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# (Article Review)

# Biophysiological Impacts of some Herbs extracts as Antioxidants, an Advanced Contemporary

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## Abstract

Recent studies have pointed to the role of medicinal plants as alternative antioxidants for medicines and chemotherapies. Plant therapy and medicinal herbs have occupied a prominent place and space in medical and pharmaceutical sciences and have become a safe source for the pharmaceutical industry and the treatment of many diseases. Safety is also one of the most important factors to consider when processing. Plants are considered safe substances to use. The population uses most plants as food naturally and without any concerns, especially since most of them do not cause side symptoms. In addition, these plants are affordable and cheap and have few side effects compared to synthetic chemical drugs that produce harmful and inhibitory side symptoms of body immunity. In the midst of this scientific review of the most important and latest studies in the world, we will review the effectiveness and impact of some of the marine extracts of Fenugreek (*Trigonella foenum graecum L.*), Oregano (*Origanum Vulgare L.),* green tea (*Camellia sinensis L. Kuntze*), Cumin (*Cuminum cyminum L.*) and Parsley (*Petroselinum crispum Mill.*). As antioxidants, these plants are widespread in most countries of the world and have extensive uses in the food, medical and industrial fields. Therefore, using the extracts of these medicinal plants and their active compounds as non-food chemicals has a preventive and therapeutic effect for many pathological conditions and has little or no side effects compared to laboratory-manufactured chemical medicines.

Key words: *Biological, oxidation, herbs, health, Physiology*

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## Introduction

Since ancient times man has benefited from medicinal plants in treating many diseases because they contain healing elements for many illnesses and sanities [1]. Recent studies and research have shown that each medical plant contains effective substances to treat certain diseases [2]. Most contemporary researchers were interested in the pharmacological effect, as this research focused on using natural active substances (medicinal essences) extracted from the plant for disease prevention [3]. Despite the significant development in treatment and pharmacy, chemical drugs have some adverse side effects. In addition to their therapeutic medical impact, they may not detect these adverse side effects [4, 5]. First, the establishment of herbs basis started with ancient Arab scientists of the use of plants as medicines, leaves, roots, flowers, and seeds, where they used these ingredients to treat diseases and heal some of their various symptoms [6]. The most famous Arab scholars in this field are Ibn al-Bitar, Ibn Sina, Al-Biruni, and Al-Razi [7]. Alcoholic and aqueous extracts of leaves, flowers, seeds, roots, and fruits of plants of various types, varieties, families, and origins have high therapeutic and pharmacological properties [8]. These substances have antioxidant activity AND antioxidant properties, then free radicals formed due to oxidative stress, which is the cause of many diseases related to lipid imbalance, are reduced [9, 10]. These oxidative factors disrupt the delicate balance between the production of free radicals and the body's ability to remove or repair their destructive effects, resulting in harmful damage to various tissues in the body due to the oxidation of fat by free radicals [11]. Antioxidants found naturally in medicinal plants are special defenses that the body has that protect it from the harm caused by free radicals. Studies have proven that antioxidants reduce the risk of diseases, especially heart disease, atherosclerosis, cataracts, aging, cancer, diabetes, and liver [12]. This study finds out the antioxidant impacts of some of the aquatic extracts of fenugreek (Trigonella foenum-graecum L.), oregano (Origanum vulgare L.), green tea (Camellia sinensis L. Kunze), Cumin (Cuminum cyminum L.), and parsley (Petroselinum crispum Mill.). As antioxidants, these plants are widespread in most countries of the world and have broad uses in the food, medical and industrial fields.

## Oxidative stress

Oxidative stress represents the state of cells characterized by high concentrations of many influential oxygen radicals such as hydroxyl radical (OH•) and superoxide anion radical superoxide hydrogen peroxide (H2O2). Quantities exceed the ability of tissue antioxidant defenses to get rid of these radicals, causing damage and sabotage in tissues [13]. They are related to increased fat accumulation in tissues, which leads to the breakdown of polyunsaturated fatty acids and damages

