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A Review on Exploring the Therapeutic Potential of Medicated Oils from Selected Medicinal Plants

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Abstract: Medicated oils have been used as a traditional treatment method throughout history, and various types of medicated oils are available. In this review article, we will shed light on some commonly used medicated oils and their benefits for both human health and the environment, with the help of previous research. The main oils discussed in this article are Olive oil, Linseed oil, Black pepper oil, and Camphor oil. Olive oil is extracted from the fruit of the *Olea Europea* plant and consists of many chemical compounds that are effective against various diseases. Phenolic substances in extra virgin olive oil are known to defend the heart and prevent cardiovascular disease by inhibiting the activity of cholesterol (LDL-c) and the oxidation of cholesterol (HDL-c). Additionally, olive oil phenolic compounds can prevent CRC and inflammation in the human body. Linseed oil, also known as flaxseed oil, contains various bioactive compounds such as secoisolariciresinol diglucoside (SDG), total fibres, omega-3 fatty acids, alpha-linolenic acid (ALA), and lignans. These compounds are responsible for improving the immune system, lowering bad cholesterol, and preventing cardiovascular disease. Black pepper, known as the king of spices, has several effects, including antioxidant, antimicrobial, anticancer, anti-inflammatory, analgesic, antipyretic, and hepatoprotective. Camphor is also a crucial medicated oil that is used as a fragrance in cosmetics, as a food flavourant, as a common ingredient in household cleaners, and as a topically applied analgesic and rubefacient for the treatment of minor muscle aches and pains.

Keywords: anti-inflammatory, antioxidants, Olive Oils, Biological activity, medicated oils, Traditional Treatment.

INTRODUCTION

All organisms in an ecosystem are directly or indirectly reliant on plants. Plants serve as the ultimate source of both food and medicine. The practice of using medicinal plants for healing is as old as humanity itself. Despite living in the age of modern medicine, we are still dependent on plants and traditional medicines for the production of new medicines. One of the most common uses of traditional methods is the creation of medicated oils, due to their efficacy and bioavailability.

OLIVE OIL

Olive oil is extracted from the fruit of the olive tree, *Olea Europae L* belonging to the family *Oleaceae*. The olive tree (or olive, a term also used for the olive fruit) is a quite small evergreen tree, with thin dull leaves and small white flowers, known for its long life. Olive oil is mainly produced in the Mediterranean area and European countries. The largest Olive oil producer in the world is Spain then Italy and Greece. [1]

Chemical Composition

Olive comprehends small quantities of free fatty acids, glycerol, phosphatides, pigments, carbohydrates, proteins, flavour compounds, sterols, and resinous substances. The major fatty acids present as glycerides in olive oils are Oleic acid, linoleic acid, palmitic acid, stearic acid, linolenic acid. Oleic acid is a fatty acid that is present in much higher concentrations than other acids.

The healthy olive oil Virgin olive oil has a more developed amount of polyphenols than refined olive oils. Virgin olive comprises about 2 – 3 % phenolic substances as a form of glucosides and esters. oil contains about 500 mg/L of polyphenols. The quantity and quality of polyphenols in olive oil is closely related to the process of olive milling. [2]

Effect of olive oil on different diseases

In cardiovascular diseases

Olive oil stands out as an excellent choice due to its high lipid content, with strong associations with the prevention of cardiovascular disease, both in primary and secondary circumstances. As well as they also enhance oxidative stability and help regulate arterial pressure. The phenolic compounds in extra virgin olive oil (EVOO) act as defenders for the heart. They work by discontinuing and reducing problems with the heart and blood vessels by preventing the process of lipid peroxidation, which is caused by troublemakers called free radicals or metals. They also inhibit the activity of cholesterol (LDL-c) and oxidation of cholesterol (HDL-c). These phenolic compounds even stop a "superoxide" reaction and interrupt the oxidation propagation phase in the body. [3]

in colorectal cancer (CRC)

Colorectal cancer (CRC) is currently ranked as the third most prevalent type of cancer across the globe. Did you know that over half of colorectal cancer cases are reported in industrialized regions of the world? However, it is possible to prevent this type of cancer by adopting a healthy diet. **The Mediterranean diet**, in which olive oil is a primary substance that eliminates colorectal cancer with the help of its phenolic compounds.

effect of olive oil phenols on CRC

Phenols are the most important component in olive oil with anti-tumor properties. Phenolic compounds of olive oils are divided into three groups:

- **Simple phenols**
(i.e., tyrosol, hydroxytyrosol or 3,4-dihydroxyphenylethanol)
- **Phenolic acids**
(i.e., caffeic acid)
- **Flavonoids**
(i.e., quercetin)

