

# Phyto-Pharmacological Appraisal of Herbal Crude Drugs

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**Abstract**\_ Plants are the very precious part of our earth. Earth is called a green planet because of the presence of plants. Many plants are used to cure many of the diseases. The medicines made by plants are also safer and don't cause any side effects. However certain plants contain toxic compounds which cause serious side effects to man and animals. Hence a proper evaluation about the plants is necessary to identify the appropriate medicinal diseases for every disease. Consequently in our paper, we present a proper description of certain herbal plants such as Acacia Nilotica, Cinchona, Cinnamon, Ginger, Mustard and Turmeric. Moreover we exhibit detailed information about the features and use of each part of the plant along with the image, which provides a unique significance to our paper.

**Keywords**\_ Acacia Nilotica, Cinchona, Cinnamon, Ginger, Mustard and Turmeric.

## 1. INTRODUCTION

In spite of great advances of modern scientific medicine, traditional medicine is still the primary form of treating diseases of majority of people in developing countries including India; even among those to whom western medicine is available, the number of people using one form or another of complementary of alternative medicine is rapidly increasing worldwide. Increasing knowledge of metabolic process and the effect of plants on human physiology has enlarged the range of application of medicinal plants.

The nature has provided an absolute resource of remedies to cure the several ailments of mankind and is best friend of pharmacy. The herbal drugs are most effective in action without any side effects. The drugs obtained from plant source constitute a major part of therapeutics in the traditional systems of medicine. The shortcomings of the drugs available today, propel the discovery of new pharmaco-therapeutic agents in medicinal plants [1, 2]. The potentialities of herbal medicines are most essential to intensify the pharmacological study of herbal crude drugs that find place in folklore and also to promote the use of herbal medicine.

Phyto-pharmacology is the study and practice of eradicating plant pathology. Plants are utilized extensively as raw drugs for many formulations in traditional systems of medicine. To check the genuineness of the raw drugs and to detect adulteration of these materials, an authentic pharmacognostic study is needed for each raw drug. Usually, the drugs are collected by traditional practitioners who have inherited Ayurvedic or other herbal practices. Their identification is mostly based on the morphological features or other traditionally known characteristics. In such cases, there is a chance of selecting incorrect raw drugs/adulterants. Our country has a long tradition of using herbal products for healthcare. There is an increasing awareness of the significance of ethnic and traditional knowledge in the

development of therapeutics. In the current scenario of globalization, information technology and knowledge system on traditional medicine have significant importance [3, 4, 5, 6].

Mankind has been continuously using the medicinal plants in one or the other way in the treatment of various ailments. In India, the sacred Vedas dating back between 3500 B.C and 800 B.C give many references of ethno-medicinal plants. One of the outermost works in traditional herbal medicine is "Vrikshayurveda", compiled even before the beginning of Christian era and formed the basis of medicinal studies in ancient India. The Rig Veda, dating between 3500 B.C. to 1800 B.C. seems to be the earliest record available on medicinal plants. Herbs seem to be very important component of medicine in other cultures too; Greek, African and Chinese medicines to mention a few. Nearly 80% of the world population depends upon traditional system of health care. Allopathic drugs have brought a revolution throughout the world, but the plant base medicines have its own status. The recent surveys had revealed that, 50% of the top prescription drugs in the USA are based on natural products and the raw materials are locked up in the tropical world-interiors of Africa, Asia and Latin America.

According to the report, it is apparent that the significance of plant based medicines has been increasing all over the world. Nearly 50% of medicines in the market are made of natural basic materials. Interestingly, the market demands for medicinal herbs are likely to remain high because many of the active ingredients in medicinal plants cannot yet be prepared synthetically [7]. The universal role of plants in the treatment of disease is exemplified by their employment in all major systems of medicine irrespective of the underlying philosophical premise. As example, we have western medicine with origins in Mesopotamia and Egypt, the Unani (Islamic) and Ayurvedic (Hindu) systems centred in western Asia and the Indian subcontinent and those of the Orient (China, Japan, Tibet, etc.). How and when such medicinal plants were first used is, in many cases, lost in pre-history, indeed animals, other than man; appear to have their own *materia medica*.

Following the oral transmission of medical information came with the use of writing (example the Egyptian Papyrus Ebers c. 1600 BC), baked clay tablets (some 660 conie form tablets c. 650 BC form Ashurbanipal's library at Nineveh, now in the British Museum, refer to drugs well known today), parchment and manuscript herbals, printed herbals (invention of printing 1440 AD), pharmacopoeias and other works of reference (first London pharmacopoeia, 1618, first British pharmacopoeia 1864), and most recently electronic storage of data. Similar records exists for Chinese medicinal plants (text from the 4th century BC), ayurvedic medicine (Ayurveda 2500-600 BC), and Unani medicine

(Kitab-Al-Shifa, the magnum opus of Avicenna, 980- 1037 AD) [8].