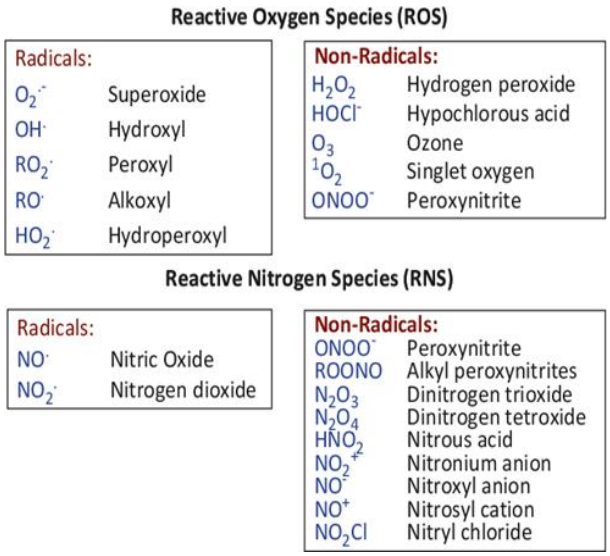



Figure 1: Reactive oxygen and nitrogen species [30]

various body tissues [14]. Oxidative stress eventually leads to partial or complete functional loss of physiological systems in the body. Therefore, the formation of free radicals and imbalance leads to many diseases such as cardiovascular and neurological diseases, infections, diabetes, aging, Ischemia, respiratory and infectious disorders, and cancerous tumors [15]. Oxidative stress refers to the physiological disturbance between the

reactive oxygen species H2O2 and O2 and the body's ability to remove them [16]. The body produces reactive oxygen species, which are byproducts of cellular aerobic metabolism, constant stress, exposure to ultraviolet rays, X-rays, air pollutants, drugs, pesticides, and chemicals [17]. They play an essential role in cellular signaling, cytokine regulation, growth factor, potent hormones, gene transcription, neuronal ion transfer, immunity, and programmed death [18]. They also play an essential role in the normal functioning of the immune system, such as T cells and immune defense, but disturbances in the normal oxidation state of cells can cause toxic effects through the production of peroxides and free radicals that damage all cell components including proteins, lipids and DNA [19]. In addition, all types of stress lead to too many free radicals and active transcription factors and the production of pro-inflammatory cytokines such as IL-1- $\beta$, IL-6, and TNF- $\alpha$, which will increase oxidative stress [20].

**Etiology of oxidative stress**

Several factors may contribute to oxidative stress and excessive production of free radicals [13-15]. These factors can include each of the following: An unhealthy diet, a lazy lifestyle, devoid of physical activity, with the practice of unhealthy habits [21]. Environmental factors, such as air pollution and radiation exposure. In addition, the body's natural immune response can also temporarily trigger oxidative stress [17-18]. This type of oxidative stress causes a mild inflammation that goes away after the immune system resists infection or repairs the injury. Also, uncontrolled oxidative stress can accelerate aging and contribute to developing several dangerous diseases [19,22]. Moreover, you may be wondering where free radicals come from in the first place. It can produce free radicals in many different ways. The human body naturally produces few free radicals during some processes such as exercising or fighting infections, which is normal and part of the body's complex system to keep itself healthy [23]. May also generate free radicals from natural bodily metabolic processes or by exposure to carcinogens (cancer-causing substances) in the surrounding environment [24]. In particular, factors related to an individual's lifestyle and daily routine may increase the risk of developing chronic or long-term oxidative stress [25]. We mention among them: exposure to ultraviolet radiation, obesity, exposure to chemicals such as pesticides and detergents, smoking or inhaling cigarette smoke (passive smoking), repeated exposure to medical radiation, air pollution, eating fried and processed foods, psychological stress, diet high in sugar, fat, and alcohol [26].

**Types of oxidative stress**

The importance of free radicals was known not so long ago when researchers Gershman and Gilbert in the United States (1954) stated that oxygen could have a toxic and destructive effect when it is free radicals [27]. Free radicals are interested in it began when the importance of radical reactions in the body's natural chemistry and the mechanism of action of many toxins were discovered [28]. Many factors (physical, chemical, number of foods, Reactive Oxygen and Nitrogen species (ROS and RNS) and at the same time cause a decrease and depletion in the antioxidant defense systems leading to oxidative degradation of various biochemical components such as fats, nucleic acids, proteins, etc. [29]. ROS and RNS act on a modification and change in their parts, their functions, and thus the incidence of various diseases [30].

