International Journal For Advanced Research In Science & Technology
A peer reviewed international journal www.ijarst.in
ISSN: 2457-0362

A STUDY OF DISTRIBUTIONAL ANALYSIS OF INDIAN TRADITIONAL MEDICINAL PLANTS SYSTEM

CANDIDATE NAME = SARFARAZ AHMAD
DESIGNATION- RESEARCH SCHOLAR MONAD UNIVERSITY HAPUR U.P
GUIDE NAME = DR. DHANENDRA KUMAR RAI
DESIGNATION- (ASSISTANT PROFESSOR) MONAD UNIVERSITY HAPUR U.P

ABSTRACT

The medicinal benefits of Aegle marmelos, often known as Bael or Bengal Quince, have long been recognized and used in traditional medicine. The purpose of this research was to examine whether or not A. marmelos leaves may be used as an effective antioxidant and antibacterial therapy. To isolate the bioactive components, the leaves of A. marmelos were extracted in a number of different ways for this study. Folin-Ciocalteu and aluminum chloride colorimetric methods were used to determine the total phenolic and flavonoid content, while standard assays like 2,2-diphenyl-1-picrylhydrazyl (2,2-diphenyl-1-picrylhydrazyl) and ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) were used to evaluate the antioxidant activity. In addition, agar well diffusion and microdilution techniques were used to assess the antibacterial activity of A. marmelos leaf extracts against a panel of harmful bacterial strains. The findings showed that the antioxidant activity of A. marmelos leaf extracts was high, as measured by their ability to quench free radicals. Total phenolic and flavonoid content in the extracts was rather high, indicating strong antioxidant activity. Antibacterial activity was also found in the leaf extracts, with certain strains of Gram-positive and Gram-negative bacteria being more susceptible than others.

KEYWORDS: Medicinal Plants System, traditional medicine, antibacterial activity, antioxidant activity

INTRODUCTION

The pharmaceutical industry has developed the most fundamental human application for the variety of plant species. Herbal remedies may be obtained for free by collecting them from the wild. Since the dawn of civilization, many plant species have supplied not just food, clothing, and shelter, but also all of humanity's necessary medications and low-cost medical supplies. The national significance of local history is found in medicinal and aromatic plants (Purohit and Vyas, 2004). Ayurvedic literature has over 8,000 herbal treatments for treating a wide variety of disorders because to the high concentrations of medicinal components found in these plants. From the beginning of time, people have used them to help advance civilization and provide for their basic needs. Numerous secondary metabolites with important therapeutic and pharmacological applications have been uncovered via phytochemical studies of several medicinal plants. Of the roughly 400,000 plant species in the world, people use only around 10–15 percent to meet their fundamental needs, including those for housing, food, medicine, and entertainment. Providing access to low-cost, life-saving medications will likely be a major issue and top priority in the years to come. Mass

International Journal For Advanced Research In Science & Technology
A peer reviewed international journal www.ijarst.in
IJARST
ISSN: 2457-0362

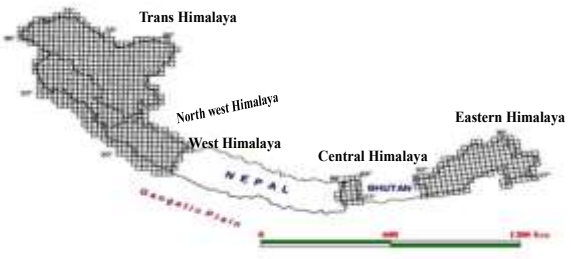
killings continue to be a real possibility in several nations owing to endemic illnesses. People in developing and under-developed countries still mostly rely on their traditional, herbal-based medical systems.

Fig 1: Uses of plants in traditional medicinal system

The introduction of chemical technology has led to a dramatic decline in the acceptance of medicinal plant treatment in developing countries. With the assistance of modern science, crude medications have been replaced with pure chemical molecules. The interest in and use of medicinal plants has also seen a dramatic increase in recent years.

