



## Herbal Antioxidants

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### Abstract:

Many of the therapeutic plants that have been utilized for thousands of years are found in the Rasayana family of herbal remedies from the Indian traditional medical system (Ayurveda), which is named for its intriguing antioxidant properties. Rasayanas are a class of non-toxic polyherbal medicine preparations that stimulate the immune system, preventing the onset of disease and extending life. This article examines seven plant beliefs (Tag et al., 2012), (Benzie and Wachtel-Galor, 2011): *Ocimum sanctum* L., *Camellia sinensis* L., *Withania somnifera* L., *Glycyrrhiza glabra* L., *Curcuma longa* L., *Zingiber officinale* Rosc., and *Melia azedarach* L. Because they are a major source of bioactive chemicals and have therapeutic and nutritional benefits, plants are thought to be extremely important. In traditional healing systems like Ayurveda, Siddha, Unani, Homeopathy, Yoga, and more, medicinal plants—which are also excellent sources of antioxidants—have been utilized. The compounds known as antioxidants shield cells from harm. Numerous scientific studies address the many health benefits of supplementing with antioxidants in the process, including reducing the impacts of cell damage, ageing, stress, and neurological diseases caused by free radicals. For example, butylated hydroxytoluene and butylated hydroxyanisole [BHT] and [BHA] also lessen oxidation. Some medicinal plants, like *Curcuma longa*, *Melia azedarach*, *Zingiber officinale*, and *Withania somnifera*, have antioxidant activity. Antioxidants are the main source of many antiviral and antimicrobial medicines that are being studied. Clove, *Portulac tribulug*, cinnamon, ginger, thyme, mint, fennel, turmeric, garlic, and eucalyptus are among the summery antimicrobial agents. Medicinal plants with antioxidant qualities include those that lower oxidative stress in cells, treat cancer, cardiovascular disease, and inflammatory diseases, as well as have phytochemicals and therapeutic qualities. A broad category of substances made by plants known as phytochemicals. High levels of antioxidants have been shown to be beneficial in a variety of diseases. This review provides some information regarding antioxidants, their medicinal plants, phytochemicals, and their roles in our body.

**Keywords:** [ antioxidants, medicinal plants, phytochemicals,]

### INTRODUCTION :

Antioxidants, often known as oxidation inhibitors, are substances that slow down or stop oxidation and generally extend the life of oxidizable materials [1]. A substance that has the ability to inhibit or delay the oxidation of other molecules is called an antioxidant. The chemical process of oxidation involves the transfer of electrons from a material to an oxidizing agent. Free radicals are a byproduct of oxidation events and can initiate cell-damaging chain reactions. Antioxidants are compounds that prevent oxidation and can mitigate the harmful consequences of oxidation on bodily tissue. They guard against the harm that free radicals can do. Free radicals are extremely erratic molecules that possess an unpaired electron. They play a significant role as intermediates in physiological processes that encompass regulation of blood vessel tone,

cytotoxicity, and neurotransmission. Numerous illnesses in humans, including cancer, Alzheimer's disease, irregularities in cardiac reperfusion, renal disease, and fibrosis, are brought on by free radicals. In a cell, antioxidants perform a variety of essential roles and offer numerous advantages [2].

