

CONCEPT OF DIVERSIFIED ACTION- A REVIEW

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ABSTRACT

“*Jagatyevam anoushadham, Na kinchit vidyate dravyam vashaannanarthayogayoh*” (Ashtanga Hrudaya, Sutrasthana 9/10) - No plant in the living world is non medicinal. It depends on the skill of the doctor to choose right plant or the right plant part for it to act as a medicine. The potentiality of a plant depends on place, time, collection methods, part of the plant, soil in which it is cultivated and other environmental factors. Plants possess different activities based on the variation in their chemical composition and changes occurring in the plants during various stages of plant development. Due to these factors, plants exhibit diversified actions attributed to different parts. A few plants exhibit contradictory actions in different parts which is an uncommon observation. This review is to put light on the reasons for this diversification and contradiction and to convey another way of conservation of medicinal plants.

KEYWORDS: Diversified action, contradictory action, chemical composition.

INTRODUCTION

The flora of India is the richest in the world. There are estimated to be over 16,000 species of flowering plants in India, which constitute about 6-7 % of total plant species in the world ². Among these plants, around 6000-7000 plants are estimated to have medicinal uses in folk medicine and for preparation of medicines by Pharmaceutical industry³. Traditional medicine, also known as indigenous or folk medicine comprises medical aspects of traditional knowledge that developed over generations within various societies before the era of modern medicine ⁴. The World Health Organization (WHO) defines traditional medicine as "the sum total of the knowledge, skills and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the

maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness⁵.

The medicinal plants mentioned in various Ayurvedic texts have different indications. These indications vary based on the factors like anupana (adjuvant), samyoga (admixture), samskara (process), collection methods etc. One of these factors is the part used. Based on this factor the drug acts differently on different systems of the body. This property of the plant is called as diversified activity. This diversion is caused due to several reasons like place of plant growth, season of collection, collection methods and various physico-chemical changes. Environmental conditions play a key role in defining the function and distribution of plants, in combination with

other factors. Single plant has multi-dimensional activities attributed to different parts. This nature of the plant is a common observation. Two parts of the same plant possessing opposite activity is rare. For example: Eranda mula- vrushya (aphrodisiac), Eranda beej - rechaka (purgative); Aragwadha phala - sramsana (laxative), Aragwadha pushpa-grahi.(antidiarrhoeal)⁶.

Due to the growing need by the pharmaceutical industry many medicinal plant species are experiencing the verge of extinction. A few of them are unavailable now. This has led to adulteration and substitution. Studies must be carried out to validate the diversification and contradictory property of the plants, the knowledge of which helps to use less resource to gain more therapeutic benefits and conserve the plant species.

Diversified action of plants:

The importance of each drug is measured through its karma. Each plant part has its

Even when whole plant is used it gives various actions. For example:

Name of the plant	Part used	Indications
1.Guduchi(<i>Tinospora cordifolia</i>)	Whole plant	Tridoshaghna(immunomodulatory), chakshushya (in eye disorders), vayasthaapana (rejuvenating) , medhya(brain tonic). ⁹
2. Vaasa(<i>Justicia adathoda</i>)	Whole plant	Kshaya (tuberculosis), kushta (skin diseases), prameha (diabetis), shwasa (respiratory disorders) ⁹

Reasons for diversified action:

Guduchi: It consists of Berberine, bitter substance, starch, gilon, gilonin¹²

Tridoshaghna: Cordifolioside A and syringin possess immunomodulatory activity¹³

Medhya: it is due to immunostimulation and increasing the synthesis of acetylcholine which is an important neurotransmitter in

own benefit. Few actions can be manipulated by external processes. For example *Swinna* (steamed) *Haritaki* is *Grahi* (anti diarrheal) and *Aswinna* (not steamed) *Haritaki* is *Anulomaka* (laxative)⁷. Adding an adjuvant also changes the activity of the drug on human body. A *Visha* (poisonous) drug might have a part in it which is *Nirvisha* (non-poisonous) or by purification of *visha dravya* acts as a medicine. For example *Langali* (*Gloriosa superba*) is a *visha dravya* and by *Shodhana* with *Gomutra* (cow urine) the poisonous property reduces and it is used therapeutically⁸. These changes occur due to various chemical modifications in the plant occurring during the process.

But a plant, in itself, has these variations despite of all the external factors which has caused the diversification in the plant parts. This is why knowledge of every plant part is important and its application must be well analysed.

learning and memory process. This central action could be due to supplementation of choline which is an important active constituent of *Tinospora cordifolia*¹⁴

Vayashtaapana: The presence of free radical scavenging properties against reactive oxygen and nitrogen diminishes the expression of iNOS gene, reduces the thiobarbituric acid reactive substances and

an increases the reduced glutathione catalase and superoxide dismutase thus acts as anti-oxidant¹⁵.

