ZIBELINE INTERNATIONAL PUBLISHING

ISSN: 2521-0807 (Print)
ISSN: 2521-0424 (Online)

CODEN : MSMAGK

Matrix Science Medica (MSM)

DOI : http://doi.org/10.26480/msm.02.2018.04.14


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# PHYTOCHEMICAL AND ANTIOXIDANT SCREENING OF ANACYLUS PYRETHRUM, APIUM GRAVEOLENS, BOERHAAVIA DIFFUSA, CINNAMOMUM CASSIA BLUME, CUSCUMIS MELO LINN, CUSCUMIS SATIVUS LINN, DAUCUS SATIVUS, FOENICULUM VULGARE, TRACHYSPERMUM AMMII AND THEIT EFFECT ON VARIOUS HUMAN AILMENTS

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**ARTICLE DETAILS**

***Article History:***

Received 26 June 2018
Accepted 2 July 2018
Available online 1 August 2018

**ABSTRACT**

Herbal medicinal plants are commonly intended for the cure and prevention of countless diseases for the reason that of low price, more effectiveness and no side effects. The medicinal plants consist of several types of phytochemical constituents as alkaloids, saponin, flavonoids, phenols, tannins and carbohydrates that are used for various human ailments. Such types of constituents not only have biochemical compounds but also have antioxidant, antimicrobial, antifungal activity and intended for the treatment of diabetes, kidney, liver and stomach ailments. The use of herbal natural plants is more economic and reliable for these types of diseases. These medicinal plants have been second-hand for different human disorders with no side effects of reoccurrence.

**KEYWORDS**

Phytochemical, Herbal medicinal, human ailments, antimicrobial, antioxidant.

## 1. INTRODUCTION

The medicinal herbal plants are second-hand in the urban countries population for the excellent human health continuation while the less developed countries population (3.3 billion) used the plants on routine basis that are observed by UNESCO. Thousands of years ago, the herbal plants consist of chief constituents which are used as natural remedies for the whole populations [1]. In the world, the plant species are about to 258, 650, out of 10% plants are used for the treatment of diseases in world populations. Majority of Pakistani people depends upon the medicinal plants for the treatment of major and minor diseases [2]. Alkaloids, phenols, tannins and flavonoids are the principal constituents having different characteristics which are used for different human health problems [3]. Mostly 75-80 % of world population depends upon the herbal medicine for primary health care, predominantly in developing countries. According to World Health Organization (WHO) the used of herbal product are increasing two (2) to three (3) times all over the world [4].

Reactive oxygen species (ROS) are generally known as oxygen free radical that has a role as a secondary messenger in intracellular signaling pathways [5]. Reactive oxygen species (ROS) are very reactive molecules because of presence of unpaired electron in their outmost shell. Reactive oxygen species (ROS) are generated in the living organism as a byproducts of regular cellular metabolic reactions. Physiologically reactive oxygen species (ROS) are produced in each cell at low concentration but if they are created at high concentration they can interact with essential cellular targets, including proteins, lipids and DNA, compromising cell viability and functions [6]. In this review paper, the *Anacylus pyrethrum, Apium graveolens, Boerhaavia diffusa, Cinnamomum cassia blume, Cuscumis melo linn, Cuscumis sativus linn, Daucus sativus, Foeniculum vulgare, Trachyspermum Ammii* are to be discussed as phytochemical and ROS screening and used for different human health.

## 2. REVIEW OF LITERATURE

### 2.1 *Anacyclus Pyrethrum*

*Anacyclus pyrethrum* belongs to family Asteraceae. *Anacyclus pyrethrum L.* (Asteraceae) commonly known as Akarkara widely used in Ayurvedic system of medicine [7]. Analysis of plant roots indicates the presence of ten (10) unsaturated amides, a sterol and three (3) fatty acids. Plant roots had the most important compounds such as phenylethylamine, polyacetylenic amides, sesamin, pellitorin, anacyclin and inulin [8]. It is used for the treatment of paralysis, epilepsy, toothache, rheumatism, sciatic and neuralgia [9]. The roots of medicinal plant had a various pharmacological effects including immunostimulating, memory-enhancing, insecticidal, local anesthetic, antidepressant and anticonvulsant [10].

Antioxidants are able to block the free radical mediated disease such as hepatic disorders, diabetes, neurodegenerative disorders, hemorrhagic shock and carcinogenesis [11]. The antibacterial potential of methanolic and aqueous extract of *Anacyclus Pyretrum* was determined against six (6) bacterial strains such as *Bacillus subtilis, Aeruginosa, Escherichia coli, Klebsiella pneumonia, Staphylococcus aureus*, *Pseudomonas* and *Micrococcus luteus*. It had a broad spectrum of antibacterial activity which was determined with the help of disk diffusion and minimum inhibitory concentration (MIC) methods [12]. The antioxidant effects of *A. pyrethrum* were due to presence of phenolic and flavonoid compounds in extracts [13].

