

PHYTOCHEMICAL AND PHARMACOLOGICAL OF RASONA (*ALLIUM SATIVUM*
LINN.): A REVIEW ARTICLEDr. Manisha[#] and Dr. Naresh Kumar Garg*

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ABSTRACT

Rasona (*Allium sativum* Linn.) commonly known as 'garlic' has been used safely since ancient time as both food and medicine. It is a rich source of several phytochemical and recognised to have significant & wide range of biological activities. The active constituent of garlic includes several sulphur containing compounds (principally thiosulfinate) which, are rapidly absorbed, transformed and metabolized. Thiosulfinate, volatile sulphur compound is responsible for its pungent smell and different biological action. Since centuries garlic has been used traditionally for the management of different disorders. In Ayurveda the garlic is considered as '**Rasayana**', an important class of drugs reputed to promote health & longevity and therefore, it can be used for the prevention as well as for the management of different disorders. In the United States and Western Europe, garlic is one of the most popular remedies used to reduce various risks associated with cardiovascular disease. Several clinical & experimental studies validated its potential uses in the pathological conditions related to the cardiovascular system, respiratory system, genito-urinary system, gastrointestinal system, hematopoietic system and skin. Garlic can be used in different forms & preparations viz. tablets, capsules, inhalation, beverages, alcohol, macerated in water, fried, cooked in oil, raw, roasted etc.

KEYWORDS: Rasona, Rasayana, Pharmacological action, Life style, Phytochemical.

INTRODUCTION

Rasona is one among the important drugs used in the Ayurvedic system of medicine. It is considered best among the *Vatashamaka* drugs by Acharya Vagbhat. Rasona is considered as *Rasayan* in ayurveda. *Rasayan* are very important for promoting health and longevity as described in Ayurveda. Various studies on *Rasayana* drugs validated their action such as immunomodulatory, adaptogenic, antioxidant, nootropic and antistress. Rasona is an annual herb native to Central Asia, but due to its widespread use as a medicine, it is cultivated in almost all continents. Various cultures used different variety of garlic depending upon their ecological productivity. There are two common species of garlic namely *Allium sativum* and *Allium tuberosum*. *Sativum* species of garlic is commonly used in most part of India and *tuberosum* species is used commonly in north-east India, south-east Asia and china. The part used is, garlic bulb that contain a wide variety of active ingredients with medicinal properties. The properties are based primarily on the large amount of sulphur compounds.

Properties

As per the traditional use in Ayurveda, Rasona has suggested to have following properties.^[3]

- ✓ **Ras:** Madhur, Lavana, Katu, Tikta and Kashaya.
- ✓ **Guna:** Snigdha, Tikshna, Guru, Pichhila and Sar.
- ✓ **Vipaka:** Katu
- ✓ **Veerya:** Ushna.
- ✓ **Doshkarma:** Vata-Kapha Shamak and Pitta Prakopak.

Traditional Use

Traditionally in Ayurveda, Rasona has used for promotion of health as well as for the management of wide range of disorders including *Kushtha Roga* (skin disorders), *Vat-Kaphaj Roga*, *Agnimandhya* (impaired digestive power), *Aruchi* (anorexia), *Ajeerna* (indigestion), *Vibandha* (constipation), *Shoola* (as analgesic), *Krimi Roga* (worm infestation), *Jeernakasa* (chronic cough), *Shwas Roga* (asthma), *Rajayakshma* (tuberculosis), *Gradhrasi* (sciatica), *Sandhivata* (osteoarthritis), generalised weakness etc. Acharya Vagbhat metioned that excess use of Rasona Vitiates Rakta and Pitta Dosha. It is specially indicated for the management

of *Vataja* disorders, *Gulma*, *Kushtha*, *Kilasa* and *Krimiroga*. The important formulations of *Rasona* include *Lasunadi Vati* & *Rasona Pinda*, which are very common in clinical practice. Acharya Kashyap specially emphasized on different properties and therapeutic uses of *Rasona* and described in detail. Garlic is known as 'da suan' in Chinese traditional medicine. It is considered a warm bitter herb with particular effects on large intestine and spleen. It is used to lower blood pressure, in parasitic infections, in food poisoning and in tumours. It is also used as mild anticoagulant. Arabians has used garlic traditionally to treat abdominal pain, infantile colic, diarrhoea, diabetes mellitus, eye infections, dandruff and tuberculosis. African herbalists used garlic to treat respiratory infections and helminthic infections. Many African families used garlic oil drops to treat childhood ear infection. Several folk traditions recommended garlic to induce abortion.

Chemical Composition (Biochemistry)

Rasona (*Allium sativum*) contains 33 sulphur compound, 17 amino acids, several enzymes and minerals such as selenium etc. It contains higher concentration of sulphur compounds than other *Allium* species. The sulphur compounds are responsible for its pungent odour and therapeutic action. Dried powdered garlic contains at least 1% alliin (S-allyl cysteine sulfoxide). One of the most biological active compounds, allicin (diallyl thiosulfinates or diallyl disulfide), does not exist in garlic until it is crushed or cut. Injury to the garlic bulb activates the enzyme allinase which metabolise alliin to allicin. Allicin is further metabolized into vinylthiophenes. This breakdown occurs within hours at room temperature and in minutes during cooking. The first chemical isolated from garlic was Allicin, which is responsible for its antimicrobial effects against many bacteria, viruses, fungi and parasites. Garlic oil, aged garlic and steam distilled garlic do not contain significant amount of alliin or allicin but instead contains various products of allicin transformation. Fresh garlic or garlic powder is considered as most potent than other forms or preparations. Garlic is also a rich source of highly bioavailable selenium, which is thought to responsible for its antioxidant and cancer preventive effect.