Vaasa: It consists of alkaloids Vasicine and Vasicinone ; adhatonine, vasicinol and vasicinolone (minor alkaloids); vasicoline, adhatodine, casicolinone and anisotine; Sitosterol, β -glucoside-galactose and deoxyvasicine and 2'-4- dihydroxychalcone-4-glucoside¹³.

Prameha: *Adhatoda vasica* ethanolic extract and fractions showed dose dependent inhibition of α -glucosidase and α -amylase enzyme and exhibited lower inhibitory activity¹⁶

Shwasa: Both vasicine and vasicinone are the primary alkaloid constituents of Adhatoda with well esteemed therapeutical respiratory potentials . Decoction of the tender leaves of Adhatoda has an unslaxing effect on throat irritation during cold and cough which also acts as an expectorant. Further Adhatoda extracts in animal models showed commendable antitussive effects. *Adhatoda vasica* reduced ovalbumin and PAF-induced allergic reaction. Alkaloid vasicinol and about 20% Vasicine inhibited ovalbumin-induced allergic reactions by about 37% at a concentration of 5 mg¹⁶

Examples for diversification based on various parts of the same plant:

Drug name	Part used	Uses
1. Bilva(<i>Aegle marmelos</i>)	Patra(leaves)	Antidiarrhoeal ¹¹
	Moola(roots)	Vomiting and pain ¹²
	Baala bilva phala majja(fruit pulp of unriped fruit)	Pain due to indigestion ¹¹
	Kaanda(stalk)	Cardioprotective, antitussive, rheumatism ¹¹
	Baalaphala(unripe fruit)	Cardioprotective ¹¹
	Pakwaphala(ripened fruit)	Not to be consumed as it causes indigestion, flatulence, reduces digestive fire. ⁶
	Pushpa(flower)	Diarrhoeal ¹¹
	Majjataila(oil from fruit pulp)	Reduces pains ¹
2. Gambhari (<i>Gmelina arboria</i>)	Flower	Relieves menorrhagia ¹¹
	Fruits	Cardioprotective, good for hair, urinary tract infections, relieves pain and helps in weight loss ¹¹
3. Shyonaka(<i>Oroxylum indicum</i>)	Unripe fruit	Cardioprotective ¹¹
	Ripe fruit	Tumour, piles ⁹
4. Eranda(<i>Ricinus communis</i>)	Leaves	Tumour, pains, urinary tract infections ¹¹
	Fruit	Liver and spleen disorders, ascitis, piles ¹¹
	Fruit pulp	Ascitis, purgative ¹¹

5. Nirgundi (<i>Vitex negundo</i>)	Leaves	Antimicrobial, appetizer ⁹
	Flower	Edema, skin disorders, tumours, spleen disorders. ¹¹
6. Kadali (<i>Musa paradisiaca</i>)	Stem	Antimicrobial, in UTI ¹¹
	Flower	Antidiarrhoeal ¹¹
	Fruit	Increases strength and weight. ⁹
7. Bhallataka (<i>Semecarpus anacardium</i>)	Fruit pulp	Aphrodisiac, nourishes the body ¹⁰
	Seed	Purgative, in skin disease, piles, edema, fever, and antimicrobial ¹¹
	Matured fruit	Constipative ¹¹
8. Aamra (<i>Mangifera indica</i>)	Young leaves	Helps in digestion ⁹
	Flower	Anti diarrheal, diabetes, ¹⁰
	Fruit pulp	Nourishes the body ⁹
9. Apamarga (<i>Achyranthes aspera</i>)	Seed	Purgative, appetizer ^{9,10}
	Fruit	Constipative, difficult to digest. ⁹
10. Kapittha (<i>Limonia acidissima</i>)	Seed	Antimicrobial, in herpis ¹¹
	Leaf	Hiccups, vomiting, diarrhoea ¹¹
	Flower	Rat poisoning ¹¹
	Taila	Non-poisonous ¹¹

Plants with contradictory action:

The contradictory or opposite action happens due to processing of drugs. Despite of processing a drug possesses such activity

A few examples are:

in different parts which is a rare observation. Some of them are practised in folklore system and they have to be scientifically validated.