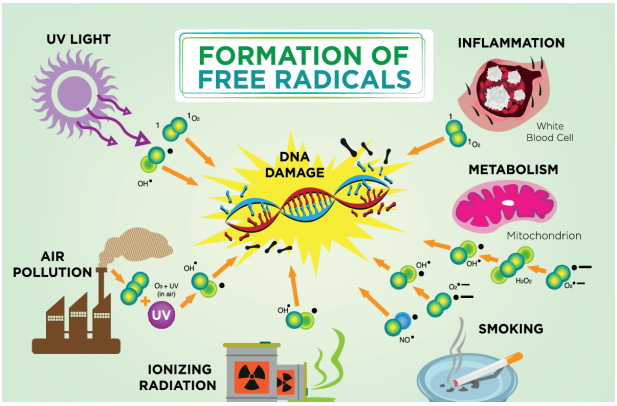
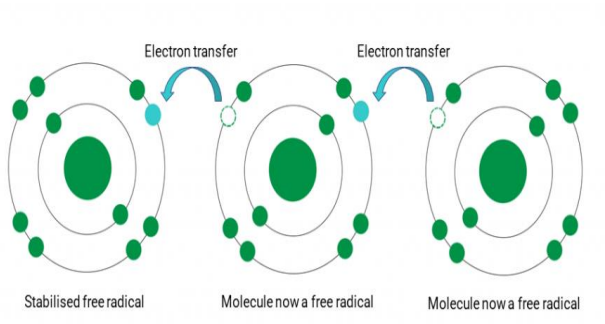



Figure 2: Factors leading to increased generation of oxidizing compounds [32]

Therefore, the bodies of living organisms have created defense mechanisms against different oxidation compounds called antioxidants [23]. Antioxidants, as oxidation compounds of different types and sources (such as internal sources), are essential in the human body in immunity, chemotherapy, building prostaglandins, and energy production [31]. There are external sources of oxidation compounds, including exposing the body to various environmental chemical pollutants such as radiation (UV, X-ray), smoke from transport, pesticides, dust, etc. that pose a serious threat to reproductive health around the world and increase infertility cases directly or indirectly [32] (figure 2).

**Free radicals: types and origin**

Free radicals are chemical compounds that contain one or more unpaired electrons in the cell and are highly reactive due to the presence of a single electron [27, 28]. So, the molecule tries to reach a state of stability as soon as possible (since it has a relatively short lifespan). It tries to attack neighboring molecules and acquire the desired electron from the stable and nearest molecule, as the attacking molecule will release a new free radical [33] (Figure 3).




1Formation of a free radical from a stable molecule after it has lost one electron [33]

Then the danger is that it starts a chain reaction of free radicals and then will disrupt the work of normal cells and the possibility of their transformation into abnormal oxidized cells that can lead to various changes in the structure and function of cells [34]. The most common free radicals in the cell that cause oxidative carbon are the negative superoxide radical, the hydroxyl radical, the peroxyl radical, the Peroxyl anion radical, and the nitric oxide radical [35]. Various metabolic processes generate serious free radicals in the body, and their most critical internal sources are mitochondrial energy houses [23]. It also results from the oxidation of catecholamine and activation of arachidonic acid, which results from increased lipid peroxidation resulting from an increase in the level of sugar in the blood serum [36]. Free radicals are also generated from the state of Ischemia and from hypochlorous acid, which is an oxidant that reacts with organic molecules, protein systems, and living membranes [37]. Cancerous tumors produce free radicals [38], and the deviation of an estimated 4% of inhaled oxygen from the reductive pathway also results from various metabolic processes in the body [39]. In addition to generating radicals from their internal sources, they are developed from external sources such as Smoking and external electromagnetic radiation such as Gama ray radiation, which splits water to produce hydroxyl radicals, as these radicals tend to gain electrons from surrounding molecules to become stable by making electronic [28, 35].

**Impacts of oxidative stress and free radicals**
**Biological roles of free radicals**

The beneficial effects of ROS and RNS occur at low and medium concentrations and are involved in many normal physiological functions towards several cellular responses [40]. Most cells can produce superoxide, hydrogen peroxide, and nitric oxide mainly, while others include the Ros/RNS inducer system, for example, defense against infectious agents by phagocytosis, killing of cancer cells by phagocytes and cytotoxic lymphocytes, detoxification of foreign substances entering xenobiotics mediated by cytochrome P450 [27]. The generator of ATP in mitochondria (energy production), cell growth, and induction of mitogenic responses at low concentrations are some of the main beneficial activities of ROS and RNS [41]. ROS also can play an essential role in various cellular signals at low concentrations, such as activation of many cytokines and growth factor signals, non-

receptor tyrosine kinases activation, activation of protein tyrosine phosphatase, activation, and release of calcium from intracellular stores, activation of nuclear transcription factors [42]. In addition, ROS exerts other vital activities such as gene transcription, especially in the endothelial cell-mediated that is necessary for regulating vascular constriction and a mediator in the immune response mediated by the activation of macrophage phagocytic cells [42]. Moreover, recent studies also suggest that ROS, like superoxide, and hydrogen peroxide, may act as a second messenger but may be harmful with increased accumulation of these free radicals [43].