**Antioxidant classification:-** There are two kinds. 1. Considering solubility Antioxidants that are hydrophilic (a) dissolve in water. Oxidants in the cell cytoplasm and blood plasma react with water-soluble antioxidants. (a) Antioxidants that are hydrophobic: They dissolve in fats. Antioxidants that dissolve lipids shield cell membranes from lipid peroxidation. 2. Considering the defensive line: A. Antioxidants as first line of defense: preventative These include minerals like Se, Mn, and Cu as well as enzymes like glutathione reductase, glutathione peroxidase, catalase, and superoxide dismutase (SOD). Superoxide (O<sub>2</sub>) is mostly quenched by SOD, and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) is catalyzed to break down into oxygen and water by catalase. Using reduced catalyst, GTX catalyzes the conversion of H<sub>2</sub>O<sub>2</sub> and lipid peroxide produced during lipid peroxidation to water. .. (b) Radical scavenging antioxidants, or the second line of defense, include glutathione, vitamin C, uric acid, albumin, bilirubin, vitamin E, carotenoids, flavonoids, and others.(1) Singlet oxygen can be effectively scavenged by 233 carotene. Radicals like O<sub>2</sub> and OH are directly impacted by vitamin C. GSH may aid in the detoxification of numerous ingested oxidizing air contaminants, such as ozone, and is an effective scavenger of numerous free radicals, including O<sub>2</sub>, OH, and different lipid hydroperoxides. c). The third line of defense, known as repair and de-novo enzymes, is a sophisticated group of enzymes that not only block the spread of peroxy lipid radicals but also repair damaged proteins, oxidized lipids, DNA, and peroxides. These enzymes reconstruct the broken cell membrane and fix damage to biomolecules [3].

#### **Mechanism of action:**

Protection against oxidation is given by antioxidants (Amorati, Foti, & Valgimigli, 2013). Lipid oxidation is influenced by various elements such as moisture, heat, light, transition metal ions, and oxygen. The oxygen and metal catalysts need to be eliminated or sequestered to make them inert in order to stop, reduce, or slow down the rate of lipid oxidation. Food that is prone to oxidation needs to be refrigerated or kept out of direct sunlight [4].

#### **Hebal Plants and its medicinal applications and main biological compounds ;**

Drugs	Medicinal application	Main Biological compounds	Reference
1.Clove	Antioxidant, antimicrobial, anti-inflammatory, anti-mutagenic, anti-allergic and anti-cancer.	Eugenol, eugenyl acetate, $\alpha$ -humulene, 2-heptanone, and $\beta$ -caryophyllene	[5,6]
2.Cinnamon	Antioxidant, antimicrobial, anti-inflammatory, anticancer, cholesterol-lowering, immunomodulatory and cardiovascular.	Cinnamaldehyde and eugenol.	[7,]
3.Turmeric	Antioxidant, antimicrobial, anti-inflammatory, anticancer, hypoglycemia and anticoagulant.	Vitamin-C, cineole, tumerone, borneol, zingiberene, d-sabinene, and d-phellandrene	[8,9]

4.Ginger	Antioxidant, antimicrobial, anti-diabetic, neuro-protective, analgesic, cardiovascular, gastrointestinal, anti-inflammatory, anticancer and antihypertensive.	Phenolic acids, gingerols, paradols and shogaols	[10,11]
5.Fennel	Antioxidants,antimicrobial,anti-inflammatory.	Phenolic compounds	[12]
6.Mint	Antioxidants,Antimicrobial,Anticancer,Antiinflammatory,	Phenolic compounds	[13]
7.Garlic	Antioxidant, antimicrobial, antidiabetic, anticancer, cardioprotective, anti-neurologica and anti-inflammatory.	Organosulfur such as Allicin, phenolic and polysaccharides compounds	14,15]
8.Chamomile	Antioxidant, antimicrobial, anti-inflammatory, anticancer, analgesic, anti-hypoglycemic, anti-stress and hepatoprotectiv	Flavonoids, terpenoids, phenolic compounds, apigenin and matricin	[16,17]
9.tulsi	antioxidant, hepatoprotective,immunomodulating,antiinflammato ry, antibacterial, antiviral, antifungal, antipyretic, antidiuretic, antidiabetic, antimalarial	Eugenol (an essential oil) and ursolic acid.9volatoil oil, Estragole, thymol.	18
10.neem	Root bark is used in ascariasis,skin disease, eczema, leucoderma, malarial fever, wounds, diabetes, insecticidal, intestinal worms.[19]	Azaridine, sterols, tannins, paraisine, rutin, seeds are rich in fatty oil consisting of palmitic, oleic, linoleic acid.	

