the olive tree, a species of the *Oleaceae* family. The olive tree is one of the oldest cultivated fruit trees, and the use of olives

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has been documented as early as the late Stone Age at the site of Kfar Samirin in Israel. In the Greco-Roman civilization, olive oil and wine were closely linked due to the similarities in their processing and economic importance. They were used not only in daily life yet also in trade, religious rites, and art. Since prehistoric times, the olive tree has been of great cultural importance in this region and still has symbolic and religious significance today. Olive trees are generally found in the coastal areas of the eastern Mediterranean, the adjacent coastal areas of southeastern Europe, northern Iran at the southern end of the Caspian Sea, western Asia, and northern Africa. The best olive oil should be acidic, from the first cold pressing, preferably from organic farming [4,5].

Olive oil is rich in molecules with antioxidant and anti-inflammatory effects, such as polyunsaturated ω -3 fatty acids, monounsaturated ω -9 fatty acids, and phenolic compounds [6]. Olive oil is recommended in the diet of pregnant women as it promotes the healthy development of the baby's brain and nervous system before and after birth. It also allows for better mineralization of the bones. Olive oil prevents the accumulation of fats in the liver, lowers blood pressure, prevents arteriosclerosis, and prevents thrombosis. Olive oil may benefit another group of dementias: the tauopathies. It could also prevent diseases related to oxidative damage, such as coronary heart disease, stroke, and various types of cancer. Olive oil may also have an anti-aging effect. Olive oil is often used in soaps and massage oils [7]. It is excellent for macerating aromatic plants and flowers for therapeutic and culinary purposes.

Virgin olive oil provides a safe and stable emulsion system [8]. The antioxidant activity of olives makes them a candidate for moderating the effects of the aging process on the skin by limiting biochemical consequences of oxidation [9] due to their high content of squalene and β -sitosterol and its richness in oleic acid (a skin emollient). As such, virgin olive oil is ideal for the direct protection of the skin [10]. Oleuropein is used in cosmetics for its antioxidant, antiviral, antimicrobial, anti-inflammatory, skin-protecting, and anti-aging properties. Fatty acids increase hydration, softness, and elasticity and act as a protective barrier [11].

Olive tree leaves contain a rich array of bioactive compounds, including phenolic compounds (such as oleuropein, hydroxytyrosol, and tyrosol), flavonoids, triterpenoids, and secoiridoids. These phytochemicals

contribute to the antioxidant, anti-inflammatory, antimicrobial, and anticancer properties of the leaves [12].

Herbal Tinctures

Herbal tinctures are alcoholic or aqueous-alcoholic solutions prepared from fresh or dried plant substances. Two basic processes are used in tincturing: maceration and percolation. One may use the *folk method* in the maceration method, which does not require measurement. However, since the substances are not measured, the result is inaccurate in terms of the strength of the tincture. The strength of the tincture refers to the amount of herbs that have been concentrated in a certain amount of solution. The other method is the *weight-to-volume (w/v)* method. The weight of the herb and the volume of the medium is measured and noted to obtain a specific tincture strength [13]. The most commonly found tincture strengths are 1:5 and 1:10 for dry plant preparations and 1:2 for fresh plant preparations. However, any relation may be used.

Regarding percolation, it is a method of extracting a herb's soluble components by allowing a solvent to slowly pass through a column of dried, powdered plant that has been contained in a unique type of equipment known as a percolator [13].

Study Objective

Considering the properties of alcohol as an extraction solvent suitable to extract cosmetically active principals from olive tree leaves, this study aimed to present a method for the easy preparation of an olive tree leaves tincture that may be incorporated into a cosmetic product and reproduced in a domestic environment.

MATERIALS AND METHODS

Chemicals

Alcohol 70% (CAS Number 64-17-5) was purchased at Sigma-Aldrich (St. Louis, Missouri, EUA).

Olive Tree Leaf Harvest and Preparation

Olive tree leaves (*Cobrançosa* variety) were selected in Portugal's Trás-os-Montes region and obtained from an organic farmer in December 2022. This region is bordered by the province of Minho to the west, the

Douro region to the south, the Douro River to the east, and Spain to the north. Trás-os-Montes is the second most important Portuguese olive-growing area, accounting for 12–15% of national olive oil production. The most important varieties are *Cobrançosa*, *Madural*, and *Verdeal* [14,15]. In the Trás-os-Montes region, forty native varieties are grown [16]. Therefore, natural ingredients are easy to obtain in this area. It is also the region with the largest number of organic farmers, and the climatic, topographical, and pedological differences predestine this region for agricultural diversity [17].