The aqueous *Anacyclus pyrethrum* root extract was used to determine the antidiabetic potential in diabetes induced rats. Aqueous extract was orally administered to rats at the dose of 150mg/kg and 300mg/kg**.** After the

treatment, blood glucose level returned back to near standard values in the diabetic rats [8]. The root decomposition showed the presence of a resin compounds called pyrethrin or pellitorin and alkyl amide have positive effects on reproduction and have directly or indirectly positive effects on testosterone to increase reproductive activity [14]. Extracts (*Anacyclus pyrethrum)* of roots with water had considerable effects on spermatogenesis and sperm count which used as an aphrodisiac and sexual stimulant but also have anabolic effects [15]. *Anacyclus pyrethrum* roots extract produce antidepressant effect due to interaction between adrenergic and dopamine receptor with increasing level of dopamine and noradrenaline in the brains of mice [16].

Aqueous root extracts of *Anacyclus pyrethrum* L. was used to determine the effects on gonadotropins (LH and FSH) and testosterone serum level in adult male rats. The results showed that the aqueous root extracts had significantly increased in serum level of gonadotropin hormone and testosterone serum [14]. The ethanolic extract of *Anacyclus pyrethrum* is useful in the treatment *of* memory dysfunction. When ethanolic extract of *Anacyclus pyrethrum* was administered orally, it improves the memory. It increases the brain cholinesterase level due to increase central cholinergic neurotransmission and had a memory enhancing activity in scopolamine induced amnesia [17]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Anacyclus pyrethrum* has been reported

### 2.2 *Apium graveolens*

The family of *Apium graveolens* is Umbelliferae [18]. *Apium Graveolens* (Umbelliferae) are commonly known as Celery [19]. *Apium graveolens* (Celery) contains a major bioactive compound called furanocoumarins which is class of phenolic compounds.

**Table 1:** (A) Qualitative analysis of plants

| Medicinal Plants | Anthocyanins | Alkaloids | Amino acids | Carbohydrates | Fixed oils | Flavonoids | Glycosides | Phenols | Proteins | Saponin | Steroids | Tannins | Terpenoids |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Anacylus pyrethrum* [9,13] | -<br> | +<br>+ | | +<br> | | +<br>+ | | | | +<br>- | +<br>+ | +<br>+ | +<br>+ |
| *Apium graveolens* [18] | | + | + | + | | + | + | + | | + | + | + | + |
| *Boerhaavia diffusa* [20] | | + | | | | + | - | | | + | - | + | - |
| *Cinnamomum cassia* [21,22] | | +<br>+ | | +<br>- | | +<br>+ | +<br>- | <br>+ | + | <br>+ | <br>+ | + | +<br>+ |
| *Cuscumis melo linn* [23,24] | | +<br>- | +<br>+ | +<br>+ | | +<br>+ | -<br>- | + | +<br>+ | <br>+ | <br>+ | <br>+ | |
| *Cuscumis sativus linn* [25,26] | | +<br> | | | | -<br> | +<br> | <br>+ | | +<br>+ | +<br>+ | +<br>+ | |

**+Ve:** Indicate positive test.
**-Ve:** Indicate negative test.

**Table 1:** (B) Qualitative analysis of plants

| Medicinal Plants | Anthocyanins | Alkaloids | Amino acids | Carbohydrates | Fixed Oils | Flavonoids | Glycosides | Phenols | Proteins | Saponin | Steroids | Tannins | Terpenoids |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Daucus carota* [27] | | + | | + | - | | + | + | + | - | - | + | |
| *Foeniculum vulgare* [28] | | - | | | | + | + | | | + | | - | - |
| *Trachyspermum Ammi* [29] | | + | - | | | + | + | + | - | - | + | + | _ |

**+Ve:** Indicate positive test,
**-Ve:** Indicate negative test.

Ferric reducing antioxidant power (FRAP) method was used to assess the antioxidant capacity of *Anacyclus pyrethrum.* Due to the presence of antioxidants in plant extracts, Fe3+/ferricyanide reduce to the ferrous form which could be monitored at 700nm. Maximum ferric reductive capacity at 0.15mg/mL with methanolic extract was 0.569mg/mL as compared to water and chloroform extracts 0.301mg/mL and 0.182mg/mL respectively. At 0.15 mg/mL ascorbic acid had the highest reducing power as compared to all the extracts which was 1.84 mg/mL [13].