MEDICINES FROM THE INDIAN HIMALAYAN REGION (IHR): A HIDDEN TREASURE

The beautiful Himalayan range, at an average altitude of around 1800 meters, is home to more medicinal plants than any other region on Earth. There are several applications for the about 200 kinds of medicinal plants native to the Himalayas. Certain therapeutic plant species are also utilized by local societies for food, building materials, and fiber. The Himalayan Region of India spans a staggering 2,400 kilometers and has five distinct biogeographic zones that vary in altitude from 300 to 8,000 meters. There is a wide variety in forest coverage from the 9.08% in Jammu and Kashmir to the 67% in Uttaranchal. Northwest of the Himalayas lies the Indian state of Himachal Pradesh (abbreviated as "H.P"). H.P. covers around 55,673 km2, or about 1.69 percent of the nation and 9.42 percent of the Indian Himalayas. With annual rainfall varying from 1800 mm in the highlands to less than 200 mm in the dry lowlands, H.P. provides a diverse selection of ecosystems and agroforestry systems, from semiarid to mountainous regions.



(a) Fig. 2- Map of Indian Himalayan Region (IHR)

International Journal For Advanced Research In Science & Technology
A peer reviewed international journal www.ijarst.in
IJARST
ISSN: 2457-0362

According to Indian Remote Sensing Data, 17.15 percent of the state land of Himachal Pradesh is covered with woods. The state is divided into 12 administrative districts. Temperate conifer, mixed, sub-alpine, subtropical, and broad-leaved forests are the several types that may be found here. Indian literature has been describing and depicting Himalayan medicinal plants since at least 1000 BC. Out of HP's 360 species of medicinal plants, 55% are herbs, 21% are shrubs, 18% are trees, and 6% are others

b) Fig . 3-Map of 12 districts of State of Himachal Pradesh

According to data gathered by Indian satellites, the woods in the Indian state of Himachal Pradesh encompass 17.15 percent of the state's total area. Moderate conifer forests, subalpine forests, subtropical forests, and broad-leaved forests are the four main categories for these woods.

Table 1: List of selected medicinal plants found in Himachal Pradesh and their uses

Trees	**Family**	**Uses**
Azadirachta indica	Meliaceae	Antiseptic, Antiviral, Anthelmintic, Insecticidal
Acacia catechu	Mimosaceae	Hypotensive Anthelmintic, Antiinflammatory,
Bauhinia variegate	Caesalpiniaceae	Anti-bacterial Hypothermic, CNS active,

Cassia fistula L	Caesalpiniaceae	Anti-viral, anti-cancer, hypoglycaemic
Ficus benghalensis L	Moraceae	Hypoglycaemic, Astringent
Moringa oleifera Lam.	Moringaceae	Antibacterial, Abortifacient,Spasmolytic,
Melia azedarach Linn.	Meliaceae	Antidiarrheal, de obstruent, Diuretic
Phyllanthus emblica	Euphorbiaceae	Antiviral, CVS active
Syzygium cumini	Myrtaceae	Anti-diabetic Astringent, Carminative, Diuretic,
Terminalia arjuna	Combretaceae	CNS active, Diuretic, Abortifacient
Taxus brevifolia	Taxaceae	Breast, Ovarian, and Lung cancer
Taxus buccata	Taxaceae	Anticancer

GENETIC DIVERSITY AND SUSTAINABLE UTILIZATION

Biodiversity refers to the wide variety of plant, animal, and microbial life forms found on Earth. Deserts, tropical forests, marine ecosystems, grasslands, permafrost, and polar ice are all represented, along with the many other habitats on Earth. All human societies have relied on this rich ecosystem for their own well-being and survival. Food security, universal healthcare, and manufactured items have all benefited from rich biodiversity, which in turn has contributed to a high level of life in the developing world.