The World health Organization (WHO) estimates that about 80% of the population living in the developing countries relies almost exclusively on traditional medicine for their primary healthcare needs. In almost all the traditional medical systems, the medicinal plants play a major role and constitute their backbone. Indian materiamedica includes about 2000 drugs of natural origin almost all of which are derived from different traditional systems and folklore practices. Out of these drugs derived from traditional system, 400 are of mineral and animal origin while the rest are of the vegetable origin. India has a rich heritage of traditional medicine and the traditional health care system has been flourishing in many countries [9].

Most recently, there has been interest in other products from traditional system of medicine. Traditional medicine is an important part of healthcare. Population in developing countries depends mainly on the indigenous traditional medicine for their primary healthcare needs. Traditional medicines have not however been incorporated in most national health systems and the potential of services provided by the traditional practitioners is far from being fully utilized. Herbal medicines are of great importance to the health of individuals and communities, but their quality assurance need to be developed. During the last decade, the use of herbal medicine has been increased. Consequently, an increase in traditional tread in herbal medicines and other type of traditional medicines has occurred. Proper use of these different types of medicines has therefore become a concern [10].

In recent years, the use of herbal medicines worldwide has provided an excellent opportunity to India to look for therapeutic lead compounds from an ancient system of therapy, i.e. Ayurveda, which can be utilized for development of new drug. Over 50% of all modern drugs are of natural product origin and they play an important role in drug development programs of the pharmaceutical industry. [11] Dietary measures and traditional plant therapies as prescribed by ayurvedic and other indigenous systems of medicine are used commonly in India [12].

Worldwide revolution for the improvement of patient safety is gaining momentum; hence drug safety for the subject becomes even more prominent in the present day scenario. Cultivation of medicinal plants with laboratory generated species is being attempted on the basis of chemical composition and is likely to be used in increased manner for commercial purposes. These changes may have profound impact on the safety and efficacy of the Ayurveda drugs in the market. Hence, a mechanism is required to be put in place to address them [13].

CharakaSamhita, an Ayurvedic classic describes all the adverse reactions to medicines when they are prepared or used inappropriately. Charaka also describes elegantly, several hostrelated factors as to be considered while selecting medicines in order to minimize adverse reactions like the constitution of the patient (Prakriti), age (Vayam), disease (Vikruti), tolerance (previous exposure) (Satmya), psychological state (Satwa), digestive capacity (Aharashakti) etc. [14]. A possible adverse drug reaction due to Vatsanabha (Aconite) resulting through an overdosing of Ayurvedic drugs

was reported[15]. Adverse drug reaction is rarely reported from Ayurvedic drugs and hence this is difficult to find these reports through electronic retrieval system. The basic reason is unawareness of Ayurvedic physicians about collective use to this information resulting in their poor documentation and reporting.

The local people and researchers face the challenging task of not only documenting knowledge on plants, but also applying the results of their studies to biodiversity conservation and community development. The current evaluation is undertaken to carry-out qualitative and quantitative phyto-pharmacological analysis of certain herbal crude drugs. This work mainly concentrates on the studies pertaining to evaluation of herbal crude drugs.

The rest of the paper is organized as follows: Section 2 provides some of the related researches, Section 3 offers 3.

Phyto-Pharmacological Description of certain Herbal Crude Drugs, Section 4 affords the overall evaluation of these drugs and finally Section 5 delivers the conclusion of this paper.

## II. RELATED RESEARCHES

Some of the recent Phyto-Pharmacological researches of certain herbal plants are discussed briefly beneath for the sake of understanding our evaluation:

Pulipati et al.[16] stated that medicinal plants are important in the traditional medicine and as well as in modern pharmaceutical drugs. Pongamiapinnata exhibits many pharmacological attributes. In traditional system of medicine various plant parts like leaves, stems, seeds and even whole parts are used for treatment. Traditionally the leaves, seeds and entire plant are used in the treatment of many diseases. Its uses includes Anti-ulcer, Antidiarrhoeal, Anti-plasmodial, Anti-inflammatory, Anti-viral, Anti-bacterial, Anti-lice. This review encompasses the available literature on Pongamiapinnata with respect to its pharmacognostic characters, physicochemical parameters, synopsis of pharmacological activities and traditional uses.