### 1.Clove:Clove bud,Lavang,



<b>Biological source</b>	<b>Family</b>
Eugenia caryophyllus.	Myrtaceae.

Contain NLT 15% v/w of clove oil.

**clove:** Within the Myaceae family, cloves (*Syzygium aromaticum*) are among the best-known herbs for their antibacterial and antioxidant properties. This herb is indigenous to Asia and Africa and is considered a traditional herb. Eugenol, eugenyl acetate,  $\alpha$ -humulene, 2-heptanone, and  $\beta$ -caryophyllene, among other bioactive components

of clove, allow it to exhibit a wide range of pharmacological activity, including antibacterial, antioxidant, anti-inflammatory, antimutagenic, anticancer, and anti-allergic qualities. Among other herbal remedies, clove has one of the strongest antioxidant properties thanks to these bioactive components. Clove oil and extract have been shown in earlier research to possess adequate antibacterial properties against a variety of bacterial strains, including Gram-positive and Gram-negative[20]. The blossoms, stems, and leaves of the clove tree (*Eugenia aromatica* or *Eugenia caryophyllata*, Family Myrtaceae) are distilled to produce clove oil[21]. The ability of clove essential oils to prevent significant food deterioration bacteria of intermediate moisture content was tested[.22].

## 2 .Cinnamon.



Drug	Biological source	Family
<i>Cinnamon</i>	<i>Cinnamomum zeylanicum</i>	Lauraceae

hints that it might assist in reducing inflammation, preventing heart disease, and supporting blood sugar regulation. For millennia, cinnamon has been valued for its therapeutic characteristics. Modern research has begun to validate many of the possible health advantages linked to cinnamon in recent years. These ten health advantages of cinnamon are backed by scientific studies. *Cinnamomum*, a technical term for trees, is the inner bark from which cinnamon is made [23]. Previous studies have discovered that cinnamon possesses antibacterial properties. Because of its antibacterial, antioxidant, and antiseptic qualities, cinnamon has long been employed. The antibacterial properties of cinnamon against a variety of bacteria, including *Bacillus* and *E. coli*, have been studied in the past [24] [25][26]. By lowering blood lipid levels, such as LDL cholesterol, and enhancing blood pressure and circulation, cinnamon supplements may be beneficial for heart health in general. Taking supplements containing cinnamon may help lower cardiovascular risk, as excessive blood pressure and blood fat levels can increase the risk of heart disease. A simple method to increase your intake of cinnamon is to incorporate it into your preferred dishes, snacks, and beverages. For an extra flavor boost, add cinnamon to foods like oats, baked goods, smoothies, chia pudding, and soups [27].

### Dosage:

The amount of cinnamon that is normally found in food is regarded as harmless. According to research, containing one to two grams of cassia cinnamon daily for up to three months is safe. Additionally, studies using three to six grams of it for up to six weeks have proven it to be safe.

**Cinnamon adverse Effects:** There aren't many documented adverse effects of cinnamon, and it's usually well-tolerated. On the other hand, taking large amounts of cinnamon, particularly high-dose supplements, may have the following adverse effect: Head Pain acid reflux, bloating, discomfort in the stomach, emesis Vomiting Reactions to allergens Stop using cinnamon supplements and get in touch with your doctor if you encounter any adverse effects, including any of the above-mentioned symptoms. Exposure to excessive amounts of cinnamon can cause hepatotoxicity.(28)