**Effects of oxidative stress on lipids**

Fatty oxidation can damage cell membranes by disrupting fluidity and permeability, and lipid peroxidation begin with the attack of varietal, which can remove the hydrogen atom from the methylene-methylene group, resulting in the formation of an unpaired electron on the carbon atom (CH) [44]. The formed carbon root stabilizes by rearranging the molecules to form a Diene bond (two double bonds in the compound), which subsequently reacts with the oxygen molecule to form a lipid peroxyl radical (LOO) extreme [45]. These radicals can react with other fat molecules to naked hydrogen atoms, so lipid Hydro-peroxides develop lipid hydro-peroxides (LOOH) and, at the same time, spread the peroxidation of other fats [46]. Lipid peroxidation products such as MDA and polyunsaturated aldehydes can inactivate many cellular proteins by forming protein cross-linkages [47].

**Effects of oxidative stress on proteins**

Effective oxygen varieties can cause fragmentation of the peptide chain, change the electron charge of the protein via cross-linking of the protein and oxidation of specific amino acids and thus lead to an increase in protein degradability mediated by qualitative proteases [48]. Enzymes with metals at or near the active site are also more sensitive to metal-catalyzed oxidation [49]. Residues of cysteine and methionine in proteins are especially susceptible to oxidation. For example, methionine oxidized to methionine sulfoxide and phenylalanine to O - tyrosine. Sulfhydryl groups can be oxidized to form disulfide bonds, and carbonyl groups can introduce into the side chains of proteins [50].

**Effects of oxidative stress on DNA**

Sufficient oxygen and nitrogen varieties interfere with DNA and lead to harmful oxidation. DNA is highly susceptible to damage mediated by free radicals such as OH, which can react with DNA by adding or losing hydrogen atoms from a sugar anion [51]. In particular, the C4-C5 double bond of pyrimidine is susceptible to •OH attack, which leads to the generation of a spectrum of harmful pyrimidine oxidation products such as thymine glycol and uracil glycol, urea residue, 5-hydroxideoxyuridine, 5-hydroxideoxycytidine, hydration, and others. Similarly, purines are prone to binding to •OH, leading to the generation of 8-hydroxydeoxyguanosine (8-OHdG), formamidopyrimidines,8-hydroxydeoxyadenosine, and other less distinct purine oxidation products [52]. A free radical attack also causes activation of the poly (ADP-ribose) synthetase enzyme, leading to DNA fragmentation and apoptosis. This process depletes the cellular level of NAD + levels, which leads to disruption of the function of the electron transition chain [53].

**Antioxidant herbs**

Medicinal plants have been the object of human interest and curiosity throughout the ages, as they have been and still are a source of naturally suitable treatment in conventional preparations and Pure Active Substances [3, 4]. This process is due to the richness of these plants with phenolic compounds (phenolic acids, flavonoids, tannins), which represent the most widespread and diverse secondary metabolites in the plant kingdom and have broad biological and pharmaceutical activity [5]. Nutritionists have defined antioxidants as natural compounds found mainly in plants that regulate many vital processes in the body, protecting it from free radicals [23].

Antioxidants are naturally present in the cells of plant tissues, and these substances are active under various stress conditions. These substances work to sweep any of the membranes and catch free radicals or free radicals and protect the cell and its components from damage caused by the oxidation of free radicals [10, 11]. Herbs have a medical or physiological effect, that is, the ability to treat a particular disease or at least reduce the symptoms of infection if used in the form of fresh or dried herb or plant extract [54].

**Antioxidant properties in herbs**

Medicinal herbs form an essential part of folk medicine in most countries, with vital importance in therapeutic products [55]. Many necessary herbs are applicants in the curing program for patients with a history of chronic diseases such as hypertension, acute coronary syndrome, coronary heart disease, heart failure, peripheral arterial disease, and stroke. Medicinal plants represent promising sources of new, safe, biodegradable, and renewable medicines, and according to the WHO report (1993), about 65-80% of the population of developing countries rely mainly on plants and plant-derived compounds for their primary health care needs [6]. About 50% of medicines in modern pharmacology are natural products derived from plants. The strategy of traditional medicinal plants depends on newly discovered pharmaceutical projects to ensure their use in the field of safety [7]. In folk medicine, herbs, leaves, flowers, and fruits are essential parts of the plant used as a tool for coronary vasodilation, radiotherapy, and antihypertensive treatments, and their botanical and pharmaceutical importance reflects by the presence of biologically active compounds such as phenols, flavonoids, alkaloids, steroids, and terpenoids and tannins in medicinal herbs and plants [9, 10].