Ghosh et al.[17] prescribed that ethnomedicinal practices used in better health treatment system from ancient time. Phytomedicines are now an essential area of better treatment and high prospects in many nations. It is less expensive as well as has better cultural and societal recognition, has better feasibility with the human physiological system and has decidedly fewer side effects. Extensive literature studies suggested that the various parts of the plant, *Heliotropiumindicum* Linn. (Family- Boraginaceae) an annual herbaceous medicinal weed and it is commonly known as Indian heliotrope were reported to possess anti-microbial, anti-tumor, anti-tuberculosis, antiplasmodial, anti-cataract, anti-fertility, wound healing, anti-inflammatory, antinociceptive, analgesic and histo-gastro protective properties. This review deals with the natural habitat, pharma-phytochemical screening, botanical, taxonomical and other critical biological aspects of *Heliotropiumindicum*. The main phytochemicals found in this plant are tannins and alkaloids. This review might be helpful for identification and preparation of a clear monograph of *Heliotropiumindicum*.

Shah et al.[18] suggested Jewel weed is a common name of *Impatiens balsamina* Linn. (Family, Balsaminaceae). It is often grown as garden plant due to its attractive foliage and flowers. It is traditionally used as diuretic, emetic, laxative, demulcent and tonic. It was reported to possess beneficial effects in lumbago, intercostal neuralgia and in burns. Studies had revealed presence of various phytoconstituents like flavanoids, triterpenoids, glycosides, fatty acids and alkaloids. That review was an attempt to summarize traditional values, pharmacognostical and phytopharmacological reports of Jewel weed.

Srivastava [19] recommended *Amaranthus tricolor* (Family- Amaranthaceae) purple red colour leafy vegetable consumed as nutraceutical herb as a promising food crop mainly due to its resistance to heat, drought, diseases and pests, and the high nutritional value of both seeds and leaves. Leaves are rich in proteins and micronutrients such as iron, calcium, zinc, vitamin C and vitamin A. This plant reported in ayurveda as astringent in menorrhagia, leucorrhoea, dysentery, diarrhoea, haemorrhagic colitis; also used in cough, bronchitis and externally used as emollient. It has been used for the treatment of piles, blood disorders, bladder distress, tooth ache, dysentery and as astringent, diuretic, haemorrhage and hepatoprotective action. The aim of that study was to provide updated information of *Amaranthus tricolor* through extensive literature survey of past 20 years regarding its pharmacognostical and phytopharmacological profile.

Prakash et al.[20] reviewed that in contemporary era medicinal plants have tremendous contribution in the healthcare system as a source of medicine to the rural population because plants are having nutritional as well as medicinal values. Literature of medicinal plants in ayurvedic classics is in scrupulous detail but it is randomly distributed. Even in Nighantu classics we found limited descriptions. To get thorough knowledge about any medicinal herb it is essential to go through all classical Ayurveda texts. *Randia dumetorum* Lam. is onymous as a usual drug of choice for Ayurvedic physicians since past due to its therapeutic properties like emetic, antipyretic, anti-inflammatory, antiallergic, antihelminthic, immunomodulatory, analgesic, wound healing etc. It is also useful in the treatment of diseases like kushtha (skin diseases), jwara (fever), shotha (inflammation), vidradhi (abscess), Pratishyaya (common cold). It occurs throughout the India upto 4000 ft. Altitude. It is found in foothills of Himalaya from Jammu to Sikkim, it is seen in Gujarat, Tamilnadu, Bengal and South Maharashtra. Its extract mainly contains glycosides, triterpenoid glycoside, Saponins named as dumentoronin A, B, C, D, E and F etc. Reflecting its therapeutic importance, a review has been done under various aspects of *Randia dumetorum* lam. Apart from classical ayurvedic textual references; present article enlightens recent research studies carried on this plant for its clinical and pharmacological evaluation.

### III.PHYTO-PHARMACOLOGICAL DESCRIPTION OF CERTAIN HERBAL CRUDE DRUGS

Crude drugs are vegetable or animal drugs that contain natural substances that have undergone only the processes of

collection and drying. The term natural substances refers to those substances found in nature that have not had man-made changes made in their molecular structure. They are used as medicine for human being and animal, internally and externally for curing disease, e.g., Senna and Cinchona. A crude drug is any naturally occurring, unrefined substance derived from organic or inorganic sources such as plant, animal, bacteria, organs or whole organisms intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in humans or other animals [21].

