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A SHORT REVIEW ON: ACANTHACEAE FAMILY BOON TO HUMAN BEING

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ABSTRACT

The phytochemicals of the plants has a good significance to study various medicinal applications and any other properties of the plant. For medicinal purposes, the Acanthaceae family has more phytochemicals properties that are mostly used externally for wounds. Acanthaceae possess antibacterial, antifungals, cytotoxic, anti-inflammatory, antipyretic, etc. Some phytochemicals like glycosides, flavonoids, alkaloids, phenolic compounds are found in the Acanthaceae family. Acanthaceae is a family of dicotyledonous flowering contains almost 250 genera and 4000 species. This family is well known for its medicinal value due to the presence of various phytochemicals.Throughout the world research and testing are been carried out on this family as an alternative option for allopathic medicine because knowledge of the properties of these medicinal plants is growing. *Adatathoda beddome*, *Barleria priontitis*, *Justeceace gendurusa*, *Hygrophila auriculata*, *Crossandra infundibuliformis*, etc. belongs to the

Acanthaceae family. The qualitative analysis was used to check the presence or absence of that particular phytochemicals. For the analysis of phytochemicals there are standard protocols for the analysis. Different methods like tannin test, carbohydrate test, flavonoids test, steroid test, starch test and alkaloid test.

Keywords: Phytochemicals, *Barleria prionities, Hygrophila auriculata*, *Crossandra infundibuliformis,* medicinal properties

INTRODUCTION

Medicinal plants are the source to cure many diseases in human beings. The present study reports that phytochemicals are beneficial to drug molecule formulation and drug discovery. The phytochemicals like terpenoids, flavonoids, and carbohydrates have therapeutic values **[1]**. These are used as secondary metabolised in plants and used as medicines in human beings.

The plant is known for its therapeutic values, and phytochemicals are present in a plant named *Hygrophila auriculata* **[2]**. The plant hygrophila auriculata has been used for a long time as a traditional medicine for the treatment of inflammation, pain, edema, urinary infection, and gout **[1-3]**. The plant *Hygrophila auriculata* Heine has been reported to contain various phytochemicals including Áavonoids (apigenin 7-O-glucuronide, apigenin 7-Oglucoside), alkaloids (asteracanthine and asteracanthicine), aliphatic esters (25- oxo -hentricontyl acetate, methyl -8-hexyltetracosanoate) **[3-6]**. *Hygrophila auriculata* also contins minerals (Fe, Cu, Co), sterols (Stimagsterol), triterpenes (lupeol, hentricotane, betulin, luteolin, luteolin -7-O- rutinosides) and essential oils **[4, 6]**. Earlier scientific investigation of *Hygrophila auriculata* conducted by **[1, 4]** showed that the crude extract has antinociceptive, antitumor, antibacterial, antioxidant, hepatoprotective, hypoglycemic, haematinic, diuretic, anabolic and androgenic activities, anthelmintic activity, anti-inflammatory, and antipyretic activity. The common name of this plant is Ikharo or Ikshura or gokulkata.

The plant is known for its therapeutic values, and phytochemicals are present in a plant named *Barleria prionitis*. This plant is mainly used for the treatment of whooping cough, toothache, respiratory disease, and tuberculosis **[5]**. It is a pricky shrub commonly known as 'Pivali koranti' native to India and Sri Lanka. It is used for various medicinal purposes in ayurvedic medicines. The juice of the leaf is used in cataract and

fever, the extract of plant rich in irioid glycosides is a potent hepatoprotective agent and useful in respiratory infections, whooping cough and tuberculosis. Extensively found in India, it is distributed widely in throughout Asia including Malaysia, Pakistan, Philippines, and Sri Lanka. Commonly known as yellow nail dye plant in English, as a medicinal plant. The whole plant is small in appearance, about 1-3 feet long and its flower are equally broad as well as tubular, mainly yellowish or whitish, approximately 3-4 cm in length. The commonly known as katashediyu, pilo katashediyo or kanta sulio.

Crossandra infundibuliformis belongs to the family Acanthaceae. This plant has proved to have various medicinal properties. *Crossandra infundibuliformis* is a popular tropical flower known as "Firecracker" **[6]**. The plant is native to Southern India, Malaysia, and Sri Lanka **[7]**. Due to its medicinal value, the various parts of this plant are used to treat many diseases. Antimicrobials of plant origin have enormous therapeutic potential. They effectively treat infectious diseases while simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials **[6]**. It is evergreen shrub growing to 1 m with glossy, wavy leaves and fan shaped flowers, which may appear at any time throughout the years. The flower are unusually shaped with 3-5 asymmetrical petals. The tiny flowers are often strung together into strands, sometimes along with white jasmine flowers and therefore in great demand for making garlands which are offered to temple deities or used to embellish women's hair. This is commonly known as Aboli or Amboli.

CLASSIFICATION

Plant taxonomy or classification is the science of naming plants and placing them in a hierarchical structure, each level being given a name like kingdom, division (phylum), class, order, family, genus, species **(Table 1)**.