Some of the crucial complex phenols found in olive oil are Hydroxytyrosol, tyrosol, and oleuropein. These phenols share similar structures and are present in high levels of olive oil. They have the potential to decrease oxidative damage to cellular DNA and consequently reduce the development of CRC. The presence of antioxidant polyphenols, such as hydroxytyrosol and oleuropein, in high levels may decrease the amount of potentially carcinogenic products of lipid peroxidation during olive oil storage. This can lead to favorable epigenetic changes and miRNA expression patterns ultimately lowering the risk of CRC development. [4], [3]

ANTI-INFLAMMATORY PROPERTIES OF OLIVE OIL

Studies have shown that OLIVE OIL polyphenols can help control inflammatory response by inhibiting NF- κ B, both in vitro and in vivo. This inhibition leads to lower expression of IL-6, IL-8, IL-1, and COX-2, creating an environment that slows the growth of cancer. Researchers have found that decarboxymethyl ligstroside aglycone, also known as oleocanthal, has anti-inflammatory properties similar to ibuprofen. Both molecules can inhibit the cyclooxygenase (COX) enzymes responsible for prostaglandin biosynthesis. COX inhibitors like aspirin and ibuprofen are known to have anticarcinogenic and antithrombotic effects. By administering oleocanthal, it may be possible to reduce the risk of developing inflammatory bowel diseases (IBD) like ulcerative colitis and Crohn's disease, which are also major risk factors for colorectal cancer (CRC). [3], [4], [2]

FLAXSEED OIL

Flaxseed oil, also called linseed oil, is a clear or slightly yellow oil obtained from the dried and mature seeds of the flax plant *Linum Usitatissimum*, belonging to the *Linaceae* family. These plants are mainly cultivated as a commercial crop in Europe, the Mediterranean, and North America.

CHEMICAL COMPOSITION

Linseed is comprised of a fixed oil (30-40%), mucilage (6-10%), protein (25%), a small amount of enzyme lipase, and linamarin - a cyanogenetic glycoside. It contains three bioactive compounds that are plant omega-3, secoisolariciresinol diglucoside (SDG) and alpha-linolenic acid (ALA). The carbohydrates present include sucrose, raffinose, cellulose, and mucilage. Unripe seeds contain starch, which is converted to mucilage upon ripening. Other constituents include phytin, lecithin, wax, resin, pigments, and malic acid.

Linseed oil produces unsaturated acids, such as linolenic acid (30-50%), linoleic acid (23-24%), and oleic acid (10-18%), along with saturated acids like myristic acid, stearic acid, and palmitic acid (5-11%), upon hydrolysis. According to some research, linolenic acid is the major unsaturated fatty acid found in linseed oil, followed by oleic acid and linoleic acid.

LINSEED OIL GENERAL USES

Linseed oil has emollient, expectorant, diuretic, demulcent, and laxative properties. It can be used externally in lotions and liniments. Additionally, it is used as a demulcent and poultice for gout and rheumatic swelling.

LINSEED OIL AND ITS EFFECT ON THE HUMAN BODY

Linseed, also known as flaxseed, contains various bioactive compounds such as secoisolariciresinol diglucoside (SDG), total fibers, omega-3 fatty acids, alpha-linolenic acid (ALA), and lignans. Research has shown that these compounds can improve the immune system, lower bad cholesterol, and prevent cardiovascular diseases. [5]. Alpha-linolenic acid has anti-inflammatory properties, while lignin provides antioxidative benefits and dietary fibers help in reducing cholesterol levels. Additionally, linseed oil also helps in controlling blood pressure and produces anti-atherosclerotic, anti-inflammatory, and antioxidant effects, as well as antihypertensive and anti-arrhythmic effects. These effects are vital for protecting the cardiac system. [6]

BLACK PEPPER OIL

Black pepper oil is obtained from the dried berries of the black Pepper, scientifically known as *Piper nigrum L.*, which is a highly traded commodity in the global market and is often referred to as the “king

of spices". Its name is derived from the Sanskrit word Pippali, which means berry. Black and white peppers differ in their harvesting time and processing techniques. Black pepper is produced by drying unripe fruit until it forms a wrinkled texture, which includes the pulp. White and black pepper have various uses, including as spices, preservatives, insecticides, and even in herbal medicine. [7]

Black pepper is a member of the *Piperaceae* family and has several common names, including peppermint, black pepper, Kaali-Mirch, and black gold. While its prime origin is the coastal areas of India, black pepper is now also grown in other parts of the world, including Vietnam, Ceylon, Malaysia, Indonesia, and Brazil. [8]

CHEMICAL CONSTITUENTS

The main chemical constituents of black pepper fruit are piperine (2-9%), Oleoresin (4.4-12%), Essential Oil (0.4-7%), starch (50%0 and fatty acids (19-9%). Phenols in black pepper are a mixture of glycosides of phenolic acids and flavanol glycosides.