Identification of the crude drug by organoleptic characters is one of the important aspects of pharmacognostical study. The morphological terminology is derived from botany and zoology, depending upon the source of the crude drug. In general, color, odor, taste, size, shape, and special features, like touch, texture, fracture, presence of trichomes, and presence of ridges of crude drugs are studied under morphology. Aromatic odor of umbelliferous fruits and sweet taste of liquorice are the example of this type of evaluation. The study of form of a crude drug is morphology, while description of the form is morphography [22].

To evaluate means to identify it and to determine its quality and purity, the identity of a drug can be established by actual collection of the drug from a plant or animal that has been positively identified [23]. In this section, we evaluate some herbal crude drugs below:

#### A. *Acacia nilotica*

*Acacia nilotica* is also known as Gum Arabic tree, Babul, Egyptian thorn, or Prickly Acacia is multipurpose nitrogen fixing tree legume. It is from the subfamily Mimosoideae of the pea family Fabaceae. Its scientific name is *Vachellia*. It occurs from sea level to over 2000 m and withstand at extreme temperature (>50°C) and air dryness. It is widely spread in subtropical and tropical Africa from Egypt to Mauritania southwards to South Africa, and in Asia eastwards to Pakistan and India.

##### ❖ Plant Description

*Acacia nilotica* is a single stemmed plant with a well-developed deep root system.



Figure 1: Acacia Tree

##### ❖ Height

- ♣ The average height of the plant has been 15-18m in height and 2-3 m in diameter.

##### ❖ Pods

- ♣ Pods are 7-15 cm long, green and tomentose (when immature) or greenish

black (when mature), indehiscent, deeply constricted between the seed giving a necklace appearance.

- ♣ Anti-hypertensive and antispasmodic, anti-diarrhoeal, astringent, anti-fertility and against HIV-1 PR, Inhibited HIV-1 induced cytopathogenicity, antiplatelet aggregatory activity and anti-oxidant [24].
- ❖ **Seeds**
  - ♣ Seeds are 8-12 per pod, compressed, ovoid, dark brown shining with hard testa.
  - ♣ Spasmogenic activity and antiplasmodial activity [25].
- ❖ **Leaves**
  - ♣ The leaves are bipinnate, pinnate 3-10 pairs, 1.3- 3.8 cm long, leaflets 10-20 pairs, and 2-5mm long.
  - ♣ Chemopreventive, antimutagenic, antibacterial, anticancer, astringent, antimicrobial activity Tender leaves are used to treat diarrhea, Aphrodisiac, dressing of ulcers, anti-inflammatory and Alzheimer's diseases [26].
- ❖ **Flowers**
  - ♣ Flowers are globular heads, 1.2-1.5 cm diameter of a bright golden yellow color, develop either in axillary or whorl pattern on peduncles 2-3 cm long located at the end of branches.



Figure 2: Flowers of Acacia nilotica

- ❖ **Stem and Bark**
  - ♣ Stems are usually dark to black colored, deep longitudinal fissured, grey-pinkish slash, exuding are dish low quality gum.
  - ♣ The bark a tinge of orange and/or green (young tree), but older trees have dark, rough bark and tend to lose their thorns.
  - ♣ Anti-bacterial, antioxidant, anti-mutagenic, cytotoxic bark is used as astringent, acrid cooling, styptic, emollient, anthelmintic, aphrodisiac, diuretic, expectorant, emetic, nutritive, in hemorrhage, wound ulcers, leprosy, leucoderma, small pox, skin diseases, biliousness, burning sensation, toothache, leucoderma, dysentery and seminal weakness. The trunk bark is used for cold, bronchitis, diarrhoea, dysentery, biliousness, bleeding piles and leucoderma [27].



Figure 3: Bark of Acacia nilotica

- ❖ **Root**
  - ♣ Root is generally of brown color in older and whitish in younger regions.
  - ♣ The roots are used against cancers and/or tumors (of ear, eye, or testicles), tuberculosis and indurations of liver and spleen [28].
- ❖ **Gum**
  - ♣ The gum varies in color from very pale yellowish brown to dark reddish brown depending on the quantity of tannins in the sample. The lighter, more highly valued gums are soluble in water and very viscous; the tannins in the darker gum reduce the solubility. The gum has a moisture content of about 13% and is slightly dextrorotary.
  - ♣ Astringent, emollient, liver tonic, antipyretic and antiasthmatic [29].

#### B. Cinchona

Cinchonas also known as Cinchona calisaya and Cinchona succirubra. Cinchonoids from the family Rubiaceae containing at least 23 species of trees and shrubs. Its scientific name is Cinchona officinalis. They are native to the tropical Andean forests of western South America. A few species are reportedly naturalized in Central America, Jamaica, French Polynesia, Sulawesi, Saint Helena in the South Atlantic, and São Tomé and Príncipe off the coast of tropical Africa.