Drug name	Part used	Uses
1. Ahiphena (<i>Papaver somnifera</i>)	Capsule	Antaphrodisiac ⁹
	Seed	Aphrodisiac ⁹
2. Aragwadha (<i>Cassia fistula</i>)	Fruit	Laxative ⁹
	Flower	Antidiarrhoeal ¹¹
3. Amra (<i>Mangifera indica</i>)	Fruit juice	Good for skin ⁹
	Fruit pulp	Causes skin diseases ¹⁰
4. Kampillaka (<i>Mallotus philipensis</i>)	Dust of fruit	Purgative ⁹
	Leaf	Antidiarrhoeal ¹¹
5. Shigru (<i>Moringa oliefera</i>)	Seed	Antaphrodisiac ¹¹
	Fruit pulp	Aphrodisiac ¹¹
6. Eranda (<i>Ricinus communis</i>)	Root	Aphrodisiac ¹¹

	Seed	Purgative ⁹
7. Kapittha(<i>Limonia acidissima</i>)	Unripe fruit	Bad for throat ¹¹
	Ripe fruit	Good for throat ¹¹

DISCUSSION

Variations are present in all of the plants but only a few of them express these diversions by performing different actions in different parts. *Rasa panchaka* (Pharmacological properties) of plants vary from each part which causes change in the activity. The chemical composition also plays a key role in estimating the activity. In the plant Gambhari (*Gmelina arboria*) both flower and fruit have cold potency. But flower is sweet, bitter and astringent in taste, has *laghu* (light) property and fruit is sweet in taste with *guru* (heavy) property. Flower increases *Vata* but fruit reduces *Vata*. Hence flower has the property to relieve menorrhagia and fruit is Cardioprotective, good for hair and urinary tract infections, relieves pain and is nourishing. The flower contains cerylalcohol, hentriacontanol-1, β -sitosterol, n-octacosanol, gmelinol which are polyphenols acting as anti-inflammatory and anti-oxidant thereby helping to relieve menorrhagia.¹⁷ The fruit contains tartaric acid which is a cardioprotective and nourishing agent¹⁸

In Bhallataka (*Semecarpus anacardium*) fruit pulp sweet to taste, *Balya* and *Brumhana* (nutritive) thus is aphrodisiac and nourishes the body; seed is sweet, bitter and pungent in taste, *snigdha* (moist) and *teekshna* (hot) and has hot potency thus purgative, used in skin disease, piles, edema, fever and is antimicrobial; matured fruit is sweet in taste, *guru* (heavy) and *ruksha* (dry) has cold potency hence is constipative. The seed consists of fatty acids Linoleic palmitic

and oleic acid which are antioxidants hence used in skin diseases¹⁹, sterol compounds like β -sitosterol, campesterol and stigmasterol which are anti-inflammatory and hence used in piles edema²⁰. The fruit pulp has Bhilwanol, anacardic acid which is antimicrobial, anti-inflammatory and thus can be used in fever, edema, skin diseases²¹. The contradictory action is *Vishesha* (specific) property of a plant and is found in very less number of plants. This is also due to the exact opposite Pharmacological properties and chemical composition.

Ahiphena (*Papaver somnifera*) capsule is *ruksha* (dry) and *dhatu shoshaka* (tissue degenerative) hence it is Antaphrodisiac whereas seed is *guru* (heavy) and *balya* (nourishing) thus acts as aphrodisiac. Capsule consists of primary alkaloid as morphine, codeine, cotaline, narcotine which are poisonous in nature hence cause degeneration. Seeds contain a sweet, fixed and odourless oil hence nourish the body.

Kapittha(*Limonia acidissima*) unripe fruit is astringent in taste, has *ruksha* (dry) *laghu* (light), *lekhana* (scrapping) property hence is bad for throat. Whereas ripe fruit has sweet, astringent sour taste, *guru* (heavy) hence is good for throat. Unripe fruits consists of more complex forms of carbohydrates/sugar than what the body should digest hence they act as toxic to throat. Ripe fruits consists minerals and anti-oxidants which maintain health of a person²².

Apart from the above mentioned plants,

there are plenty other medicinal drugs which possess such kind of diversified action based on the pharmacological properties and chemical constituents. The place, soil, season, environmental conditions play a major role in deciding the variations in the properties of the plant²³.

SCOPE FOR FURTHER STUDY

Diversified action of the other medicinal plants can be studied. Few actions claimed by folklore practitioners which are unknown must be proven.

CONCLUSION

Specific part used is told in most of the drugs because different parts may have different action. Rasapancaka plays an important role in the diversification of action. Translocation is the one of the reasons for diversified character of different parts of the plants for its therapeutic utility. Before using different parts of same plant as substitute, the *rasapanchaka* (pharmacological properties) and chemical composition should be analysed through research works. It helps in conservation of plant species as single plant can be used in different diseases.

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