**Table 2:** (A) Quantitative phytochemical screening of plants

| **1-Quantitative Analysis of *Anacyclus pyrethrum*** | | | |
|---|---|---|---|
| **Name of constituent** | **Type of extract** | **Assay Values** | **References** |
| Phenols (a) | Methanol | 310.78 ± 5.2 | [13] |
| | Water | 183.82 ± 3.1 | |
| | Chloroform | 91.8 ± 1.7 | |
| Flavonoids (b) | Methanol | 92.50 ± 4.2 | |
| | Water | 72.50 ± 2.1 | |
| | Chloroform | 24.20 ± 1.2 | |
| (a) µg gallic acid equivalent per mg of extract (mg GA/g)<br>(b) mg quercetin equivalent per g of extract (mg QE/g) | | | |
| **2-Quantitative Analysis of *Apium graveolens*** | | | |
| Phenols | Ethyl Acetate | 22.70 ± 1.56 mg/g | [30] |
| | Methanol | 51.09 ± 1.44 mg/g | |
| | Butanol | 19.43 ± 0.88 mg/g | |
| | Water | 46.40 ± 0.31 mg/g | |
| Flavonoids | Ethyl Acetate | 4.08 ± 0.31 mg/g | |
| | Methanol | 2.12 ± 0.08 mg/g | |
| | Butanol | 4.80 ± 0.03 mg/g | |
| | Water | 0.77 ± 0.01 mg/g | |
| **3-Quantitative Analysis of *Boerhaavia diffusa*** | | | |
| Carbohydrate | | 10.56±0.12 | [31] |
| Protein | | 2.26±0.02 | |
| Vitamin C | | 44.80±5.78 | |
| Vitamin B1 | | ND | |
| Vitamin B2 | | 22.00±4.25 | |
| Vitamin B3 | | 97.00 ±8.01 | |
| Vitamin B6 | | ND | |

**Table 2:** (B) Quantitative phytochemical screening of plants

| **4-Quantitative Analysis of *Cinnamomum cassia*** | | | |
|---|---|---|---|
| **Name of constituent** | **Type of extract** | **Assay Values** | **References** |
| (a) Phenols<br>(b) Flavonoids<br><br>(a) µg gallic acid equivalent per mg of extract (mg GA/g)<br>(b) mg quercetin equivalent per g of extract (mg QE/g) | | 5.59±0.06<br>3.12±0.07 | [32] |
| **5-Quantitative Analysis of *Cucumis sativus*** | | | |
| Phenols<br><br>Flavonoids | Fresh extract<br>Dried extract<br><br>Fresh extract<br>Dried extract | 19.25 (µg/mg)<br>6.23 (µg/mg)<br><br>16.24 (µg/mg)<br>1.82 (µg/mg) | [33] |
| **6-Quantitative Analysis of *Daucus carota Linn*** | | | |
| Total phenolic contents | leaves extract<br>seeds extract | 13.83 mg /g<br>7.08 mg /g | [34] |
| **7-Quantitative Analysis of *Foeniculum vulgare Mill*** | | | |
| Total phenolic contents<br><br>Total flavonoid contents | Hexane fraction<br>Chloroform fraction<br>Methanol fraction<br><br>Hexane fraction<br>Chloroform fraction<br>Methanol fraction | Nill<br>10.51 mg/g<br>48.37 mg/g<br><br>Nill<br>5.26 mg/g<br>21.44 mg/g | [35] |
| **8-Quantitative Analysis of *Trachyspermum ammi*** | | | |
| Carbohydrates<br>Protein<br>Fat<br>Fibre<br>Moisture<br>Minerals matter | | 38.6 µg/mg<br>15.4 µg/mg<br>18.1 µg/mg<br>11.9 µg/mg<br>8.9 µg/mg<br>7.1 µg/mg | [36] |

**Table 3:** Antioxidant analysis of the plants

| **Plants** | **DPPH(2,2,diphenyl-1-picrylhydrazyl)** | **FRAP (Ferricreducing)** | **NO (Nitrogen oxide radical)** | **OH (Hydroxyl radical)** | **$O^{-}_{2}$ (Superoxide anion radical)** | **$H_2O_2$ (Hydrogen peroxide)** | **References** |
|---|---|---|---|---|---|---|---|
| ***Anacylus pyrethrum*** | 55.83±1.92 µg/ml | NR | 32.61±1.68 µg/ml | 60.14±0.43 µg/ml | NR | 38.54±0.94 µg/ml | [7] |
| ***Apium graveolens*** | 1.41±0.270 µg/ml | 12.48±1.06 µg/ml | NR | NR | NR | NR | [37] |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Boerhaavia diffusa*** | 82.12 µg/ml | 19.48±1.02 µg/ml | NR | NR | 99.8 µg/ml | NR | [38] |
| ***Cinnamomum cassia*** | 42.03±0.06 (µg/L) | NR | NR | NR | NR | NR | [39] |
| ***Cuscumis melo*** | 21.8±0.2 µg/ml | NR | 17.7±0.2 µg/ml | 18.7±0.1 µg/ml | 16.8±02 µg/ml | 17.8±0.1 µg/ml | [40] |
| ***Cuscumis sativus*** | 13.06 µg/ml | NR | NR | NR | NR | NR | [41] |
| ***Daucus carota*** | 136±3.21 µg/ml | NR | NR | NR | NR | NR | [34] |
| ***Foeniculum vulgare*** | 32.32 ± 0.77 (µg/ml) | NR | NR | NR | NR | NR | [42] |
| ***Trachyspermm Ammi*** | 73.41 µg/ml | NR | 67.33 µg/ml | 62.48 µg/ml | 63.22 µg/ml | NR | [29] |