#### ❖ Plant description

Cinchona are large shrubs or small trees with evergreen foliage.



Figure 4: Cinchona

- ❖ **Height**
  - ♣ These trees growing up to a height of 5–15 m (16–49 ft).
- ❖ **Leaves**
  - ♣ The leaves are opposite, rounded to lanceolate and 10–40 cm long.

- ♣ Leaves broadly elliptic-ovate or sometimes sub-orbicular, 24-50 cm long, 17-40 cm wide, upper surface puberulent, sometimes primarily along veins, or glabrate, lateral veins usually 9-11 pairs, margins entire, apex rounded, base broadly to narrowly cuneate, petioles 1.5-4.5 cm long, stipules ovate, caducous.

#### ❖ Flowers

- ♣ The flowers are white, pink or red, produced in terminal panicles.. A key character of the genus is that the flowers have marginally hairy corolla lobes.
- ♣ Flowers numerous in panicles up to 20 cm long or slightly longer; calyx about 1 mm long, densely appressed pubescent, the teeth deltate; corolla pink or red, appressed pubescent, the tube 10-12 mm long, the lobes ca. 4-5 mm long, villous within [30].



Figure 5: Flowers of Cinchona

#### ❖ Seeds

- ♣ The fruit is a small capsule containing numerous seeds.
- ♣ Fruit a lanceoloid to oblong capsules containing 40-50 seeds, 1-4 cm long, dehiscent from base to apex.
- ♣ Seeds 4-5 mm long by 1 mm, with a broad ciliate wing.

#### ❖ Stem and Bark

- ♣ The bark is spongy with a slight odour and strongly bitter.
- ♣ Over half the harvested bark is utilized in the manufacture of the quinine prescription drug.
- ♣ In Brazilian herbal medicine quinine bark is considered tonic, stomachic, and febrifuge. It is used for anemia, indigestion, gastrointestinal disorders, general fatigue, fevers, malaria and as an appetite stimulant [31].



Figure 6: Harvested Cinchona bark

- ♣ Other folk remedies in South America cite quinine bark as a natural remedy for cancer (breast, glands, liver, mesentery, spleen), amoebiasis, carditis, colds, diarrhea, dysentery, dyspepsia, fevers, flu, hangover, lumbago, malaria, neuralgia, pneumonia, sciatica, typhoid, and varicose veins.
- ♣ In European herbal medicine the bark is considered antiprotozoal, antispasmodic, antimalarial, a bitter tonic, and febrifuge. There it is used as an appetite stimulant, for hair loss, alcoholism, liver, spleen, and gallbladder disorders; and to treat arrhythmia, anemia, leg cramps and fevers of all kinds.
- ♣ Although all cinchona species are good sources of quinine, *C. succirubra* and *C. ledgeriana* are the species containing the highest amount of quinine alkaloids.

#### *C. Cinnamon*

Cinnamon, also called Ceylon cinnamon, bushy evergreen tree of the laurel family (Lauraceae) and the spice derived from its bark. It's scientific name is *Cinnamomum verum*. Cinnamon is native to Sri Lanka (formerly Ceylon), the neighbouring Malabar Coast of India, and Myanmar (Burma) and is also cultivated in South America and the West Indies.

#### ❖ Plant description

Cinnamon tree is an evergreen bushy tree.



Figure 7: Cinnamon tree

#### ❖ Height

- ♣ The cinnamon tree grows in moist well-drained soils and rarely reaches more than 15 metres (49 feet) in height.
- ❖ **Leaves**
  - ♣ The thick simple leaves have smooth margins and are usually oval; the veins are roughly parallel to each other.
  - ♣ Young leaves are red and mature to a deep green.
- ❖ **Flowers**
  - ♣ The tree produces small yellow or green flowers on panicles.
  - ♣ The small bisexual flowers are greenish to yellow and are borne in clusters.
- ❖ **Fruits**
  - ♣ The fruit is a dark drupe.
- ❖ **Stem and Bark**
  - ♣ The stems must be processed immediately after harvesting while the inner bark is still wet. The processed bark dries completely in four to six hours, provided it is in a well-ventilated and relatively warm environment. Once dry, the bark is cut into 5 to 10 cm (2 to 4 in) lengths for sale.
  - ♣ People use cinnamon as a supplement to treat problems with the digestive system, diabetes, loss of appetite, and other conditions.
  - ♣ It has also been used in traditional medicine for bronchitis.
  - ♣ Doctors used cinnamon to treat conditions such as coughing, arthritis, and sore throats.
  - ♣ Cinnamon is known to possess antioxidant, anti-inflammatory, antimicrobial, anti-diabetic, and anticancer properties [32].
  - ♣ It can also help to fend off heart disease, high cholesterol and neurological health disorders, like Alzheimer's and Parkinson's disease.