### 3. Turmeric: Haldi

DRUG	Biological source	Family
Turmeric	Curcuma longa	Zingiberaceae



#### Turmeric

Turmeric's medicinal and antioxidant properties include its usage as an insecticide, antifungal, and antibacterial treatment for sinusitis, rheumatism, anorexia, liver problems, cough, and diabetic sores. Strong antioxidant curcumin has the ability to scavenge epoxides and inhibit binding to macromolecules. Stated differently, the antioxidant capabilities of this spice are comparable to those of nutrients like vitamins C and E, which also have the ability to prevent free radical reactions[29][30]. The fields of science and medicine as well as cooking have both shown a great deal of interest in turmeric. *Curcuma longa*, a perennial herbaceous plant, belongs to the ginger family and is rhizomatous [31]. Although curcumin's source, turmeric, has been used for millennia for its medical benefits, only lately has research been done to pinpoint the precise mechanism(s) of action and identify the bioactive ingredients [32]. The primary naturally occurring polyphenol present in the rhizome of *Curcuma longa* (turmeric) and other *Curcuma* spp. is curcumin (1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione), also known as diferuloylmethane [33]. Because of its anti-inflammatory, anti-mutagenic, antibacterial, antioxidant, and anticancer qualities, *curcuma longa* has long been utilized as a medicinal herb in Asian nations [37, 38]. Curcumin's numerous health advantages have drawn interest from all over the world. These benefits seem to be mostly attributed to its anti-oxidant and anti-inflammatory properties. Curcumin's bioavailability is greatly increased when coupled with substances like piperine, which is the best way to attain these effects. Curcumin may be able to assist with the treatment of metabolic syndrome, oxidative and inflammatory diseases, arthritis, anxiety, and hyperlipidemia, according to research. Additionally, it might aid in the control of inflammation and soreness in the muscles brought on by exercise, improving

#### Side Effects:

Many studies conducted on healthy participants have substantiated curcumin's safety and effectiveness. Even with its well-established safety, there have been a few unfavorable side effects noted. In a dosage response study, seven participants who received 500–12,000 mg and were monitored for 72 hours had yellow stool, rash, diarrhea, and headaches [39]. In a different trial, participants who received 0.45 to 3.6 g/day of curcumin for one to four months also had diarrhea and nausea, and their serum lactate dehydrogenase and alkaline phosphatase contents increased [40].

#### 4. Ginger:

Drug	Biological source	Family
Ginger	<i>Ginger officinale</i>	Zingiberaceae



#### Ginger.

One of the most important herbal medicinal plants from the Zingiberaceae family is ginger, which is the underground rhizome of *Zingiber officinale* roscoe and herbaceous perennial plants [41]. Asiatic in origin, ginger (the rhizome of *Zingiber officinale*) has been utilized for medicinal purposes for over 2,000 years worldwide [42–43]. Polyphenol components found in ginger include phenolic acids, gingerols, paradols, and shogaols. Its biological benefits, including those related to gastrointestinal tract, cardiovascular health, renoprotection, antihypertensive, antiulcer, anti-inflammatory, and antioxidant activity, are attributed to these main constituents [44,45,46,47]. The chemical components found in ginger, such as zingiberene, zingerone, shogaols, and gingerols, are linked to the plant's antioxidant activity [48].

**Phytoconstituents:** The components of ginger are diverse and can differ based on the region of origin and the state of the rhizomes, but here is a summary of the main ones that have been linked to the crude drug's pharmacological effects. Gingerol is the main pungent agent (phenylalkylketones or vanillyl ketones) of ginger; rhizome extracts also contain large concentrations of other gingerol analogues, including shogaols, paradol, and zingerone. Gingerol and shogaol seem to be the main sources of ginger's pharmacological effect (Duke and Beckstrom 1999). Ginger contains phenylalkylketones, sometimes known as vanillyl ketones, such as zingerone, 6-gingerol, 8-gingerol, and 10-gingerol, as well as 6-shogaol, 8-shogaol, and 10-shogaol. There has also been identification of 6-paradol, 6- and 10-dehydrogingerdione, and 6- and 10-gingerdione [48].