NR: Not Reported in Literature

The main furanocoumarins in celery are three phototoxic furanocoumarins, xanthotoxin, psoralen and bergapten. It is a strong diuretic and also have urinary antiseptic properties due to the volatile oil called apiol [43]. The quantitative phytochemical constitutions are D-Limonene (57.7%), Myrcene (18.74%), Terpineol (8.6%), β–Selinene (8.1%), β-pinen (2.4%), β-caryophyllene (0.5%), Carnone (0.3%), Trans-limonene oxide (0.3%), α-Terpinolene (0.3%), α-selinen (0.2%), Trans-3-butylidenephthalide (0.1%), α-Muuroloene (0.1%), Cis-limonene oxide (0.1%), Linalool (0.1%), α-pinen (0.1%) and Trans-ocimene (0.1%) [44]. The medicinal plant have ability to do work as antibacterial, antifungal, anti-inflammatory, antioxidant, anthelmintic, antispasmodic, carminative, diuretic, laxative and sedative [44]. The recommended dose of celery seeds is about to 1.2 gm to 4 gm daily and fresh plant juice is about to 23gm (15ml) three (3) times in a day [45]. It is also used as alternative therapy for the patients suffering with arthritis, rheumatism and gout due to its anti-inflammatory effects [19].

The flavonoids had the ability to collect a free radicals and antioxidant potential. The flavonoids and phenolic compounds have pharmacological features such as anti-oxidants, anti-mutagenic, anti-bacterial, anti-diabetic, anti-inflammatory, anti-thrombosis, hyperlipidemia and anti-cancer. *Apium Graveolens* (Celery) is one of the plants that are rich in flavonoid such as apigenin and apiin [30]. The name of celery was given to the dry food of *Apium graveolens.* The celery is commercially available as vegetable, seed, flaks and seed oleoresin [19]. Celery is known as mild

diuretic, used as a urinary antiseptic, antispasmodic, anthelmintic and sedative [44].

The celery has a very effective role in fertility rate due to its flavonoids and antioxidant properties. The hydro-alcoholic extract of celery leaves can be used for improving the fertility parameters. After taking the extract of the celery leaves it causes the improvement of the sperm parameters such as mobility and its number in male sex. The female sex hormone called progesterone also boosted due to celery [44]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Apium graveolens* has been reported.

### 2.3 *Boerhaavia Diffusa Linn*

The family of *Boerhaavia diffusa* is Nyctaginaceae [46]. The plant *Boerhaavia diffusa* (Nyctaginaceae) frequently known as punarnava [47]. This medicinal plant distributed in tropical region such as South America, India and Africa. The phytochemical analysis of punarnava exposed that it contains steroids, lipids, lignins, flavonoids, alkaloids, triterpenoids, phlobaphenes and ursolic acid [20]. It contain main constituients such as boerhaavia acid, boeravinone, palmitic acid, sitosterol, esters of sitosterol, punarnavine, boerhaavia acid many other compounds [48].

*Boerhaavia diffusa* considered as a source of vitamins, carbohydrate, protein, tannin, saponin, flavonoid and terpinoid [46]. *Boerhaavia diffusa* are mostly used for the management of depression, diabetes, anemia, liver disorders, tumours, cancers and all kind of internal inflammations. The entire plant also used as antistress, antidiabetic, adoptogenic, antioxidant and immunostimulator. The plant has various beneficial effects in the treatment of tumors and abdominal cancers [49]. The antoxident activity was observed due to presence of minerals, organic acids, flavonoids and phenolic compounds in the root of plant [46]. Roots of this medicinal plant were found to be exposed antioxidant potential which supports to use as traditional medicine [47].

The majority of serum parameters were altered such as alkaline phosphatase (ALP), glutamic oxaloacetic transaminase (GOT), acid phosphatase (ACP) and glutamic-pyruvic transaminase (GPT). It was found that a consideredable hepatoprotective activity was observed in thioacetamide induced rats. The hepatotoxicity was experimentally induced with carbon tetrachloride in mice and rats [50]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Boerhaavia diffusa* has been reported.