Because it aids in distinguishing plants both within and across species, genetic diversity in medicinal plants has been the subject of substantial study Protecting these species is crucial

for the continuation of plant variety conservation initiatives. The study of genetic diversity among plant species has made extensive use of DNA-based markers due to their ability to provide a straightforward link of genetic material, biochemical, and phenotypic evaluation of plants. This bridges the gap between plant resource use and preservation by aiding in the characterisation of germplasm. Variations in the genetic composition of the linked plant species may be quickly and easily measured using the RAPD method.

THE AEGLE MARMELOS: A TAXONOMIC AND DISTRIBUTIONAL ANALYSIS

The Rutaceae family, which has 160 genus and 1900 species has a long history of usage in herbal medicine. The citrus family also includes the Rutaceae. Aegle marmelos is an Indian subtropical plant. Due to its adaptable character, this plant may grow up to a height of 120000 cm above sea level. Sri Lanka, Vietnam, Cambodia, Myanmar, Tibet, Thailand, Burma, Indonesia, Nepal, Malaysia, arid portions of Fiji, and, to a lesser extent, northern Luzon in the Philippine Islands are just some of the places you could find it. Bael fruit was first planted in Europe in 1959. The states of Himachal Pradesh, Uttaranchal, Madhya Pradesh, Jharkhand, Uttar Pradesh, and Bihar all do a good job of cultivating the bael tree. Successive breeding operations have shown that A. marmelos has the highest quality and nutritional value. The Aegle genus, which includes the marmelos species bael, is one of the three monotypes of the orange subfamily. Until recently, seeds were the primary means of propagation for this species. Bael is self-fruitful and its early fruit set is quite heavy, but its ultimate retention is very poor because of a substantial decline in fruit, which may be attributable to climatic conditions however additional variables have not yet been investigated.

The bulk of the world's fruit supply comes from South East Asian nations including India, Pakistan, Sri Lanka, Thailand, Bangladesh, and Myanmar. Although the bael tree may be found in every Indian state, it is particularly prevalent in the northern regions of the country, including Uttar Pradesh, West Bengal, and Bihar. The nutritional characteristics of the bael fruit are what really set this tree apart as one of the best traditional medicinal trees in India.Even though the bael tree is deciduous and may reach considerable heights, there is no organized arboretum devoted to its fruit. Since this stone apple occurs naturally in many parts of India and there is no coordinated effort to cultivate it, accurate global production statistics are unavailable. The Tarai west and Amangard regions of Uttarakhand's forest division account for the most majority of the state's 650 hectares of bael plantings.

Table. 2: Taxonomical description of *A. marmelos*

Kingdom	Plantae
Phylum	Angiosperms
Class	Mangolopsida
Order	Sapindales

International Journal For Advanced Research In Science & Technology
A peer reviewed international journal
www.ijarst.in
IJARST
ISSN: 2457-0362

Family	*Rutaceae*
Genus	*Aegle*
Species	*marmelos*

Table 3: Language-specific names of *Aegle marmelos*

Language	**Name**
Burman	Opesheet, Ohshit
English	Bael Fruit, Holy Fruit, Elephant Apple, Bengal Quince, Indian Quince, Stone Apple
German	Belbaum, Schleimapfelbaum, Baelbaum
Gujarat	Bili
Hindi	Bael, Shandilya, Shailush, Shriphal, Gandggarbh, Sadaphal, Granthil, Belgiri, Mahakapithya
Indonesian	Batuh, Maja
Javanese	Modjo
Khmer	Bnau
Bahasa	Bilak, Bel, Bila, Maja, Pahit
Portuguese	Marmelos
Thai	Matum, Mapin, Tum
Vietnamese	Mbau nau, Trai

International Journal For Advanced Research In Science & Technology
A peer reviewed international journal
www.ijarst.in
IJARST
ISSN: 2457-0362



(a) Bael Tree **(b) Bael Fruit** **(c) Bael Leaves**

Fig 4 Parts of *A. marmelos* used in medicines (a) Bael Tree (b) Bael Fruit (c) Bael Leaves