#### **5. Fennel.**

Drug	Biological source	Family
Fennel	<i>Foeniculum vulgare</i>	Apiaceae



## Fennel.

Fennel seeds are used in meat, vegetable products, fish sauces, soups, salad dressings, stews, breads, pastries, teas, and alcoholic beverages within the food and flavor business. Among other things, fennel oil is used in sauces, liqueurs, creams, soaps, and perfumes. Fennel has a variety of morphologies and leaf colors that are appealing for aesthetic purposes and as a raw vegetable. Fennel seed has been utilized for its therapeutic properties as a laxative, stimulant, expectorant, carminative, antispasmodic, and stomachic [49]. Limonene, fenchone, phellandrene, cisocimene, para-cymene, gamma-terpinene, anethole, alpha-pinene, camphene, sabeinene, beta-myrcene, estragole, safrole, beta-pinene, camphor, and other volatile components are among the many chemicals found in fennel essential oil [50]. These investigations have shown that the plant's high phenolic content in its extracts is what gives it its antioxidant properties. Studies have demonstrated the high antioxidant capacity of fennel. Many antioxidant mechanisms, including free antioxidants 2020, 9, 1309 10 of 36 radical scavenging, superoxide anion radical scavenging, total antioxidant, and hydrogen peroxide scavenging, are responsible for the plant extract's antioxidant capacity [51, 52]. Studies conducted in vitro have shown that the plant's essential oil and ethanol extracts have potent antioxidant properties [53]. Free radical scavenging properties of the plant's hydro-ethanolic extracts have been demonstrated to be closely correlated with the phenolic component level of the fennel extract. It has been shown that this plant's essential oil and extracts have strong anti-inflammatory, antibacterial, and antioxidant qualities [54]. Using the disk diffusion method, the antibacterial properties of fennel extract and essential oil (EO) have been demonstrated.

## 6. MINT. *Mentha*

DRUG	Biological source	Family
Mint	<i>Mentha piperita</i>	Lamiaceae



## Mint.

One of the fragrant perennial herbs in the Lamiaceae family is mint (*Mentha*) [55]. It has been applied to a number of industries, including cosmetics and pharmaceuticals [56]. Because phenolic components are present, mint EO and aqueous extracts may have antioxidant qualities [59,57–58]. Because of its anti-inflammatory properties, mint essential oil has been demonstrated to be a successful alternative short-term treatment for irritable bowel syndrome in people [60]. This plant's ability to fend off oxidative stress at the cellular or living organism level is solely dependent on its chemical makeup. Mint extract has been used as an antibacterial and antioxidant bioactive natural extract, according to other studies [61–62]. Several investigations have demonstrated this plant's potent antibacterial activity against Gram-positive bacteria, particularly *S. aureus*, as well as its capacity to suppress some types of bacteria. The antibacterial activity of this plant at varying oil concentrations has been documented in several investigations. Strong antibacterial activity of mint oil has been demonstrated against a variety of bacteria, including *Enterococcus faecalis*, *S. aureus*, *S. epidermidis*, *E. coli*, *Bacillus cereus*, and *Cronobacter sakazakii* [63, 64]. The HSV-1 and HIV viruses are inhibited by this herbal remedy [65].

## 7. GARLIC.

Drug	Biological source	Family
Garlic	Allium sativum	Amaryllidaceae.



### GARLIC

**bioactive components in garlic:** Garlic contains a variety of bioactive substances, the most frequent ones being organosulfur compounds, saponins, phenolic compounds, and polysaccharides [66]. Garlic contains a high quantity of quercetin, as measured by high-performance liquid chromatography, although onions have a higher protocatechuic acid content (67). According to reports, the DPPH technique was used to assess the total flavonoid content of garlic bulbs (36.1 mg kg<sup>-1</sup> FW), polyphenolic compounds (12.64–22.66 mg/1 g gallic acid), and antioxidant activity (9.92–40.41 mol Trolox/g). The bioactive properties of garlic are mostly attributed to organosulfur compounds and their byproducts, with diallyl thiosulfonate, or allicin, making up the majority of this contribution. Diallyl sulfide (DAS), diallyl disulfide (DADS), diallyl trisulfide (DATS), E-ajoene, Z-ajoene, S-allyl-cysteine (SAC), and S-allyl-cysteine sulfoxide (alliin) are other important organosulfur components [70].