### 2.4 *Cinnamomum Cassia*

*Cinnamomum cassia blume* belongs to the family Lauraceae. *Cinnamomum cassia* (Lauraceae) also called as Cinnamomum arromaticum, Chinese cinnamon or Chinese cassia, mostly cultivated in the countries of India, China, Uganda, Vietnam, Bangladesh and Pakistan. It is used as flavoring agent in various Asian countries [51]. According to another study, the Cinnamon contains cinnamate, cinnamic acid, cinnamaldehyde and essential oils. The essential oils which present in this medicinal plant are eugenol, L-borneol, caryophyllene oxide, cinnamyl acetate, trans-cinnamaldehyde terpineol, terpinolene, thujene, b-caryophyllene and L-bornyl [52]. The major constituents are cinnamaldehyde (75-90%), coumarin (7%) and essential oil (4%). The others constituents which are present in traces amount are salicylic acid, cinnamyl alcohol, eugenol, benzoic acid, cinnamic acid, corresponding esters and aldehydes [51]. The major antioxidant constituients in this plant are tannin, flavonoid, phenol and volatile oils. This medicinal herb is used in different traditional

medicine system such as Unani, Ayurvedic, Japanese and Chinese in the treatment of dyspepsia, diabetes, brain ischemia, cancers, peptic ulcer disease and ischemic brain injury [53]. It was reported that cinnamon used as flavoring agent. It can be used to reduce the risk of colon cancer with the improvement of colon health. The cinnamon used as coagulant which prevent the bleeding and to increase the blood circulation in uterus [52].

The gas chromatography-mass spectrometry (GC-MS) method was used to investigate the essential oil of *Cinnamomum* bark. The result exposed the major chemical constituents include eugenol (9.317%), α-muurolene (0.133%), o-methoxy cinnamic aldehyde (0.236%), tricyclo-nona-3,6-dien-9-on (0.173%) and naphthalene,1,2,3,4-tetrahydro-1,6-dime (0.195%). The 2-propenal, 3-phenyl (87.013%) considered as minor constituents. These constituents are accountable for the *Cinnamomum* bark fragrance and beneficial effects [54]. The essential oils and other components had various pharmacological activities such as antimicrobial, anti-inflammatory, antitermitic, antifungal, antioxidant, antidiabetic, antimycotic and anticancer. The traditional use of Cinnamon powder is to treat dental problems, toothaches and bad breath [52]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Cinnamomum Cassia* has been reported while antibacterial activity of *Cinnamomum cassia* has been given below (Table 4)

**Table 4:** Antibacterial activity of *Cinnamomum cassia* extracts against UTI isolated bacteria. [55]

| **Types of Extracts** | **Diameter of Inhibition Zone (DIZ) in mm** | | | | |
|---|---|---|---|---|---|
| | ***E. coli*** | ***K.pneumoniae*** | ***P.aeruginosa*** | ***E.faecalis*** | ***P.mirabilis*** |
| Aqueous | 4.66±0.57 | 2.66±0.57 | 3.66±0.57 | 5.66±0.57 | 7.0±1.0 |
| Methanolic | 19.66±0.57 | 10.0±0.81 | 18.0±0.60 | 16.0±0.6 | 18.6±0.57 |
| Ethanolic | 21.33±0.57 | 15.66±0.57 | 19.66±0.57 | 17.66±0.57 | 20.33±0.57 |

According to this observational study *Cinnamomum Cassia* have ability to reduce low density lipoprotein (LDL) and serum triglyceride while high density lipoprotein (HDL) was increased in healthy volunteers [56]. According to Food and Drug Administration (FDA) and World Health Organization (WHO), the daily average dose of Cinnamomum cassia is about to 1.25mg/kg for adult male [51].

### 2.5 *Cucumis melo Linn*

*Cucumis melo linn* belongs to the family Cucurbitaceae [24]. *Cucumis melo Linn* (Cucurbitaceae), commonly known as musk melon or kharboza. The phytochemical study revealed that the seeds contain chromone derivatives, phenolic glycoside, arginine, sitosterol, beta-sitosterol, alpha-galactosidases, dihydroxy triterpenes, aspartic and glutamic acids [23]. The stems of this plant had an effective role in constipation, liver disorders, purgative and flatulence [57]. Anti-inflammatory and antioxidant effects were explored with the extract of *Cucumis melo* [58]. The seeds are commonly used for the treatment of kidney and bladder stones, oliguria, jaundice, chronic fevers, bile obstruction, eczema, general debility, painful and burning micturition and ulcers in the urinary tract. The seeds of the plant are mostly used as diuretic, lithotripter, laxative and refrigerant [23].