Aegle marmelos is a deciduous tree that can thrive in a wide variety of climates, from desert to semiarid to mesophytic, and may reach a height of 6-8 meters. A. marmelos can withstand temperatures as low as -8 degrees Fahrenheit and thrives at altitudes up to 1219 meters above sea level. The branches sometimes display long, straight spines. The stem produces gums, while the wrinkly, corky, and shallow bark is used to poison fish. Seeds are a common method of Bael reproduction. Because of their abrasiveness and stubbornness, the seeds rot quickly when maintained under standard storage settings. Bael may be grown in a wide range of soil types, including those that are sandy, clay, waterlogged, unirrigated, acidic, alkaline, or anywhere in between (pH 5 and 10). Bael trees are subject to pests including Phyllocnistis citrella, Aonidiella aurantii, and Papilio demoleus, and need pesticides to treat nitrogen and zinc deficiencies and foliar spray.

The trifoliate, fragrant leaves of the A. marmelos, a slow-growing evergreen, are one of the plant's most distinguishing traits. The plant's midrib is visible underneath the leaflets. The leaves are alternate and complex, with sometimes as many as two pairs per leaf.Each of the leaves' opposite leaflets is about 12 inches long, and the leaves' terminal petiole is longer than the rest. Fresh leaves, which range in size from 40 to 100 centimeters (100 to 40 inches) long and 20 to 50 millimeters (50 to 20 inches) broad, are eaten all over the world as a seasonal delicacy.

The new growth is glossy, and it often has small leaves that are just a fifth or tenth as long as regular leaves. These leaves are often found around the base of the spurs. When the mature leaves of A. marmelos are crushed, a foul odor is released. The lengths of the petioles and the numbers of green stamens with yellow anthers vary greatly, with the biggest leaves being almost as large as ordinary leaves on quickly increasing long internodes. These crowded leaves of varying diameters often obscure the underlying branches.Aegle marmelos has dimorphic twigs. Short leaf spurs (10-30 mm) and numerous internodes, mostly tiny in size, formed on principal branches of the previous year's development with no spines on the leaf, and (a) normal twigs 30-50 mm in length with the presence of internodes, one or two spines

alongside and small leaf at each node.Some of these trees have petioles with a prominent wing that runs almost the whole petiole's length, while other plants have just two faint green lines that grow into exceedingly thin wings at the tip. Border crenulation and surface smoothness or curvature also vary greatly among various tree seedlings' leaflets. It is also difficult to forecast how the blades, petioles, and supporting twigs of a plant will react to sunshine and become red.

Aegle marmelos has greenish white, bisexual flowers that grow approximately 20 mm in diameter. They are produced in clusters and have a nice fragrance. The outer surface of the little calyx is rounded, and it contains just five short sepals. The petals are elongated and oval in shape, with a bluish-green hue and tiny oil glands. The stamens are numerous and often clustered together. The ovary has an oval outline that narrows toward its big central axis. There are multiple ovules in each of the small, numerous (8-24) cells that are stacked in a ring. Flowers on this plant are more likely to wilt at higher elevations because they are more sensitive to the thinner air. Stone apple extinction is associated with soil zinc deficiency.

Fruit

The diameter of the hard, hefty, rounded, oblong, pyriform fruits may be anywhere from 40 to 180 millimeters. The flesh of certain fruits, although having a grey or yellow exterior, is a wonderful orange or brown. Up to the point when the fruit is completely developed, the peel is less fragile and gray-green. The ripe fruits are the size of a huge orange and mature in about eleven months. They are collected along with the fruit stalk when their color changes to a pale yellow. The number of fruit that a mature tree may yield ranges from 400 to 1000. The pulp, which may be anywhere from yellowish orange to brown, is quite tasty and very thick. The shell is so tough that it can only be broken by striking it with something equally heavy and solid, like a hammer. The fruit may be eaten both fresh and dried. A beverage comparable to sharbat may be made by filtering and sweetening fresh juice.