### Health benefits of garlic:

Studies have shown that eating garlic lowers total cholesterol (TC) and low-density lipoprotein (LDL), and that these effects are more noticeable when taken for a longer period of time and at a lower dosage, particularly in people with cardiovascular disorders [71]. Garlic powder or oil, as well as raw garlic, can be used as a functional and medicinal food. Strong data suggests that garlic has anti-tumor, anti-preventive, and therapeutic benefits for boosting the immune system. Its antioxidant action also shields the body from free radical damage [72–73]. It has been discovered that a balanced diet full of functional foods cooked with garlic is beneficial to human health. Garlic has the ability to change blood anticoagulant levels and increase the activity of the body's organs, particularly the digestive and respiratory systems [74].

### Blood pressure lowering effect:

A systolic blood pressure (SBP) of 140 mm Hg or higher, a diastolic blood pressure (DBP) of 90 mm Hg or higher, or both, is generally considered to be hypertension. The incidence of associated morbidity and mortality is reduced by the prevention and appropriate management of hypertension. According to the Joint National Committee (1993), a 3 mm Hg drop in SBP reduces the death rate from ischemic heart disease by 5% and from stroke by 8%. For some people with hypertension, lifestyle modification is the only treatment option; for everyone else, it is an additional therapy (Joint National Committee, 1997). It has been demonstrated that diets rich in fruits, vegetables, and low-fat dairy products can lower blood pressure. Higher garlic consumption is linked to a decreased prevalence of hypertension in the general population.[ 75] . An inverse relationship has been found by epidemiological research



between eating garlic and a lower chance of cardiovascular disease development. The idea that eating garlic has a major cardioprotective impact is supported by a large body of research, including investigations on both humans and animals. But some aspects of using garlic correctly, such as using the many preparations that are available, the dosage, the length of time it takes, and how it interacts with generic medications, need to be adjusted. To pinpoint the precise components in garlic or garlic products that account for the majority of its biological effects, more research needs to be done[76].

## 8. Chamomile.

Drug	Biological source	Family
Chamomile	<i>Matricaria chamomilla</i> L.	Asteraceae.



### Chamomile.

One common herbal remedy is chamomile (*Matricaria chamomilla*). This plant, which belongs to the Asteraceae family, is still employed in the pharmaceutical and cosmetic sectors among other medical fields [77,78]. Strong antioxidant and antibacterial properties are found in chamomile [79]. Numerous studies have shown that this plant's extract and essential oil (EO) have strong antibacterial properties against a wide range of Gram-positive and Gram-negative bacteria, such as *Salmonella thyphimurium*, *E. coli*, *S. aureus*, and *Bacillus*. This plant's strong antibacterial properties are also a result of its high phenolic component content. Flavonoids, terpenoids, phenolic chemicals, apigenin, and matricin are found in chamomile [77,80–81]. This plant's extract has an antioxidant property because flavonoids are included in it. The pharmacological properties of chamomile include anti-inflammatory, anti-bacterial, anti-fungal, anti-oxidative, analgesic, anti-cancer, anti-hypoglycemic, anti-stress, and antihypertensive properties.