Figure 7: Cinnamon sticks, powder, and dried flowers of the *Cinnamomum* plant

#### D. Ginger

Ginger is a flowering plant whose rhizome, ginger root or ginger, is widely used. Ginger is in the family Zingiberaceae, to which also belong turmeric (*Curcuma longa*), cardamom (*Elettaria cardamomum*), and galangal. Its scientific name is *Zingiber officinale*. Ginger originated in Island Southeast Asia and was likely domesticated first by the Austronesian peoples.

- ❖ Plant description

It is a herbaceous perennial which grows annual pseudostems (false stems made of the rolled bases of leaves).

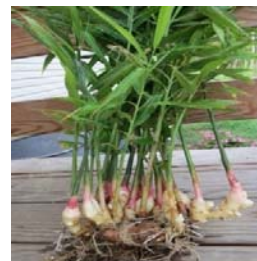


Figure 8: Ginger plants

- ❖ **Height**
  - ♣ It is a perennial reed-like plant with annual leafy stems, about a meter (3 to 4 feet) tall.
- ❖ **Leaves**
  - ♣ They have about a meter tall bearing narrow leaf blades.
- ❖ **Flowers**
  - ♣ Ginger produces clusters of white and pink flower buds that bloom into yellow flowers.
- ❖ **Root**
  - ♣ The roots of the Ginger has a role in traditional Ayurvedic medicine.
  - ♣ Evidence that ginger helps alleviate nausea and vomiting resulting from chemotherapy or pregnancy.
  - ♣ Ginger could help prevent colon cancer and constipation.
  - ♣ This makes a soothing natural remedy for a cold or flu.
  - ♣ Ginger has been used for centuries to reduce inflammation and treat inflammatory conditions [34].
  - ♣ Other possible uses include reducing cholesterol, lowering the risk of blood clotting, and helping to maintain healthy blood sugar levels [35].



Figure 9: Root of ginger plant

#### E. Mustard

Mustard plant is a plant species in the genera *Brassica* and *Sinapis* in the family Brassicaceae. Its scientific name is *Brassica*. A large number of varieties exist, e.g. in Germany, Netherlands, mainly differing in lateness of flowering and resistance against white beet-cyst nematode (*Heterodera schachtii*).

- ❖ **Plant description**

Mustard plants are thin herbaceous herbs with yellow flowers.



Figure 10: Mustard plants

❖ **Height**

- ♣ It grows to a height of 2-3 feet (60-90 cm).

❖ **Leaves**

- ♣ The leaves of the plant are toothed, lobed, and occasionally have the larger terminal lobes.

❖ **Flowers**

- ♣ Mustard plants become 30 to 40 days old, they bear numerous beautiful yellow flowers.
- ♣ The flowers bloom gradually from below upwards.

❖ **Seeds**

- ♣ Mustard seeds are the small round seeds of various mustard plants.
- ♣ The seeds are usually about 1 to 2 millimetres (0.039 to 0.079 in) in diameter and may be colored from yellowish white to black.
- ♣ The seed and oil from the seed are used to make medicine.
- ♣ Black mustard oil is used for the common cold, painful joints and muscles (rheumatism), and arthritis.
- ♣ Black mustard seed is used for causing vomiting, relieving water retention (edema) by increasing urine production, and increasing appetite.
- ♣ Some people make a paste by mixing ground black mustard seed with warm water. They pack the paste in cloth and apply the cloth directly to the skin as a “mustard plaster.” This preparation is used for treating pneumonia, pain and swelling (inflammation) of the lining of the lungs (pleurisy), arthritis, lower back pain (lumbago), and aching feet [36].



Figure 11: Mustard seeds

*F. Turmeric*

Turmeric is a flowering plant of the ginger family, Zingiberaceae. Its scientific name is *Curcuma longa*. The plant is rhizomatous, herbaceous, and perennial, and is native to the Indian subcontinent and Southeast Asia, and requires temperatures between 20 and 30 °C (68 and 86 °F) and a considerable amount of annual rainfall to thrive.

❖ **Plant description**

Turmeric is a perennial herbaceous plant.



Figure 12: Turmeric plants

❖ **Height**

- ♣ It grows upto a height of 1 m (3 ft 3 in) tall.

