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Health and Medicine Benefits for Black Cardamom (Amomum *sublatum*)

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Abstract:

Amomum sublatum, often known as black cardamom, is a spice that is high in vitamins, bioactive phenolic compounds, and phytochemicals. It was discovered that the chemical makeup of black cardamom extract has potential medicinal uses. Research that looked at the phytochemical substances in cardamom extract revealed the presence of saponins, steroids, alkaloids, tannins, and phenolic compounds also looked at vitamins and trace elements to maintain diabetes balance through various processes. Bioactive chemicals found in whole black cardamom have anti-inflammatory and antioxidant properties. As a result, it is thought of as a traditional medicinal plant for disease prevention, and it is recommended that further research be done on the cardamom qualities of this plentiful plant that serves as a natural supply of alternative medicines.

Keywords: black cardamom, traditional medical, phenolic compounds, anti-inflammatory, antioxidant**.**

Introduction

Amomum subulatum, sometimes known as "green cardamom," and Amomum sublatum, also known as "black cardamom," are the two most prevalent varieties of cardamom.1fig (1). Large cardamom, also known as black cardamom, is referred to as the "queen of spices" and is a member of the zingiberaceae family. It has a sweet aroma and bioactive compounds, so it has long been used to treat a variety of illnesses, including cardiovascular disease, diabetes, oxidative stress, and inflammations.

Several studies researched phytochemical compounds in black cardamom such as polyphenols,alkaloids, tannins, polyphenols, and considerably with high flavonoids[4.5]. have been indicated that essential oil contents of black cardamom seeds relatively 4.5% and 1.1% for oil leaves with phenolic compounds, this high content of effective compounds provide to large cardamom a broad range of pharmacological effective

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like anti-oxidant, antibacterial, anticancer, anti-inflammatory effects[6].

Taxonomical Rank	Taxon
Kingdom:	Plantae
Class:	Liliospida
Order:	Zingiberales
Family:	Zingiberaceae
Genus:	*Amomum*
Species:	*subulatum*

Figure (1) Taxonomical features of Black Cardamom[3]

Figure (2) Traditional types of cardamom.

Chemical Composition

Whole Black Cardamom is used and provides sufficient dietary calories, protein carbohydrate dietary fiber, trace elements, and low cholesterol[7],fig(3). Several studies have shown that the extract of cardamom contains primary and secondary phytochemical compounds, vitamins (ascorbic acid, retinol, riboflavin, thiamin, niacin), and minerals[8,9]. A study suggested cardamom can be a favorite source for medical care since flavones and phenolic are the most bioactive compound found in ethanolic cardamom extract, and have shown anti-oxidant and anticancer activity[10].

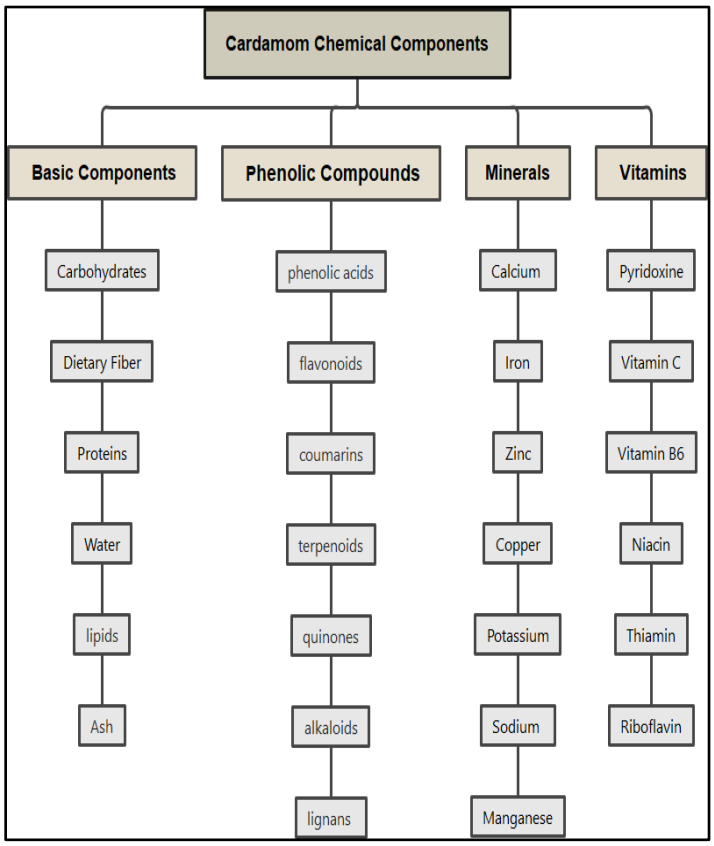

Figure (3) Chemical nutrients contain in black cardamom.