**Extractions of plants: types, methods, and purposes**

**Extraction of alkaloids**

In this method, alkaloids extracted from plant matter with solvents organic substances that are not miscible with water, e.g., ether, petroleum ether, chloroform Etc. Moreover, depending on free alkaloids or salts are distributed between the acidic or alkaline aqueous phase and the organic solvent phase [56].

**Extraction of glycosides**

The combination of alcohol with water is the most widely used solvent for the Extraction of glycosides, and in general, should take some precautions and take essential points into account before starting the Extraction. The resulting extract usually contains other non-glycosidic substances such as proteins, colorants, etc. [57]. These can be disposed of by sedimentation by the lead acetate carrier, filtering the sediment, and removing what is in the filtrate.

After purification of the glucosides from these impurities present, the content is under low pressure. The glucosides are left to crystallize and remain recrystallized with suitable organic solvents or use chromatographic methods [58].

**Extraction of flavonoids**

The plant material was picked, cleaned of impurities, dried in the shade, and kept in places away from external influences (dust, moisture, sunlight Etc.) to preserve the compounds they contain, and this is to avoid the impact of various enzymes present in the plant such as polyphenol-oxide, Glycosidase enzymes that convert complex heterosides into simple heterosides or gluconates [62].

As shown in diagram (1), flavonoids extract after drying and grinding the plant parts to extract flavonoids from them [63]. Then treated with a solvent suitable for Extraction and alcoholic solutions are the most commonly used solvents; depending on the condition of the plant, wet or dry, we use alcohol (methanol or ethanol) in the case of a damp plant or their solutions (by 70% or 80%) in the case of a dry plant [64]. The plant parts are soaked in the appropriate solution for at least one day, stirring occasionally, after which the extract is filtered and concentrated under low pressure until dry, and the process repeats several times until it is sure that most of the natural compounds extracted [65].

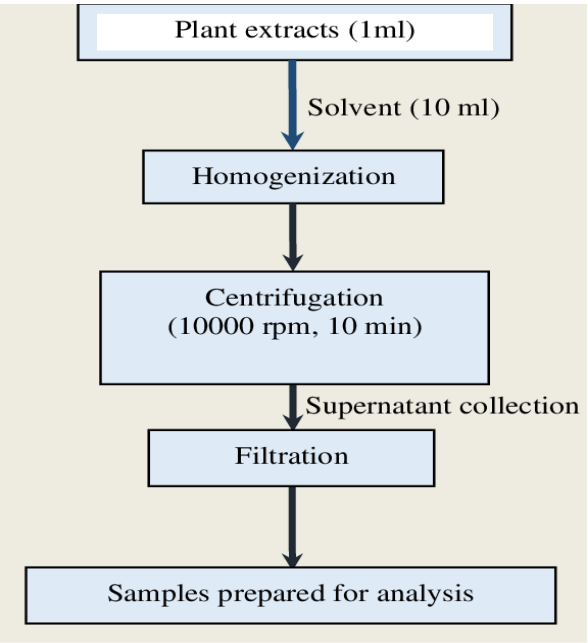



Diagram 1: Flavonoid extraction stages

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**Extraction of terpenes**

Many methods use to extract turbines, but the most important is steam distillation or Extraction by volatile organic solvents. The steam distillation method is the most widely used [59]. In particular, to extract monoterpenes, sesquiterpenes, and some binary terpenes, we consider these minimal terpenes as the essential components of volatile oils separated from different parts of plants [60]. The plant parts are thoroughly crushed and then steam dripped. Petroleum ether is also used for extraction at a low temperature (50 degree of Celsius) for a sufficient period, which is enough to extract all turbine compounds [61].

**Extraction of volatile fatty acids**

There are several ways to extract volatile oils FROM medical plants [66]. There is no room to explain it in this chapter, but it details in the relevant books. Among these methods used in the Extraction of volatile oils: Distillation, which includes hydrodistillation and steam distillation; Extraction by volatile organic solvent, which provides for Extraction by soaking, and Extraction by liquid and gas carbon dioxide; and Extraction of flowers [67].