The production of peroxynitrite was inhibited due to *Cucumis melo* extract, which increase the antioxidant potential. The production of superoxide anion was inhibited, which was dose dependent [58]. The methanolic extract at dose of 500mg/kg reflects the maximum antihyperlipidemic activity as compared to aqueous extract. This result showed that methanolic extract had potent antihyperlipidemic activity in high cholesterol diet induced hyperlipidemia, as compared to atorvastatin [59]. The diuretic effect was significantly increased in treated experimental animals. These results indicate the extracts containing the combination of *Cucumis melo* and *Macrotyloma uniflorum* can be used to manage the renal ailments such as hypertension and edema [60]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Cucumis melo* has been reported while antioxidant activity of *Cucumis melo* has been given below (Table 5).

**Table 5:** Antioxidant composition of the *Cucumis melo* extracts [58].

| **Antioxidant** | **Amounts in the extract** |
|---|---|
| **Endogenous Enzymes** | |
| Superoxide dismutase | 95 ± 8 IU/mg |
| Catalase | 10 ± 2 IU/mg |
| Glutathion peroxidase | 1 ± 0.5 IU/mg |
| **Exogenous Enzymes** | |
| Co-enzyme Q | 10 54.0 ± 4 mg/100 g |
| Lipoic acid | 19.3 ± 1 mg/100 g |

| | |
|---|---|
| Glutathion (GSH) | 215 ± 12 µg/100 g |
| Glutathione disulfide (GSSG) | 3075 ± 55 µg/100 g |
| Carotenoids | 350 ± 34 µg/100 g |
| Selenium | 2.5 ± 0.2 µg/100 g |
| Vitamin E | 240 ± 22 µg/100 g |
| Vitamin A | 10000 ± 154 µg/100 g |
| Vitamin C | 5000 ± 523 µg/100 g |

### 2.6 *Cucumis Sativus Linn*

*Cucumis sativus L*. belong to family Cucurbitacea. It is commonly named as Cucumber (English) and Khira (Hindi). It is widely distributed in northern India and warm and temperate countries of the world. The phytochemical analysis revealed the presence of 2, 6-nonadienal, 2-nonenal, methyl-2-methylbutanoate, cucurbitacin C, pectin, codisterol, dehydroporiferasterol, galactinol, dihydroxyhexadecanoic acid and cucurbitacins [22]. It can be used for the management of menstrual illnesses, dyspepsia, asthma, piles, leprosy and bronchitis. The traditional used of *Cucumis sativus* are laxative, astringent, anthelmintic, antidiarrheal and antipyretic. It is also used to manage the hepatitis, bronchitis, dyspepsia and asthma [61]. The used of medicinel plant includes antidiarrheal, antimicrobial, antihyperlipdmic, antidiabetic, antipyretic, astringent, anthelmintic, laxative and purgative. The pharmacologically plant used as antiallergic, antihypertensive, antidiabetic, antioxidant, antidermatitis and anti-fungal [22]. The protective activity against gastric ulcers was improved due to the presence of flavonoid, alkaloids, steroids and polyphenols. These phytoconstituents have ability to reduce the gastric acid volume, total acidity, free acidity, anti-inflammatory and antioxidant [62].

The ethanolic extract of cucumber had a significant improvement in hypoglycemic, hypolipidemic and glycogenesis in treated animals. The cucumber extract decrease the low density lipoprotein (LDL) reduce upto 13% and glucose level in blood upto 67% after single intraperitoneal injection. The total cholesterol and triglyceride level was reduced to 29% and 72% respectively. As a result, a significant improvement in glycogenesis was observed by using the *Cucumis sativus* extracts in diabetic rats [63]. The anti-inflammatory activity was investigated in rat, treating with the extract of methanolic of *Cucumis sativus.* The extract at the dose of 150mg/kg and 250mg/kg was orally administered. The methanolic extract reduced inflammation 72.06% (250mg/kg) and 57.35% (150mg/kg) in carrageenan-induced paw edema test. These effects were compared with 79.41% (10mg/kg) indomethacin [41].

The aqueous extract of *Cucumis sativus* fruit pulp was used to assess the carminative and antacid properties. It was determined with carbondioxide evolution method. The $NaHCO_3$ considered as standard drug for the comparison of results. The aqueous extract of *Cucumis sativus* fruit pulp possessed significant carminative and antacid properties [15]. The *Cucumis sativus* extracts was used to investigate the treatment effects on the acne vulgaris, due to its antimicrobial and antioxidant potential to cure acne. The fresh extract of *Cucumis sativus* was mixed with linseed (*Linum usitatissimum*) oils and tea tree (*Melaleuca alternifolia*) oils in the formulations of polyherbal cream for the treatment of acne vulgaris [33].