BIOLOGICAL ACTIVITY OF BLACK PEPPER

Black pepper contains various substances such as terpenes, alkaloids, lignans, and phenylpropanoids. These substances are responsible for a range of crucial biological activities, including antioxidant, antimicrobial, anticancer, anti-inflammatory, analgesic, antipyretic, hepatoprotective, bio-enhancing, and enzyme inhibitory activities. One of the most important compounds in black pepper is piperine, which is found in the fruit's ethanolic extract. Studies have shown that piperine has an anticancer effect on three different colorectal cancer cell lines, namely HT-29, HCT-116, and HCT-15. [9]

CAMPHOR OIL

Camphor oil is an essential oil that is extracted from the wood of the camphor tree, scientifically known as *Cinnamomum camphora*, which belongs to the *laurel* family. Camphor is widely used as a fragrance in cosmetics, as a food flavoring, and as an ingredient in household cleaners. It is also used topically as an analgesic and rubefacient to treat minor muscle aches and pains.. [10]

CHEMICAL COMPOSTION

Camphor is a chemical compound that exists in various forms, each with a unique essential oil composition. The leaves of the cinnamomum camphora plant contain camphor as the primary component, along with other compounds such as cineol, linalool, eugenol, limonene, safrole, α -pinene, β -pinene, β -myrcene, α -humulene, p-cymene, nerolidol, borneol, camphene, and more. [11]

BIOLOGICAL ACTIVITY OF CAMPHOR

Camphor is a naturally occurring substance with a wide range of applications in both traditional and modern medicine. It has been traditionally used as a remedy for colds, providing relief from chest congestion and treating inflammation-related diseases such as rheumatism, sprains, bronchitis, asthma, ingestion, and muscle pain. [12]

There are numerous reports that demonstrate the effectiveness of camphor, either alone or in combination with other treatments, in preventing and treating serious illnesses.

Camphor is also known for its flavouring properties and its ability to act as an insecticide, antimicrobial, antiviral, anticoccidial, anti-nociceptive, anticancer and antitussive agent. Additionally, it can be used as a skin penetration enhancer. [11]

INFORMATION COLLECTED FROM RESEARCH PAPERS.

Name	Scientific Name	Obtained by (Part)	Method of Extraction	Chemical Constituents	uses
Olive Oil	<i>Olea Europea L.</i> <i>Oleaceae</i>	fruit of the olive tree <i>Olea europea L.</i>	Pressure method, Centrifugation method, Selective filtration method	fatty acids, glycerol, phosphatides, pigments, carbohydrates, proteins, sterols, etc.	Used to prevent cardiovascular disease, colorectal cancer and as an anti-inflammatory agent
Linseed Oil / Flaxseed oil	<i>Linum Usitatissimum.</i> <i>Linaceae</i>	the dried and mature seeds of the flax plant <i>Linum Usitatissimum</i> ,	Solvent Extraction method	fixed oil (30-40%), mucilage (6-10%), protein (25%), a small amount of enzyme lipase, and linamari.	anti-atherosclerotic, and antioxidant effects, as well as antihypertensive and anti-arrhythmic
Black Pepper Oil	<i>Piper nigrum L.</i> <i>Piperaceae</i>	the dried berries of the black Pepper, <i>Piper nigrum L.</i>	Steam Distillation	piperine (2-9%), Oleoresin (4.4-12%), Essential Oil (0.4-7%), starch (50% and fatty acids (19-9%).	antioxidant, antimicrobial, anticancer, anti-inflammatory, analgesic, antipyretic, , and enzyme inhibitory activities.
Camphor Oil	<i>Cinnamomum camphora</i> <i>Laurel</i>	extracted from the wood of the camphor tree,		as cineol, linalool, eugenol, limonene, safrole, α -pinene, β -pinene, β -myrcene, α -humulene, p-cymene,	act as an insecticide, antimicrobial, antiviral, anticoccidial, anti-nociceptive, anticancer and antitussive agent.

CONCLUSION

Medicated oils are the traditional way of treating and preventing several diseases from ages. All the modern researches on medicated oils are also states that the medicated oils provides several beneficial effects on the human body because of their components like polyphenols, eugenol, Fatty acids, pigments, carbohydrates, glycerols, glycosides, glucosides, protein etc. But the effects are depends on the method of consumption of medicated oils. These medicated oils have different activities as mentioned in the review article based on different research papers.

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