**Fenugreek (*Trigonella foenum graecum L.*)**

A perennial herbaceous plant belonging to the legume family, its height ranges from (30-60) cm (picture 1). The plant grows to a height of about three feet, has three parts, the long leaves of which are thin, the steam has three serrated leaves of a grayish-green color, the long stem is attached to leaves up to 5 cm with double triangular leaf appendages and long, jagged, up to 2.5 cm long oval and with a narrow end at the base, the axillary flowers are white or pale yellow. The fenugreek seeds are tiny, about 5 mm long, with a brownish-green or yellow to brown, rectangular or square shape, and characterized by a precise groove in one corner of the seed. A study published in the International Journal of Current Research and Review in 2017 showed that the germination process increased the activity of antioxidants contained in fenugreek seeds [68]. They were

at their highest activity on the seventh day of the germination process, which may make eating them a way to help alleviate diseases related to high oxidative stress [69]. Fenugreek supplements may help increase antioxidant levels in the kidneys and reduce oxidative stress, so fenugreek may play an essential role in preventing diabetic nephropathy [70]. Fenugreek seeds significantly impact cardiovascular health and protect the heart from severe damage during a heart attack. Heart attacks are a substantial cause of death and occur when the artery leading to the heart is blocked; fenugreek seeds prevent further damage to nature and resist oxidative stress that occurs during a heart attack [71].

Picture 1: Fenugreek (*Trigonella foenum graecum L.*)

Fenugreek also contains a saponin compound, which in turn enhances immunity because it stimulates the activity of antioxidants present in fenugreek, thereby reducing oxidative stress, which negatively affects the health of the immune system for its role in damage to living cells connected to tissues, and therefore damage to proteins and DNA [72]. Antioxidants also work to remove acne by reducing the oxidative stress of free radicals, getting rid of impurities and viruses that infect the skin and hair, and cleansing them of bacteria, parasites, and insects [73]. Fenugreek is unsafe when consumed in large quantities for up to 6 months, as it can cause some side effects; such as diarrhea, bloating, gas, stomach disorders, dizziness, and headache, and it may also cause a smell in the urine similar to the scent of Maple syrup, and may also cause nasal congestion, coughing, wheezing, swelling of the face, and an allergic reaction in people with allergies [70].

**Origanum (*Origanum vulgarize L.*)**

It is native to Turkey and Cyprus and has spread from it to the countries of the Mediterranean basin, Iran, North America, the Arabian Peninsula, and India [74]. It grows on sunny slopes in meadows, fields, and Stony lands in dry climates. Marjoram is a perennial herbaceous plant 30-60 cm high. The stem is stiff, ribbed, and covered with fine hairs, which are brown mixed with red on the top, the leaf is tongue-shaped, and its flowers are in spindle clusters, which are bright red, and have an aromatic smell. Its flowers are white, tending to pink [75]. It uses in the food industry as a seasoning for meat and vegetables. It is advisable not to take it during pregnancy, as it is an active uterine stimulant.

The used part of the plant is all its aerial parts, it contains volatile oil, and its most essential components are sabinin, sabinin hydrate, carvacrol, and linalool. It also includes flavonoids caffeic acid, rosmarinic acid, and terpenes; marjoram is widely used [76]. John Gerard reported that marjoram is a cure for brain and head diseases caused by cold, is antispasmodic, is a good stimulant for the nervous system, and should not applicate during pregnancy [77]. He noted that research on this herb's toxicity proved that its extract is safe up to 5 g per kilogram of body weight. Continuous use for two months also did not damage liver and kidney function and blood picture, making it completely safe when used continuously. Recently found, it contains the substance (E-beta-caryophyllene (EBCP), an anti-inflammatory substance, even in small doses. Studies have shown the role of Origanum as a treatment for many diseases, but as an antioxidant is still under research and about the plants of the family to which it belongs [78]; as Origanum found that the plants of the oral family, in general, contain the oil known as Thymol, as well as flavonoids,

which showed an antioxidant in many of the studied plants, such as thyme and mint [79].

A study on Origanum found that it acts as an antioxidant by reducing cholesterol levels, lipoproteins, and triglycerides in the blood. The antioxidants contained in marjoram help get rid of free radicals, the accumulation of which leads to increased oxidative stress associated with cell damage and cancer diseases [80]. Marjoram is unsafe when consumed by pregnant women because large amounts of it may stimulate the onset of menstruation, which may endanger pregnancy. It also slows blood clotting and increases the chances of bruising and bleeding in people who mainly suffer from

Picture 2: Origanum (*Origanum vulgarize L.*)

bleeding disorders and slows the heartbeat. Marjoram also increases the secretion of fluid in the lung when used in large quantities, which can aggravate lung problems such as asthma and emphysema [76].