It was investigated that ethanolic extracts of the plant possessed cytotoxic activity. The ethanolic extracts showed significant reducing power due to its antioxidant potential [25]. The antifungal activity was determined against *Pityrosporum ovale, Trichophyton spp., Microsporum spp., Aspergillus niger, Blastomyces dermatittidis and Candida albicans* which showed significant results. This medicinal plants had widely used in

traditional medicine as anticancer agent, antifungal and pesticide due to presence of biologically active compounds [25]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Cucumis sativus L*. has been reported.

### 2.7 *Daucus Carota*

*Daucus carota Linn* belong to family Apiaceae generally known as carrots. The major active constituents are phenolic, phytosterol, triterpene and polyacetylene [64]. *Daucus carota* had a remarkable quantity of vitamins, nicotinic acid, flavonoids, α, β and γ –carotene lycopene, cryptoxanthin and leutenin. They also have carotenoids such as abscisic acid, trisporic acid and β-apocarotenoids [65]. The ethanolic extract of *Daucus carota* was used to investigate the wound healing property. The cream was prepared with 1%, 2% and 4% (w/w) of ethanolic extract by using soft paraffin as a base. The antioxidant and antimicrobial potential due to various compounds phytochemical constituents such as flavonoids and phenolic derivatives which are present in ethanolic root extract [66]. This medicinal plant can be used for the management of Alzheimer patients [67]. The juice extract of the roots *Daucus carota* had antiulcer and gastroprotective potential [65].

The *Daucus carota* seeds extract with methanol was used to investigate hypolipidemic activity in normal rats. These rats were treated with extract at the doses (200mg/kg and 400mg/kg) for seven days. The lovastatin at the dose of 7.2mg/kg used as standard drugs. After the treatment, lipid profiles were assessed in blood serum on eight day. The significant reduction of triglyceride, HDL, VLDL and total cholesterol was observed in treated groups as compared control group [68]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Daucus carota* has been reported.

### 2.8 *Foeniculum vulgare mill*

*Foeniculum vulgare Mill* (Umbelligarae) commonly known as fennel in traditional medicine. The major chemical constituent in the oil of *F. vulgare* are trans-anethole, fenchone, p-cymene, and methyl chavicol [69]. The vitamins and minerals are present in its composition such as vitamin A and C, phosphorous, iron, calcium, potassium, thiamine, niacin and riboflavin. The main constituents of Fennel volatile oil are fenchone (1-20%), anethole (40-70%) and estragole (2-9%). The *F. vulgare* also contains d-apenine, camphene, pectin and methyl chavicol. *Foeniculum vulgare* consists of fat (10%), minerals (13.4%), moisture (6.3%), proteins (9.5%), fiber (18.5%) and (42.3%) carbohydrates [28]. The dried fennel when used as nutrient, it contains carbohydrate, lipids (mono and polyunsaturated), protein, minerals and vitamins [70].

*Foeniculum vulgare* had antiseptic, anti-inflammatory and palliative effects, had ability to treat infertility in female albino mice due to folliculogenesis effects. The alcoholic extract of at doses of 100mg/kg and 200mg/kg were used [71]. It can be used for the management of digestive, endocrine, reproductive and respiratory complaints [69]. The pharmacological uses includes antimicrobial, anti-inflammatory, antipyretic, antitumor, antispasmodic, antidiabetic, hepatoprotective, hypolipidimic and memory enhancing effects [70]. The *Foeniculum vulgare* seeds were used to manage the polycystic ovary syndrome (PCOS). The renoprotective potential of *Foeniculum vulgare* aqueous extract was studied in female rats. The aqueous extract at the dose of 150 mg/kg was intragastrically administered. The estradiolvalerate at the dose of 4mg in 0.2ml of same oils was considered as a standard drug. The aqueous extract of fennel exhibited the positive effect on renal functions [72].

The analgesic activity of ethanolic extract at the dose of 200mgm/kg, 100mgm/kg and 50mgm/kg were determined in rats and mice. The anti-inflammatory activity of ethanolic *Foeniculum vulgare* extract was investigated. The conclusions of this study reflect the significant activities of analgesic and anti-inflammatory such as rheumatism, fever and dental pain of ethanolic extract while their effect on antioxidant enzymes of *F. vulgare* has been given below (Table 6) [73].