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Pharmacological Uses

Herbal medicines are increasingly used as dietary supplements for the treatment of different disorders with their safety and efficacy[11]. Black cardamom has nutrients are present: glycosides, ascorbic acid, carotenoid, minerals and trace elements[6]. Black cardamom is known for its medical benefits likes "antioxidant, anticancer, antibacterial, immunomodulatory and metabolic syndrome"[12]. Thus, Black cardamom has several benefits in complementary medicine and it has been chosen according to its easy absorbability by the body without having any side effects if used with a suitable dose[9]. Black cardamom has a curative property in the medicinal systems[13].

1-Anti-inflammatory

Black cardamom was reported to have pharmacological prospective activities against anti-inflammatory[14]. Traditionally, the volatile oil present in the seed containing myrcene, D-Iimonene, methyl heptenone, β-pinene, linalool acetate, terpinyl acetate, and 1,8-cineole, smaller amounts of limonene, α-terpenyl acetate, α-terpineol, borneol, camphor and α-pinene in leaves extract[15]. Commonly used as an anti-bacterial, anti-inflammatory agent [16]. methanolic extract effectively reduced inflammatory responses by regulating pro-inflammatory mediators and targeting cyclooxygenase enzymes. anti-inflammatory mechanism of the methanolic extract of cardamom also showed the involvement of the oxygenase-1 (ho-1) pathway which open a new pace in drug discovery and development area our results suggest black cardamom as a possible therapeutic alternative for use against a broad range of inflammatory conditions further investigations leading to the isolation of bioactive components for pharmacological it will be fruitful for the development of novel anti-inflammatory agents[17]. A study showed that an extract of black cardamom was able to inhibit the growth of Mutans Streptococci inhibition which increased by the concentration increased from 5% to 40% compared to the control[18].

2- Cardiovascular Effect

The pharmacological of black cardamom aqueous extract on blood pressure have been evaluated by investigated that cardamom extract can lower the mean arterial blood pressure and decrease the heart rate because of

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muscarinic receptor stimulation which leads to the production of NO, which diffuses into smooth muscle cells to relax also lead to hypotension[19],[10]. Another study reported that black cardamom can be maintaining the heart-healthy by reducing blood clots and keeping blood pressure in check[5].

3- Neuroprotective Effect

Research reported that cardamom oil has a neuroprotective effect in neurotoxicity induced by aluminum chloride and reduction in oxidative damage, it also has a pharmacological effect against Alzheimer's disease. In-vivo study inhibition of amyloid plaque formation with cardamom oil[20].

4-Hepato-Protective Effect

Black cardamom oil components "1,8-cineole, terpinene, terpineol,alpha-pinene, and limonene promote the reduced congestion of the liver[21]. Also, black cardamom extract increased the hepatic activity of animals against on high-fat diet and high carbohydrates and resulted showed an increase of endogenous antioxidants and improved liver function[4].

5- Anticancer Effect

Phytochemical compounds were specified as plant-derived chemicals with high importance to disease prevention and human health, using phytochemicals was suggested as one of the cheap approaches for preventing diseases related to oxidative stress, like cancer because cardamom antioxidant properties[22]. Bioactive compounds against cancer cells can be isolated and investigated from black cardamom extract[7]. Cardamom has the ability to improve immune responses and resulting effective treatment for breast cancer[23].A study reported that black cardamom extract has been most effective against lung cancer cells when hexane was followed by dichloromethane when extracted cardamom[10] .