List of Potentially Active Constituents

Selenium, germanium, tellurium and other trace minerals.

Alliin metabolism

- The alliin metabolism can be summarized as follows
- Alliin (Odourless)
- Allinase activated by heat or cutting
- Allicin (appearance of odour)
- Diallyl trisulfide Diallylsulfides
- Diallyl disulfide Ajoenes & Vinylthiophenes

Pharmacology

Rasona was reported to enhance the synthesis of nitric oxide, which is responsible for its anti-hypertensive

effect. The property is retained in heat treated and aged garlic products. Allicin and ajoene were reported to reduce nitrite accumulation in the atherosclerotic plaques and in hypoxic tissues by inhibiting inducible nitric oxide synthesis in macrophages. In rats, alliin is well absorbed orally and reaches to its peak within 10 minutes and completely excreted within 6 hours. Allicin and vinylthiophenes are absorbed slowly attaining their maximum concentration within 30 to 120 minutes and persist inside the body upto 6 days. In rats, mice and dogs, S-allyl cysteine is well absorbed orally (98-100 %). Aged garlic extract and its constituent S-allyl cysteine have been found to protect vascular endothelial cells from injury caused by oxidised LDL. Some other constituents have been shown to inhibit copper induced oxidative modification of low density lipoprotein. Diallyl disulfide and diallyl trisulfide from *Rasona* are responsible for its lipid lowering effect via inhibition of HMG CoA reductase and or others enzymes. Some studies suggested other mechanism which includes increased loss of bile salts in faeces and mobilisation of tissue lipids in circulation, as garlic has profound effect on postprandial hyperlipidaemia. Some study demonstrated reduction in vascular tissue lipids, fatty streak formation and atherosclerotic plaque size via the reduction in lipoprotein oxidation.

Pharmacological Action

Several clinical and experimental studies on *Rasona* validated its wide range of action. Some of them are tabulated below.

Dosage

Dose of garlic is determined depending upon part or forms used. Dose of some common forms are as follows.

- **Bolus of Kand (Bulb):** 3 – 6 gm/day
- **Oil of Kand (Bulb) :** 1 – 2 drops/day
- **Enteric coated tablets of garlic powder :** 600-800 mg/day

Drug Interaction

Following drug interaction have been reported with garlic.

- Garlic may increase the effect of diuretics and may cause excess diuresis.
- Garlic may increase the risk of bleeding/potentiate the effect of warfarin therapy.

Contraindications

Use of *Rasona* has contraindicated in following conditions.

- Should not be used by patients on oral anticoagulant and or antiplatelet therapy.
- Breast feeding mother (it can pass into breast milk and cause colic in infants).
- Pregnant women (being *Ushna* and *Tikshna*, it may cause uterine contraction followed by bleeding).
- *Pitta Prakrati* individual.
- Allergic reactions and contact dermatitis.

- Acharya Kashyapa has contraindicated *Rasona* in *Agnimandhya* (impaired digestion), child, *Kamala* (jaundice), *Atisar* (diarrhoea), acute exacerbation of *Shwas Roga* (*asthma*), following *Vaman* (therapeutic emesis), *Virechan* (therapeutic purgation) and *Asthapan Basti* (therapeutic enema).

DISCUSSION

The use of plant based medicines is rapidly increasing as they help in promotion of physical and mental health and offers no adverse effects. *Rasona* is one among the important herbs has been used in variety of traditional systems specially Ayurvedic system of medicine. In Ayurveda *Rasona* has been used in the prevention as well as in the management of wide range of disorders which include *Vataja* disorders, *Gulma*, *Kushtha*, *Kilasa* and *Krimiroga* etc.

Rasona is a well-known *Rasayana* in Ayurveda. *Rasayana* remedies act essentially on nutrition dynamics and rejuvenate both the body and psyche. Thus, they are reputed to promote physical health, mental health and longevity. In the present era the incidence of diseases like hypertension, diabetes mellitus, psoriasis, etc. is rapidly increasing as a result of disturbed lifestyle. The stress is considered a major culprit in the manifestation and or exacerbation of such type of disorders. Several clinical and experimental studies on *Rasona* validated its wide range of pharmacological effect which includes immunomodulators, anti-diabetic, anti-hypertensive, anti-oxidant, cardio-protective, anti-stress effect etc. Therefore, *Rasona* plays an important role in the prevention as well as in the management of such type of disorders.

CONCLUSION

In the present era altered immunity and psychosocial stress play an important role in the pathogenesis of lifestyle related disorders. *Rasayanas* as described in Ayurveda nourishes the body, boosts immunity and help to keep the body and mind in best of health. Therefore, being *Rasayana*, *Rasona* is very helpful in the prevention and management of such type of disorders. The present review facilitates to gain necessary information about the enormous pharmacological activities of *Rasona*, which would motivate and provide lead to researchers for further exploration of pharmacological activities.

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