**Table 6:** Effects of *F. vulgare* extracts on antioxidant enzymes, malondialdehyde and lipid levels in the plasma of rats [74].

| **Antioxidant Enzymes and Lipid Levels** | **Groups** | |
|---|---|---|
| | **Group Control** | **Group Treated with F. vulgare Extract** |
| Superoxide dismutase (U/mg protein) | 10.8± 0.167 | 19.867± 0.011 |
| Catalase (nmol H2O2 degraded/min/mg protein) | 10.14± 3.43 | 33.41± 4.05* |
| Malondialdehyde (nmol/ml) | 1.2± 0.09 | 0.696± 0.147* |
| Triglyceride (mg/100 ml) | 2.278± 0.054 | 2.267± 0.126 |
| Total cholesterol (mg/100 ml) | 233.766± 25.25 | 221.591± 1.61 |
| LDL cholesterol (mg/100 ml) | 231.7± 25.22 | 219.397± 1.56 |
| HDL cholesterol (mg/100 ml) | 1.611± 0.029 | 1.741± 0.027* |

(*P≤0.05 vs. control.)

The study of aqueous extract of *Foeniculum vulgare* was used to investigate its anti-diabetic effects. This extract is useful in lowering the blood sugar in streptozotocin induce diabetic rats. The methanolic extract of fruit *F. vulgare* decreased the blood glucose and triglyceride. This medicinal plant can be used in the manufacturing of antidiabetic drugs. The *Foeniculum vulgare* had significant protecting effects on gastrointestinal complaints. The infant with colic disorders was treated with fennel oil emulsions. It showed 65% improvement in infant than the control group. It was also investigated *F. vulgare* had a defensive effect on gastric ulcer. These functions of the plant are present due to its antioxidant capacity [75]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *F. vulgare* has been reported.

### 2.9 *Trachyspermum Ammi*

*Trachyspermum ammi (Ptychotis ajowan)* belongs to the family Apiaceae [76]. *Trachyspermum ammi L.* (Apiaceae) commonly known as ajwan. The gas chromatography (GC) and gas chromatography mass spectrometry (GC-MS) investigates the main components of the essential oil which includes p-cymene (26.8%), thymol (43.7%) and γ-terpinene (24.9%) [77]. It is used in the management of gastrointestinal diseases such as diarrhea, dyspepsia and cramp disorders. This medicinal plant had various pharmacological properties such as antifungal, antihypertensive, antitussive and cytotoxic. The medicinal uses are in the treatment of stomach disorders, carminative, antiseptic and antimicrobial [78]. *Trachyspermum ammi* extracts reflect the significant antihyperlipidaemia effect in albino rabbits [79].

Some researchers essential oil of *Trachyspermum ammi* seed used to investigate the antimicrobial activity [80]. Antimicrobial activity was observed with four types of bacteria such as *Salmonella typhi, Escherichia coli, Lactobacillus* and *Bacillus lichenifomis* by agar disc diffusion method. The essential oil indicates superior antimicrobial activity in contrast to different solvent extracts. Antioxidants activity of methanolic and aqueous seed extracts of *Foeniculum Vulgare* and *Trachyspermum ammi* were reported due to presence of high contents level of total phenolic in extracts [11]. The ethanolic and aqueous extracts of seeds of *Trachyspermum ammi* were used to investigate the anthelmintic activities. The effects of extracts were observed in earthworm *P. posthuma* (Annelida) at the dose of 10mg/ml, 20mg/ml and 40mg/ml. The albendazole considered as reference drug. The death of worms and time of paralysis parameters were used to determine anthelmintic effect. The dose dependent anthelmintic activities of seeds of *Trachyspermum ammi* L were observed during this study [81].

*Trachyspermum ammi* seeds has nephroprotective effects. The nephroprotective activity of plant seed aqueous extracts due to the presence of antioxidative polyphenolic compounds. It was concluded that polyphenolic constituent, to inhibit the nephrotoxicity due to oxidative stress and to restore the kidney markers [82]. The traditional used of seed ajwain is to treat of urinary stone. The seed of ajwain were decocted in milk, and then orally administered to the patient suffering from urinary stone. The treatment should be continued for nine days [83]. The anti-cholinergic activity was observed due to presence of thymol as main constituent of *Trachyspermum ammi* [76]. The traditional used of *Trachyspermum ammi* as stimulant in digestive system. It was recommended to increase gastric acid, bile acids and digestive enzymes secretion level. The effects on the enzymatic system of pancreatic lipase and amylase improve the digestive stimulant activity [83]. Phytochemical qualitative (Table 1 A, B), quantitative (Table 2 A, B) and antioxidant screening (Table 3) of *Trachyspermum ammi* has been reported.

## 3. CONCLUSION

Herbal plants are used as natural remedies throughout the world for the treatment of different diseases because of presence of phytochemical constituents and bioactive compounds likewise phenols, saponin, flavonoids, alkaloids etc. Now a day, scientist's attention is gradually more turning to ethno botanical practices because of less cost, more effectiveness, reliable and no serious side effects of herbal plants for development of new drugs in opposition to very old and advanced diseases

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