Before the experiment, fresh olive tree leaves were ground with a coffee mill, with particles smaller than 2 mm (Figs. 1a and 1b).

Equipment Cleaning and Disinfection

It is necessary to clean and disinfect the equipment to minimize the risk of contamination. To do this, a cleaning solution, denatured alcohol (at least 60% alcohol by volume) in a spray bottle, boiled water, and clean rags are needed.

Protective clothing was worn, and the hair was tied back. The work surfaces were cleaned with a cleaning solution and sprayed with alcohol. Surfaces were dried with a disposable paper towel. Metal, silicone, and glass containers were disinfected and sterilized. For this purpose, the equipment was boiled in water for twenty minutes and dried with a disposable paper towel. Then, each item was sprayed with alcohol, ensuring it also found itself inside the containers and lids. The items were dried with a disposable paper towel. Tools and non-heat-resistant plastic containers were sprayed with alcohol, taking care that it also reached the inside of the containers. The containers and tools were air-dried.

Olive Tincture

The weight-to-volume method was employed. A 20% olive tree leaf tincture was made (or 1:5 w/v). The exact formulation was as follows (Table 1):

1. 15 g of fresh olive tree leaves were weighed into a sterilized vessel.
2. The alcohol was measured out and added to the olive tree leaves (Fig. 2a).
3. The mixture was stirred to ensure the moistness of the olive tree leaves (Fig. 2b).
4. A square piece of natural wax paper was placed on top of the vessel, and the vessel was sealed



Figure 1: Olive tree leaves: a) fresh olive tree leaves, b) powdered olive tree leaves.

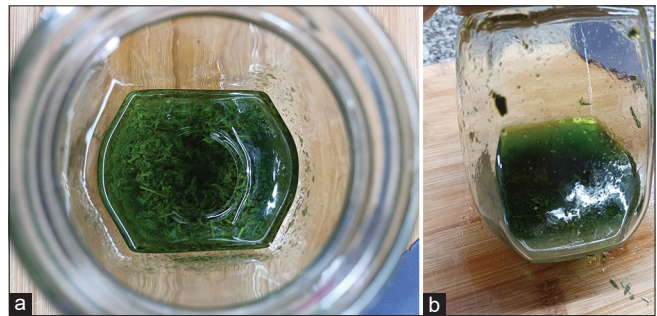


Figure 2: Steps of the preparation: a) mixture of alcohol and fresh olive tree leaves, b) mixture after stirring.

Table 1: Olive tree leaf tincture formulation.

Ingredient	Weight (g)
70% alcohol	75
Olive tree leaves	15

with the lid (this prevented any contamination from the chemical coating that might have been on the lid).

5. The mixture was shaken daily for two weeks and then left to sit for another day.
6. The preparation was filtered through a coffee filter, then labeled and sealed.

The mixture was stored in an airtight, light-resistant container. Direct sunlight and excessive heat were avoided.

RESULTS

The pH of the olive tree leaf tincture was determined with pH stripes and was in the range of 5.5 to 6.5. This may have an impact on how much of the tincture will be used and how it will be used. For this reason, we suggest using it at a concentration of 1%. The chosen herb-to-solvent ratio of 1:5 (w/v) yielded a concentrated tincture with enhanced potency.

The higher concentration of active constituents in the tincture is expected to offer a more potent and effective form of herbal extract.

The tincture may be incorporated into formulations such as emulsions, hydrogels, and water solutions. For homemade cosmetics, stability testing should also be conducted in a domestic setting to ensure the final product will continue performing as intended, remain unmodified, and be safe. Homemade stability tests often cannot be conducted in laboratory settings or with specialized equipment, yet they yield valuable information. Additionally needed is a paper outlining the manufacturing processes for each batch. In the batch manufacturing report, the following information should be included: batch number, composition, size and weight, storage requirements, master formula of the batch, start and end process dates, product expiration dates, and, if the batch is intended for sale, the manufacturer's license number.

DISCUSSION

The preparation of the olive tree leaf tincture using the weight-to-volume method proved to be effective in extracting the beneficial compounds from the leaves. The use of a 20% tincture concentration allowed for a sufficient extraction of the active components present in the olive tree leaves. The weight-to-volume method involves the accurate measurement of the leaves and the alcohol to ensure a proper ratio. This method has been widely used in herbal tincture preparations due to its simplicity and reproducibility.