❖ **Leaves**

- ♣ The leaves are alternate and arranged in two rows.
- ♣ They are divided into leaf sheath, petiole, and leaf blade.
- ♣ From the leaf sheaths, a false stem is formed.
- ♣ The petiole is 50 to 115 cm (20–45 in) long.
- ♣ The simple leaf blades are usually 76 to 115 cm (30–45 in) long and rarely up to 230 cm (91 in).
- ♣ They have a width of 38 to 45 cm (15 to 18 in) and are oblong to elliptical, narrowing at the tip.

❖ **Flowers**

- ♣ The hermaphrodite flowers are zygomorphic and threefold.

❖ **Root**

- ♣ Highly branched, yellow to orange, cylindrical, aromatic rhizomes are found.
- ♣ Curcumin is the main active ingredient in turmeric. It has powerful anti-inflammatory effects and is a very strong antioxidant.
- ♣ Turmeric is used for arthritis, heartburn (dyspepsia), joint pain, stomach pain, Crohn's disease and ulcerative colitis, bypass surgery, hemorrhage, diarrhea, intestinal gas, stomach bloating, loss of appetite, jaundice, liver problems, *Helicobacter pylori* (*H. pylori*) infection, stomach ulcers, irritable bowel syndrome (IBS), gallbladder disorders, high cholesterol, a skin condition called lichen planus, skin inflammation from radiation treatment, and fatigue.
- ♣ It is also used for headaches, bronchitis, colds, lung infections, hay fever, fibromyalgia, leprosy, fever, menstrual

problems, itchy skin, recovery after surgery, and cancers. Other uses include depression, Alzheimer's disease, swelling in the middle layer of the eye (anterior uveitis), diabetes, water retention, worms, an autoimmune disease called systemic lupus erythematosus (SLE), tuberculosis, urinary bladder inflammation, and kidney problems.

- Some people apply turmeric to the skin for pain, ringworm, sprains and swellings, bruising, leech bites, eye infections, acne, inflammatory skin conditions and skin sores, soreness inside of the mouth, infected wounds, and gum disease.

- Turmeric is also used as an enema for people with inflammatory bowel disease [37].



Figure 13: Root of Turmeric plant

Table 1: Overall evaluation of certain Herbal crude drugs

No.	Name of the plant	Scientific name	Family	Part of the plant	Uses
1.	Acacia nilotica	Vachellia	Fabaceae	Pods	<ul style="list-style-type: none"> <li>Anti-hypertensive and antispasmodic, anti-diarrhoeal, astringent, anti-fertility and against HIV-1 PR, Inhibited HIV-1 induced cythopathogenicity, antiplatelet aggregatory activity and anti-oxidant</li> </ul>
				Seeds	<ul style="list-style-type: none"> <li>Spasmogenic activity and antiplasmodial activity</li> </ul>
				Leaves	<ul style="list-style-type: none"> <li>Chemopreventive, anitmutagenic, anti-bacterial, anticancer, astringent, antimicrobial activity Tender leaves are used to treat diarrhea, Aphrodisiac, dressing of ulcers, anti-inflammatory and Alzheimer's diseases</li> </ul>
				Stem and bark	<ul style="list-style-type: none"> <li>Anti-bacterial, antioxidant, anti-mutagenic, cytotoxic bark is used as astringent, acrid cooling, styptic, emollient, anthelmintic, aphrodisiac, diuretic, expectorant, emetic, nutritive, in hemorrhage, wound ulcers, leprosy, leucoderma, small pox, skin diseases, biliousness, burning sensation, toothache, leucoderma, dysentery and seminal weakness.</li> <li>Used for cold, bronchitis, diarrhoea, dysentery, biliousness, bleeding piles and leucoderma</li> </ul>
				Root	<ul style="list-style-type: none"> <li>The roots are used against cancers and/or tumors (of ear, eye, or testicles), tuberculosis and indurations of liver and spleen</li> </ul>
				Gum	<ul style="list-style-type: none"> <li>Astringent, emollient, liver tonic, antipyretic and antiasthmatic</li> </ul>
2.	Cinchona	Cinchona officinalis	Rubiaceae	Stem and bark	<ul style="list-style-type: none"> <li>Quinine bark is considered tonic, stomachic, and febrifuge. It is used for anemia, indigestion, gastrointestinal disorders, general fatigue, fevers, malaria and as an appetite stimulant.</li> <li>Quinine bark as a natural remedy for cancer (breast, glands, liver, mesentery, spleen), amoebiasis, carditis, colds, diarrhea, dysentery, dyspepsia, fevers, flu,</li> </ul>



