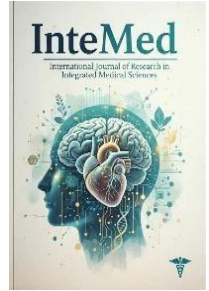




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Review Article

Antimicrobial activity of Ajmoda [Carum roxburghianum] : A Review

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Abstract: In today's fast going life people fail to follow proper diet and healthy lifestyle which results in to low immunity. Therefore they are suffering from different diseases and recurrent bacterial infections. In such conditions to protect the life, many antibiotics are used against the disease causing micro-organisms. But due to the increase in antimicrobial resistance (AMR) against antibiotics the health forums are looking and searching for alternatives which are scientifically validated, viable, and biocompatible.

Simultaneously the world is turning towards the ancient ayurvedic wisdom. So this is the right time to research the drugs and bring it to the notice of the world about our time tested ayurvedic medicines and its scope in the treatment. In ancient ayurvedic literature many medicinal plants are described with their *krimighna* properties and *Ajmoda* is one of them. *Ajmoda* found all over the India, especially cultivated in Maharashtra, Punjab and Uttar Pradesh region. So it is easily available, economically affordable and non-controversial. So *Ajmoda* has been selected for the study. This study investigates the therapeutic scope, traditional efficacy, and modern clinical relevance of *Ajmoda* with

special respect to its *krimighna karma* i.e. antimicrobial activity.

Keywords :- Ajmoda, Antimicrobial Resistance (AMR), Biocompatible, Clinical relevance, Traditional efficacy.

❖ Introduction :-

In ancient nighantus, the use of *Ajmoda* is mentioned against krumi. *Ajmoda* is an herb that lives for one or two years i.e. annual or biennial herb, featuring an upright, smooth, hairless, hollow, and ridged stem. Its feather-like, smooth leaves have deeply cut leaflets which are 1 to 6 cm long with white-bordered bases, attached to short stalks that disappear toward the top of the plant.

From March to June, it produces umbrella-shaped flower heads made of 12 to 15 branches, each bearing smaller clusters of 20 to 25 white blossoms. The fruits grow at the top of the plant and are harvested as its most useful part. *Ajmoda* has a strong, goat-like smell, and its leaves are also fragrant.

❖ Botanical Identification :-

Latin name : *Carum roxburghianum*

Family : Umbellifereae

English name : Celeri.

संस्कृत :- अजमोदा, मराठी :- ओवा, हिन्दी :- अजवायन,

पर्यायी नावे :- खराश्वा, उग्रगंधा, मयूरिका.

❖ Properties and actions :-

Raspanchak of *Ajmoda* is Katu, tikta in rasa, Katu vipaka, Ushna virya and Laghu, ruksha, tikshna in guna. It is Kapha vata shamak and pitta vardhak because of its ushna-tikshna properties. Traditionally *Ajmoda* is used in ajirna, agnimandya, netraroga, krimi, chhardi, hikka, basti ruja etc.

❖ Objectives :-

- To study the anti-microbial activity of *Ajmoda* (*Carum roxburghianum*).
- To study comparative anti-microbial activity of two different extracts of *Ajmoda* (i.e. water extract & alcohol extract).
- To review ayurvedic and modern literature related to *Ajmoda* (*Carum roxburghianum*).
- To review ayurvedic literature related to *krimi*.
- To review modern literature related to microorganisms *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*.

❖ Materials and Methods :-

- Literature search strategy - A systematic literature search will be conducted across major electronic databases, including AYUSH portal, Google scholar, PubMed, Scopus, Science Direct, etc.
- Classical Textual Analysis – Primary classical Ayurvedic treatises like *Charak Samhita*, *Sushrut Samhita*, *Sharangdhar Samhita*, *Nighantu granthas* like *Bhavprakash* will be critically reviewed for *Ajmoda* and *Krimi*.
- Antimicrobial Study -

For antimicrobial study of *Ajmoda* agar disc diffusion method will be used and preparation of extracts will be done as follow –

a) Sample A :-

The dried powder will be mixed with water and will be kept for 48 hours in room temperature. The filtrates from it will be subjected to the rotary evaporator for solvent removal.

The crude extract obtained will be investigated for antimicrobial activity.

b) Sample B :-

The dried powder will be mixed with alcohol and will be kept for 48 hours in room temperature. The filtrates from it will be subjected to the rotary evaporator for solvent removal. The crude extract obtained will be investigated for antimicrobial activity.

c) Sample C :-

Standard control drug sample. The drug 'Ofloxacin' will be used as sample 'C'.

❖ In vitro study :-

An in vitro study to evaluate the antimicrobial activity of *Ajmoda arka* against the

microbes namely *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* will be done in the Lab.

a) *Escherichia coli* :-

It is a Gram negative, anaerobic, rod-shaped bacterium of the genus *Escherichia*. It is commonly found in the lower intestine of warm-blooded animals.

b) *Pseudomonas aeruginosa* :-

It is a Gram negative, aerobic, non-spore forming bacteria capable of causing variety of infections like pneumonia, septicemia etc.

c) *Staphylococcus aureus*:-

It is a Gram positive bacterium that is a common cause of skin infections, soft tissue infections, Folliculitis, Carbuncle, etc.

❖ Agar disc diffusion method :-

Agar plates are first spread with microbes, each on single plate.

Then filter paper discs are placed on the agar plates with extracts on it i.e. with sample A, sample B and sample C.

The microbes are allowed to grow on the agar media for the specific time period and then observed.

Generally the antimicrobial agent diffuses into the agar and inhibits germination of the test micro-organisms.

The zone of inhibition shows the antimicrobial property of the plant extract.

Highly effective samples can produce a wide ring of no microbial growth.

While an infective sample can show no change in the surrounding of the sample.

The effectiveness of intermediate sample can be measured using their zone of inhibition.

This method will be used to determine the antimicrobial activity of *Ajmoda* against the mentioned micro-organisms.

❖ Observation and result :-

Zone of inhibitions will be observed for *Ajmoda water extract*, *Ajmoda alcohol extract* and standard drug sample and measured carefully. These observations will be noted and presented in the form of photographs, tables and graphs. Interpretation of antimicrobial activity will be done. Result will be drawn on the basis of collected data.

❖ Discussion:-

Thorough discussion will be done on the basis of observations drawn. Comparative analysis of zone of inhibitions produced by all extracts and samples along with positive solvent activity will be done. On the basis of collected data, observed data and published data discussion will be done.

❖ Conclusion:-

On the basis of outcome from discussion particular conclusion will be drawn.

❖ Summary :-

Further study requirements will be summarized and all the details will be discussed in short.

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