**Green tea (*Camellia sinensis L. Kuntze*)**

Green tea is grown in India, China, Indonesia, Sri Lanka, Japan, Guinea, Malawi, Argentina, Turkey, Pakistan, Africa, South America, and parts of the Middle East. The Chinese have used green tea drinks for more than four thousand years. There are 33 types of green tea depending on the cultivation and the region; each style characterizes by its taste and flavor and depends on the type of soil and solar energy arriving at it during its growth period [81]. Green tea makes from Camellia sinensis leaves and buds that have not undergone the same withering and oxidation process used to make oolong teas and black teas. Green tea originated in China, and since then, its production and manufacture have spread to other countries in East Asia. Green tea was first known to China, from where it moved to Japan in 800 BC when Japanese Buddhist monks returned from China, who went there to study, carrying green tea, which they used as a medicinal herb [82].

Picture 3: Green tea (*Camellia sinensis L. Kuntze*)

Green tea contains a compound called Theanine, which is the primary compound in tea responsible for improving sleep. It helps relax the brain by reducing nerve cell stimulation and stress hormones, so green tea may help enhance sleep quality. Studies have shown that green tea active substances prevent premature aging of body cells and reduce the severity of symptoms associated with arthritis [83]. Experiments on rats showed that the Catechin in green tea reduced the increase in cholesterol and was also used to speed up metabolism and burn fat because its antioxidant effect helps the liver function more effectively [84]. In a study conducted by [85], he explained the impact of tea in reducing low-density lipids in the blood serum and contributes to protection against heart disease, and no effect of tea on the amine group transporter enzymes was observed and explained the role of flavonoids contained in tea in reducing fat percentage [86].

**Cumin (*Cuminum cyminum L.*)**

Likely originating in Central Asia, Southwestern Asia, or the Eastern Mediterranean, people have used cumin as a spice for thousands of years [87]. An annual herbaceous plant of limited growth, reaching a height of 30-40 cm. The plant bears small white-purple flowers in tent inflorescences, and the fruits are oblong- oval, each of which, when dried, quickly splits into two curved fruits. The color of the fruit is olive–green, the length is 0.4 - 0.7 cm, the diameter is 2-3 mm, the aroma is aromatic, and the taste is slightly bitter [88]. Cumin is considered a spice and an aperitif, the manufacturer of some types of bread and pies, the treatment of indigestion, anti - putrefactive, colic treatment, as an expeller of gases, diuresis milk, as a diuretic and antiseptic for the urinary tract and kidneys [89]. Decongestant and intestinal spasms, to expel tapeworms and intestinal worms, lithotripsy of kidney and ureter stones, treatment of shortness of breath, asthma, and cough, stop nosebleeds (epistaxis), improve skin tone, treatment of involuntary urination, as compresses for breast and testicular congestion, soothes toothache, cheese and sausage making, antioxidant - tonic and sexual tonic - helps dissolve cholesterol-rheumatism treatment [90]. One of the benefits of cumin is that it contains many plant compounds, including flavonoids, alkaloids, and phenols, all known for their health benefits and antioxidant properties that help reduce the damage caused

Picture 4: Cumin (*Cuminum cyminum L.*) [83]

by free radicals known as oxidative stress [91]. Cumin stimulates the loss of excess weight by resisting the stress and oxidative stress that free radicals may cause, which can cause overweight or obesity, thanks to the great content of cumin antioxidants important in this regard [92].

Notably, cumin's antioxidant properties may be more potent than the antioxidant properties of vitamin C [93]. Cumin also protects against damage to the DNA of cells and oxidation in the cell walls. Cumin seeds also help with weight management; drinking a lukewarm cumin drink in the morning can help you lose weight [94]. According to a report published by Health line, "research [95] shows that obesity can cause oxidative stress and inflammation, and oxidative stress by free radical damage in the body. Cumin's antioxidant properties help control these free radicals, and its anti-inflammatory properties can fight inflammation, "he said. Although cumin contains several active substances that make it useful in many cases, its uncontrolled consumption may have some side effects, like a decrease in blood sugar, so people with diabetes should pay attention to its large intake. Cumin may slow down blood clotting, so

people with bleeding disorders should avoid taking it. From another hand, eating excess cumin may cause heartburn or even kidney or liver damage. In addition, it may lower testosterone levels and fertility in men, and eating cumin too much during pregnancy may cause miscarriage. It may interfere with certain medications such as antibiotics, anticonvulsants, antidiabetics, and anti-inflammatories. It may lower blood sugar levels during surgery, so it is advisable to stop using cumin at least two weeks before surgery [92].