The shaking process during the two-week period allowed for the optimal extraction of bioactive compounds from the olive tree leaves. The agitation facilitated the release of the compounds into the alcohol, resulting in a concentrated tincture.

The use of alcohol as a solvent during the tincture preparation process is anticipated to enhance the stability and shelf life of the extract. This ensures the preservation of the bioactive compounds over an extended period, allowing for the long-term storage and use of the tincture.

Filtering the tincture through a coffee filter ensured the removal of any solid particles or plant debris, enhancing the purity and clarity of the final product. Proper labeling and storage in an airtight, light-resistant container preserved the integrity of the tincture,

preventing degradation or loss of its therapeutic properties.

The olive tree leaf tincture holds significant importance in the realm of cosmetics. The tincture is derived from fresh olive tree leaves, known for their beneficial properties and traditionally used in skincare and beauty preparations. The tincture becomes a valuable ingredient in cosmetic formulations by harnessing the active compounds in the leaves. Olive tree leaves and herbal tinctures derived from them possess a remarkable range of bioactive compounds and exhibit significant pharmacological activities. Their antioxidant, anti-inflammatory, antimicrobial, and potential anticancer properties make them valuable candidates for further exploration in the field of natural medicine. Continued research and clinical studies are warranted to fully elucidate their mechanisms of action and therapeutic potential.

One of the notable advantages of the olive tree leaf tincture is its versatility. It may be easily incorporated into various cosmetic products, such as emulsions, hydrogels, and water solutions. This adaptability allows formulators to explore a wide range of possibilities in creating skincare, haircare, and body care products with added benefits.

The olive tree leaf tincture provides several advantageous properties. It is known for its antioxidant activity, which helps protect the skin against free radicals and oxidative stress, contributing to the overall health and youthful appearance of the skin. Additionally, the tincture possesses anti-inflammatory properties, making it beneficial for soothing sensitive or irritated skin. In addition to the successful preparation of the olive tree leaf tincture, it is important to note that olive tree leaves have been reported to possess antigenotoxicological properties. Several studies have indicated that extracts derived from olive tree leaves exhibit potential protective effects against DNA damage and oxidative stress [18]. The inclusion of olive tree leaves in the tincture formulation suggests the possibility of harnessing these antigenotoxicological properties for potential therapeutic applications. Further research and investigations are necessary to elucidate the underlying mechanisms and identify the specific compounds responsible for the observed effects.

Furthermore, the tincture contains compounds promoting moisturization and hydration, improving

skin elasticity and suppleness. It may also assist in the revitalization of dull and tired-looking skin, lending it a radiant and refreshed appearance.

The obtained tincture may now be subjected to further analysis and evaluation to determine its phytochemical composition, including the presence of bioactive compounds such as phenolic compounds, flavonoids, and other constituents. Subsequent studies should explore the potential antioxidant, anti-inflammatory, antimicrobial, and other pharmacological activities of the tincture.

CONCLUSION

Consumers are becoming increasingly interested in products less harmful to the environment. These days, cosmetics are becoming progressively more “green.” A cosmetic may be considered “green” if its formulation contains active ingredients derived from plants, such as minerals and plants, rather than analogous active ingredients chemically reproduced in the laboratory. It is preferable if it is produced in an environmentally sustainable manner, using processing methods that respect nature and plants in accordance with organic crops.

The use of natural ingredients, such as olive tree leaf tincture, is becoming increasingly popular in the cosmetic industry as consumers seek gentle, sustainable, and effective products. The tincture aligns with these preferences, as it is derived from organic sources and offers a more environmentally friendly alternative to synthetic ingredients.

While further research and stability testing are necessary to explore the full potential of the olive tree leaf tincture in cosmetics, its incorporation into formulations holds promise for enhancing the efficacy and appeal of beauty products. With its diverse range of beneficial properties and compatibility with various formulations, the olive tree leaves tincture emerges as a valuable and sought-after ingredient in the cosmetics industry, catering to the growing demand for natural and effective skincare solutions.

Overall, the findings of this study support the potential of olive tree leaves as a valuable resource for developing natural and sustainable interventions targeting DNA damage and related health conditions. Continued research in this field will contribute to a better understanding of the therapeutic potential and

applications of olive tree leaves in the field of natural cosmetics and medicine.

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Statement of Human and Animal Rights

All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

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