CONCLUSION

India's reputation as "the botanical garden" stems from the country's massive production of useful plants, which the Indian people utilize for everything from cooking and cleaning to treating illness. Numerous products—from current pharmaceuticals and nutraceuticals to herbal supplements and ancient remedies to the chemical entities used to create new medications—are derived from plants with medical properties. The subtropical Indian Aegle marmelos, a member of the Rutaceae family, is used for medicinal purposes. Eight of Himachal Pradesh's districts (Chamba, Kangra, Una, Hamirpur, Mandi, Bilaspur, Solan, Shimla, and Sirmour) are home to A. marmelos. list its therapeutic qualities, which include anti-venom, antibacterial, antioxidant, hepatoprotective, analgesic, and anti-ulcer effects. In this work, we used RAPD markers to examine the phytochemical, antibacterial, and antioxidant diversity of A. marmelos across eight locations in Himachal Pradesh. Genotype x phytochemical correlation was also studied. Leaves of the A. marmelos tree were gathered

from eight different regions in Himachal Pradesh, and their genetic diversity was analyzed. (H.P).

REFERENCES

1. Adebajo AC and Reisch J. Minor furocoumarins of *Murraya koenigii*. Fitoterapia. 2000; 71(3): 334-337.

2. Adetuyi AO and Popoola AV. Extraction and dyes ability potential studies of the colourant in *Zanthoxylum zanthoxyloides* plant on cotton fabric. Journal of Science Engineering Technology.2001; 8(2): 3291-3299.

3. Adhikari BS, Rikhari HC, Rawat Y S and Singh SP. High altitude forest: composition, diversity and profile structure in a part of Kumaun Himalaya. Tropical Ecology.1991; 32(1):86-97.

4. Afolayan AJ.Extracts from the shoots of *Arctotis arctotoides* inhibits the growth of bacteria and fungi. Pharmaceutical Biology. 2003; 41(1): 22-25.

5. Aiyer AKYN. The antiquity of some field and forest flora of India. Bangalore Printing and Publishing Co. Ltd. Bangalore. 1956.

6. Akinsinde KA and Oulkoya DK. Vibriocidal activity of some local herbs. Journal of Diarrhoea Disease Research. 1995; 13:127-129.

7. Akkaya MS, Bhagwat AA, Cregan PB. Length polymorphisms of simple sequence repeat DNA in soybean. Genetics. 1992; 132:1131-39.

8. Anandharajan R, Jaiganesh S, Shankernarayanan NP, Viswakarma RA, Balakrishnan A. *In vitro* glucose uptake activity of *Aegle marmelos* and *Synzygiumcumini* by activation of Glut-4, PI3 kinase and PPAR*γ* in L6 myotubes. Phytomedicine.2006; 13:434–44.

9. Anderson JA, Churchill GA, Autrique JE, Tanksley SD, Sorrells ME. Optimizing parental selection for genetic linkage maps. Genome. 1993; 36:181-86.

10. Andow D. Vegetational diversity and arthropod population response. Annual Review of Entomology. 1991; 36: 561-586.

11. Ariharan VN and Nagendra P. Anti-bacterial activity of three morphological traits of *Aegle Marmelos (Linn.) Corr*.-'Vilvam'(Bael). Asian Journal of Pharmaceutical and Clinical Research.2014; 8(2):338-42.

12. Arul V, Kumaraguru S, Dhananjayan R. Effects of aegeline and lupeol-the two cardioactive principles isolated from the leaves of *Aegle marmelos* Corr. Journal of Pharmacy and Pharmacology.1999;51.

13. Arul V, Miyazaki S, Dhananjayan R. Mechanisms of the contractile effect of the alcoholic extract of *Aegle marmelos Corr*. on isolated guinea pig ileum and tracheal chain. Phytomedicine. 2004; 11(7-8):679-83.

14. Atawodi SE. Antioxidant potential of African medicinal plants. African Journal of Biotechnology. 2005; 4(2): 128-133.

15. Badam L, Bedekar S, Sonawane K and Joshi S. In vitro antiviral activity of bael (*Aegle marmelos Corr*) upon human coxsackie viruses B1-B6. The Journal of Communicable Diseases. 2002; 34: 88-99.