## 9. Tulsi.

Drug	Biological source	Family
Tulsi	<i>Ocimum sanctum</i>	Labiatae



## Tulsi.

*Plants with medicinal and antioxidant property* : Ocimum sanctum Linn. (Tulsi, Sacred Basil)

**Family – Lamiaceae.**

**Chemical constituents:-**Eugenol (an essential oil) and ursolic acid.[82]volatoil oil, Estragole, thymol.

### Medicinal and antioxidant property:-

Ocimum sanctum has a broad safety margin and is known for its anti-stress, antioxidant, hepatoprotective, immunomodulating, anti-inflammatory, antibacterial, antiviral, antifungal, antipyretic, antidiuretic, antimalarial, and hypolipidemic effects. Tulsi is used either alone or in combination with other herbs in Ayurvedic medicine to treat a variety of clinical ailments, including anxiety, bronchitis, fever, snake and scorpion bites, and chronic cough[82]. Thiobarbituric acid reactive compounds, or TBARS, were reduced in LPO production and antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPX), and glutathione transferases (GT) were boosted by the aqueous extract. Along with reducing glutathione (GSH) levels in plasma, it also enhanced antioxidant levels in the rat brain, lung, kidney, and liver [82, 83]. Therapeutic benefits of tulsi have been discovered IJPBS |Volume 4| Issue 1 |JAN-MAR|2014|173-178potential as an antioxidant and antidiabetic drug.low blood sugar,

## 10. Neem.

Drug	Biological source	Family
Neem	Azadirachta indica.	Meliaceae



## Neem

Melia azedarach L. (Margosa) Family - Meliaceae

**Chemical constituents:-** Azaridine, sterols, tannins, paraisine, rutin, seeds are rich in fatty oil consisting of palmitic, oleic, linoleic acid[84].

**Medicinal and antioxidant Propert :** Root bark is used in ascariasis, skin disease, eczema, leucoderma, malarial fever, wounds, diabetes, insecticidal, intestinal worms[84]. The DPPH radical scavenging assay and the extracts' capacity to scavenge free radicals are used to measure antioxidant activity. The outcome demonstrated that Melia azedarach extract, which has the largest concentration of phenolic components, has the strongest antioxidant activity. The presence of hydroxyl groups in the chemical structure of phenolic compounds, which can supply the essential elements for a radical scavenger, may be the cause of the compound's strong scavenging ability. The total polyphenol content and the IC50 value show that the antioxidant activity is strengthened by an increase in polyphenol content[85]. Because the neem plant possesses larvicidal and insecticidal effects on insects that either eat plant components or suck sap, it can be used as a bio-insecticide [86]. The active component of neem, azadirachtin, interferes with development and inhibits eating and oviposition [87].

Activity of antioxidants Neem seed extract has been shown to have antioxidant properties in vivo during horse grain germination, a process linked to decreased levels of lipid peroxides and lipooxygenase activity (Balasenthil et al., 1999). Additionally, an antioxidant principle that effectively inhibits plant lipooxygenases has been identified. Neem-derived antioxidants are an easy and affordable method to add antioxidants to food. Neem-derived extracts, in the form of teas and oils, appear to be an easy and affordable approach to add antioxidants (Alzohairy, 2016).

### Chemistry of Neem Compound:

Neem contains naturally occurring chemicals called limonoids or triterpenes. Neem continues to yield new discoveries of limonoids. According to Naik et al. (2014), azadirachtin, salannin, meliantriol, and nimbin are well-known. The nimbin, the bifurcating constituent, has the following groups: aldehyde, acetoxy, lactone, ester, and methoxy. Nimbodin has sulfur in it.

### Conclusion:

All plants discussed in this review have chemical constituents, and medicinal properties, such as cough, liver disorder, antibacterial, antifungal, insecticides, nausea, vomiting, malarial fever, anti-inflammatory, peptic ulcer, asthma, antipyretic, antidiabetic, skin disorder, anticancer etc. all plants discuss in this review have multiple biological effects of antioxidant activity. These antioxidative plants reduce oxidative stress. They prevent the disease. Preventing the formation of radicals, prevent/promoting decomposition of product. The main function of antioxidant that may protect your cells against free radicals. Antioxidants are often added to foods to prevent the radical chain reaction. So antioxidant are very much necessary for our body, but our body cannot manufacture these chemicals, so they supply through diet.

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