Hygrophila auriculata [8]

Barleria prionities [9]

Crossandra infundibuliformis

		[10]

Figure 1: Different Plants of *Acanthaceae* family

Table 1: Classification [8-10]

Taxonomy	*Hygrophila auriculata*	*Barleria prionities*	*Crossandra infundibuliformis*
Kingdom	Plantae	Plantae	Plantae
Phylum	Tracheophyta	Tracheophyta	Tracheophyta
Division	Magnoliophyta	Magnoliophyta	Magnoliophyta
Class	Magnoliopsida	Magnoliopsida	Magnoliopsida
Order	Lamiales	Scrophulariales	Lamiales
Family	Acanthaceae	Acanthaceae	Acanthaceae

PHYTOCHEMICALS

Phytochemicals are produced by plants which is generally help to resist bacteria and plant virus infection of plant. Some phytochemicals are used as herbal or traditional medicines or some are used as poisons. Phytochemicals is 'bioactive non nutrient plants compound' which is used in medical field to reduce the chronic diseases **[11, 12]**. Phytochemicals have complementary mechanism of action in the body, including some effects like modulations of enzymes and hormons actions, stimulation of the immune system, and interference with DNA replication and physical action **[11]**. Plant generate chemical compounds like alkaloids, flavonoids, tannins, glycosidase, starch, steroids, terpanoides, saponins and phenolic compounds etc. phytochemicals are produced by plants through the primary or secondary metabolism. Some phytochemicals like aristolochic acid is known as phytotoxins which is toxic to the human, some are antinutrients and some like polyphenol and flavonoids are pro-oxidant in high amount **[13-15]**.

Metabolites are the end product of the metabolic process and the intermediate product or formed during the process. Basically phytochemicals constituent of plants classified into two categories based on their role in normal metabolic process, known primary and secondary metabolites. Primary metabolites are directly involve in growth, development and reproduction. They are widely distributed in nature and also used as food by humans. Primary metabolites such as carbohydrates, amino acids, vitamins, enzymes, hormones are essential for plant growth, development and defense.It includes small molecules such as sugar, tricarboxylic acid or Krebs cycle intermediates, and proteins. They are similar in all living cells.

Enzymes are the protein which produced in the any living organism as a primary metabolites. In the absence of the enzymes the metabolic reaction would require a more time to complete. The enzymes produced in various organisms are extracted for the use in

industrial work such as the fermenting of wine, curdling of cheese and brewing of beer. Lipase, amylase, protease are the example of it **[16, 19]**.

Carbohydrates are the group of organic compound which are the most important primary metabolites that are common in all organisms. It is a biomolecule which is form of carbon, hydrogen, and oxygen. Carbohydrate act as substrate for the important biological processes like Krebs cycle and glycolysis. Glucose, cellulose are the example of it **[19]**.

The secondary metabolites are produced in living plant cells and do not play much of significant role in the primary life of the plants. They can be classified on the basis of chemical structure, composition, their solubility in various solvents and usually according to their biosynthetic pathways. Secondary metabolites are different resources for the pharmaceuticals, food additives, and the phytochemicals. This are produced in smaller quantities and are difficult to extract. Some categories of secondary metabolites have been used in various biotechnological process for the formation of the medicines or the compound. Alkaloid, flavonoids, steroids, tannis are the example of secondary metabolites **[19]**.

Alkaloids is a compound which is toxic or physiologically active compound. Alkaloids like pteropopin and isopetropodin have an antimicrobial activity, and also promoting the white blood cells in human body **[16]**. Some alkaloids are stimulating neurotransmitters such as dopamine and serotonin, they are directly affect to the central nervous system and also act as anti-malaria and in treating in hypertension, rheumatism and motion sickness **[8]**.

Flavonoids are mainly used as antioxidant and protect against degenerative disease. They act as 'nature's biological modifiers' as anti- allergens, anti-inflammatory, and induce the metabolites that eliminate mutagens and carcinogens **[16]**. It also work as anti-microbial by complexing extracellular and soluble protein, and by complexing bacteria cell wall **[16,18]**.

Saponins are service active agents with soap like properties and can be detected by their ability to cause foaming and to haemolyse blood cell **[15]**. They serve as a vaccine booster by acting as adjuvant. They have anti-inflammatory, emetics, antiviral, antifungal and antibacterial **[16]**.

Cardiac glycosidase have pharmacological activity especially to the heart, most of them are toxics in nature. Used in treatment of congestive heart failure, where they inhibit

sodium potassium pump. They are also used in the treatment of atrial fibrillation, flatter and act as emetics and as diuretics **[16, 18]**.

Tanins have physiological role by acting as antioxidant through free radical scavenging activity, inhibition of prooxidative enzyme and lipid peroxidation **[8, 14]**. They also inhibit tumor growth by inducing apoptosis and inhibiting mutagenicity of carcinogen **[16, 17]**.

ETHANOBOTANICAL USEES

It is been noted from a survey of the ethanobotanical literature that the different parts of the plants like roots, seeds, and aerial parts of the plant are widely used in the traditional system of medicine for the treatment of numerous diseases such as jaundice, hepatic obstruction, rheumatism, inflammation, pain, urinary infection, edema, gout, malaria, impotence and aphrodisiac **[20]**.

CONCLUSION

The plants are bestowed with many important phytochemical which are responsible for their therapeutic value. Medicinal plants are gaining more importance because of their healing power. The phytochemical studies are providing health application at an affordable cost. As a modern antibiotic have various toxic or bad effect to human body this phytochemicals serve as alternative antimicrobial agent which is not much harmful for the human body. The secondary metabolites like alkaloids, flavonoids, tanins and cardiac glycosidase have ability to cure the normal disease and antimicrobial activity. Ethno medicine desperately represents one of the best revenue in searching new economic plants for medicine. Phytochemical studies and antimicrobial properties from various extracts from many plants have recently been of great interest in both research and the food industry, as their possibility to use as natural additives emerged from a growing tendency to replace synthetic antioxidants and antimicrobials with natural compounds. The acantheceae family plants shows the more medicinal value because of having rich phytochemicals in it.

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