**Parsley (*Petroselinum crispum Mill*.)**

European, Middle Eastern, and American cuisine people using Parsley for a long time. The Egyptologist "Grabo" found the remains of seeds and leaves of this plant in some pharaonic tombs and confirmed that they used Macedon in many therapeutic recipes for many diseases [87]. The pharaohs used fresh Parsley as an antipyretic food and in cases of menstrual disorders or interruptions and the form of sprays to remove inflammation and tumors, while they used the seeds of Parsley to remove intestinal gas and dysuria [96]. The ancients used it in the treatment of stomach infections, as a solvent for kidney stones, as a good laxative for the abdomen, as anti-colic, anti-asthma, dyspnea, and breast tumors; it softens the smell of the mouth and is a menstrual diuretic, beneficial for spleen and liver problems, and also circulates milk. Fresh leaves using as a poultice against breast swelling, insect bites, lice, and skin infections. [97]. Its height varies between 6 to 20 cm, it has several markets that grow from one root, and the market is upright, rounded, and branched. The leaves are compound. The flowers are in compound aggregates of white color, the inflorescences are tent compound, and Macedonia characters by its intense aromatic aroma and bright green leaves [98]. It found that Parsley contains vitamins A, C, and myricetin in its chemical composition, making it one of the essential catechins, as it reduces the percentage of damage to lipoproteins in the blood and DNA prevents the activity of free radicals [99]. As stated, [100], the plant acts as an antioxidant due to the presence of flavonoids, which play a role in its union with free radicals to reduce their effect and damage to cells. He adds that using parsley water extract on animals has led to an increase in defensive antioxidants in the body, in addition to Beta-carotene, which reduces fatty compounds in the body [101]. A study conducted on humans found that giving Parsley for two weeks increased antioxidants and raised the level of the enzyme glutathione reductase G-R and SSOD superoxide dismutase due to the role of flavonoids as antioxidants [102]. Eating Parsley in large quantities may lower blood sugar levels and eating Parsley may increase the body's ability to retain more significant amounts of sodium, which may cause blood pressure levels to rise. Eating Parsley also causes a decrease in the quantity of breast milk. Parsley can have a severe negative impact on the health of the pregnancy, especially when consumed in excess, as Parsley contains chemical compounds that may stimulate uterine contractions and spasms, so it is advisable to avoid Parsley during pregnancy or eat it only in moderation, as eating it during pregnancy may cause uterine contractions that can lead to miscarriage and termination of pregnancy [103].

## Conclusion

It concluded from the review of studies and research in this chapter that natural plant extracts have a vital therapeutic role against oxidative stress, subsequent pathological injuries, and a decrease in the standards of immunity in the human body and animals. In addition, the part of active substances presents in the chemical composition of plants in sweeping free radicals and rid the body of them.

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**(مقالة)**

# التأثيرات الفيزيولوجية الحيوية لبعض مستخلصات الأعشاب كمضادات للأكسدة، قراءة حداثوية متقدمة

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## الملخص

أشارت الدراسات الحديثة إلى دور النباتات الطبية كمضادات أكسدة بديلة للأدوية والعلاجات الكيميائية. إذ شغلت المعالجة النباتية والأعشاب الطبية مكانة ومساحة بارزة في العلوم الطبية والصيدلانية وأصبحت مصدراً آمنا لصناعة الأدوية وعلاج العديد من الأمراض. إذ أن السلامة من المضاعفات والأعراض الجانبية هي أيضاً واحدة من أهم العوامل التي يجب مراعاتها عند المعالجة. تعتبر النباتات مواد آمنة للاستخدام. يستخدم سكان العالم معظم النباتات كغذاء طبيعي ودون أي مخاوف، خاصة وأن معظمها لا يسبب أعراضاً جانبية. بالإضافة إلى ذلك، فإن هذه النباتات ميسورة التكلفة ورخيصة ولها آثار جانبية قليلة مقارنة بالعقاقير الكيميائية الاصطناعية التي تنتج أعراضا جانبية ضارة ومثبطة لمناعة الجسم. في خضم هذا الإستعراض العلمي لأهم وأحدث الدراسات في العالم، سنراجع فعالية وتأثير بعض المستخلصات النباتية كالحلبة والمردقوش والشاي الأخضر والكمون والبقدونس. كمضادات للأكسدة، تنتشر هذه النباتات على نطاق واسع في معظم دول العالم ولها استخدامات واسعة في المجالات الغذائية والطبية والصناعية. لذلك، فإن استخدام مستخلصات هذه النباتات الطبية ومركباتها النشطة كمواد كيميائية غير غذائية له تأثير وقائي وعلاجي للعديد من الحالات المرضية وله آثار جانبية قليلة أو معدومة مقارنة بالأدوية الكيميائية المصنعة في المختبر.

**الكلمات المفتاحية:** حيوي ، أكسدة ، نباتات طبية ، صحة ، فسيولوجي