					<p>hangover, lumbago, malaria, neuralgia, pneumonia, sciatica, typhoid, and varicose veins.</p> <ul style="list-style-type: none"> <li>The bark is considered antiprotozoal, antispasmodic, antimalarial, a bitter tonic, and febrifuge. There it is used as an appetite stimulant, for hair loss, alcoholism, liver, spleen, and gallbladder disorders; and to treat arrhythmia, anemia, leg cramps and fevers of all kinds.</li> </ul>
3.	Cinnamon	Cinnamomum verum	Lauraceae	Stem and bark	<ul style="list-style-type: none"> <li>Treat problems with the digestive system, diabetes, loss of appetite, and other conditions.</li> <li>Used in traditional medicine for bronchitis.</li> <li>Treat conditions such as coughing, arthritis, and sore throats.</li> <li>Possess antioxidant, anti-inflammatory, antimicrobial, anti-diabetic, and anticancer properties.</li> <li>Fend off heart disease, high cholesterol and neurological health disorders, like Alzheimer's and Parkinson's disease.</li> </ul>
4.	Ginger	Zingiber officinale	Zingiberaceae	Root	<ul style="list-style-type: none"> <li>Helps alleviate nausea and vomiting resulting from chemotherapy or pregnancy.</li> <li>Prevent colon cancer and constipation.</li> <li>Soothing natural remedy for a cold or flu.</li> <li>Reduce inflammation and treat inflammatory conditions .</li> <li>Reducing cholesterol, lowering the risk of blood clotting, and helping to maintain healthy blood sugar levels</li> </ul>
5.	Mustard	Brassica	Brassicaceae	Seeds	<ul style="list-style-type: none"> <li>The seed and oil from the seed are used to make medicine.</li> <li>Black mustard oil is used for the common cold, painful joints and muscles (rheumatism), and arthritis.</li> <li>Black mustard seed is used for causing vomiting, relieving water retention (edema) by increasing urine production, and increasing appetite.</li> <li>Paste of ground mustard and water is used for treating pneumonia, pain and swelling (inflammation) of the lining of the lungs (pleurisy), arthritis, lower back pain (lumbago), and aching feet</li> </ul>
6.	Turmeric	Curcuma longa.	Zingiberaceae	Root	<ul style="list-style-type: none"> <li>Powerful anti-inflammatory effects and is a very strong antioxidant.</li> <li>Used for arthritis, heartburn (dyspepsia), joint pain, stomach pain, Crohn's disease and ulcerative colitis, bypass surgery, hemorrhage, diarrhea, intestinal gas, stomach bloating, loss of appetite, jaundice, liver problems, Helicobacter pylori (H. pylori) infection, stomach ulcers, irritable bowel syndrome</li> </ul>

					<p>(IBS), gallbladder disorders, high cholesterol, a skin condition called lichen planus, skin inflammation from radiation treatment, and fatigue.</p> <ul style="list-style-type: none"> <li>• Used for headaches, bronchitis, colds, lung infections, hay fever, fibromyalgia, leprosy, fever, menstrual problems, itchy skin, recovery after surgery, and cancers. Other uses include depression, Alzheimer's disease, swelling in the middle layer of the eye (anterior uveitis), diabetes, water retention, worms, an autoimmune disease called systemic lupus erythematosus (SLE), tuberculosis, urinary bladder inflammation, and kidney problems.</li> <li>• Apply turmeric to the skin for pain, ringworm, sprains and swellings, bruising, leech bites, eye infections, acne, inflammatory skin conditions and skin sores, soreness inside of the mouth, infected wounds, and gum disease.</li> <li>• Used as an enema for people with inflammatory bowel disease</li> </ul>
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The above evaluation is provided in order to display various uses of these plants and its parts in treating and preventing a wide variety of diseases since various researches doesn't show the details. In our paper we provide the plant description along with the images; hence it will be useful to all for finding the appropriate plants without any confusion. Also the above table gives information briefly about the part of the plant, which is used to cure the diseases and also the diseases cured or avoided are also exhibited.

#### IV. CONCLUSION

The above evaluation provides information about the plants such as Acacia Nilotica, Cinchona, Cinnamon, Ginger, Mustard and Turmeric and its description and also affords the use of the plants. More researches are needed to isolate the constituents responsible for the biological actions. It was also observed that no clinical trials have been done so far. So from the current review of literature and ayurvedic text it was concluded that these plants are having high medicinal value. The traditional and ethnomedicinal literatures showed that these plants are very effective and safe for medicinal uses. Our evaluation will be very helpful for further researches of formulating new drugs using these herbal crude drugs.

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