6- Anti-Oxidant Effective

Phytochemical anti-oxidants were utilized as components in the nutritional additions for maintaining health and avoiding disease[24]. Also, natural anti-oxidants must be utilized for declining free radicals developed from harmful effects[25]. Anti-oxidant phytochemicals, for instance, vitamins C, and E, flavonoids, glutathione, and vegetable dyes, might be offering protections against cellular damages[26], while the endogenous anti-oxidants defense against ROS were strengthened through natural anti-oxidants which strengthen them

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as well as restoring the optimal balance via neutralizing ROS[27]. The study noted that seed cardamom extract compounds containing 1,8-cineol, and cinnamaldehyde, these bioactive compounds have antioxidant ability against lipid peroxidation. Another study reported that the ethanolic extract of black cardamom has a high amount of polyphenolic compounds "gallic acid, tannic acid,quinic epicatechin,trans-ferulic acid" [28]. Other study suggested the relationship between the method of extract and antioxidant activity for oil extract, the study referred to the reduction in antioxidant properties of oil extract by ethyl acetate and chloroform compared with water extract this moderate because of the loss of volatile compound, results demonstrate high DPPH radical scavenging and antioxidant activity of the aqueous extract of the large cardamom among all other extractives[25].

7-Antidiabetic

The hypoglycemic drugs were accompanied by unpleasant side effects, whereas bioactive compounds derived from natural resources are regarded as safe and cost[22],[29]. New research has been devoted to natural products that can modulate these mechanisms as they are considered safer and more economical than drugs, cardamom has been studied extensively in this regard driven by its use as an antidiabetic agent in traditional medicine systems[30]. The result of a new study reported that cardamom extract contains a variety of concentrations with trace elements, thus cardamom will be a potent natural anti-diabetic that could help to reduce diabetic complications[31], because trace elements including iron, zinc, chromium, manganese, copper, and selenium act as cofactors for many enzymes affecting the metabolism and insulin action[32],also varied studies in the table(1-1) showed that Se , Cr, and Zn improved glycemic profile and anti-diabetic, in addition, V, Co, Mo, and Ni can be the hypoglycemic effect when contributed with complex[33].

Table (1-1) Trace element anti-diabetic effective in type 2 diabetes

Trace Elements	Anti-diabetic Affective	References
Selenium	-Keep glucose at a level -Prevents the development of complications in diabetic patients by improved lipid metabolism.	[33,34]
Zinc	-Play important role in insulin concentration and structure -Lower blood glucose	[33,35]

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Iron	- Effect on the metabolism of glucose -Impaired uptake of iron could affect the consumption and storage of glucose	[33, 36]
Chromium	-Improves insulin action, and required for normal carbohydrate metabolism. -Reduce blood lipids.	[32, 37]
Cobalt	-$CoCl_2$ Reduce lipid peroxidation -Increased tissue glucose uptake	[32, 38]
Copper	-Improvement in insulin action -Increased insulin response	[32]
Vanadium	- Affects glycogen synthesis. - Enhanced insulin activity and Its sensitivity. -A low dose of Vanadyl sulfate can preserve the functional characteristics of β-cells	[37, 39]
Manganese	-Maintains the normalization of the synthesis and secretion of insulin as well. -Activators of various enzymes like (PEPCK).	[32, 40]
Nickel	-Nickel chloride administration could prevent alloxan or streptozotocin-induced hyperglycemia.	[41]

Conclusion

Black cardamom was utilized to handle various disorders; there are multiple advantages of its phytochemicals as antioxidants, and free radical scavengers in the cells. Besides therapeutic agents, cardamom extract has massive information sources for many chemical constituents that might develop as drugs with accurate selectivity, they were the reservoirs regarding possible significant chemical compounds serving as new clues and leads for up-to-date drug designs. Correlations between phytoconstituents and cardamom bioactivity were vital for identifying the compounds' certain activities for treating many chronic diseases and health ailments. Due to the importance of the above-mentioned context, the cardamom phytochemical screening was of high importance for discovering and developing new therapeutic agents with enhanced efficiency. Also, various research groups provided this research worldwide. Typically, cardamom is providing a major store for many chemical substances with possible therapeutic properties that were used in treating human diseases such as cardiovascular diseases, relief pain, urinary infections, and diabetes. The bioactive substances like flavonoids, tannins, phenolic compounds, ad alkaloids offered a scientific base for the efficiency of cardamom utilized in folk medicine for treating a lot of infections. A lot of research proposed that dietary antioxidants have been more effective compared to pure compounds to prevent oxidative stress-related pathologies.

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