MICROBIAL GROWTH INHIBITION BY APARAJITHA DHOOMA CHOORNAM

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ABSTRACT :

The antimicrobial activity of Aparajitha Dhooma Choornam was evaluated against microbes commonly found in the manufacturing unit of the Arya Vaidya Pharmacy (CBE) Ltd located at Kanjikode. The study was attempted to discard the microbial contamination of flora of various sections of the manufacturing unit, thereby create an aseptic atmosphere for quality products. The choornam showed total inhibition of coliforms and reduced fungal growth.

KEY WORDS: Aparajitha Dhooma Choornam, Microbial Inhibition

INTRODUCTION

Aparajitha Dhooma choornam is mentioned in Ayurvedic texts in the context of Jwara Chikitsa for fumigation. The fumigation prevents the spread of infectious fever and also disinfects the air from pathogens. In the study, Aparajitha Dhooma choornam was used as a fumigation powder for creating an aseptic condition in the critical areas of production and filling in the factory.

MATERIALS AND METHODS

Preparation of Aparajitha Dhooma Choornam

Eight herbs were used in the preparation of Aparajitha Dhooma choornam. The ingredients of the choornam are described in Table (1). The raw materials obtained from market were air dried in shade at room temperature and powdered mechanically.

MEDIA AND REAGENTS

The chemicals required included Sabouraud Dextrose Agar (SDA) and Nutrient Agar (NA) for preparing agar plates and were of analytical grade.

Methods

The antimicrobial activity was evaluated for each section separately. Duplicate agar plates of SDA and NA were incubated at each section and the microbial flora was studied. The growth

of microbes was calculated by total plate count method.

The same procedure was repeated half- an- hour after fumigation with Aparajitha Dhooma choornam. The following studies were also carried out:

1. Microbial flora study after fumigation for 1 week.
2. Microbial flora study, weekly once for a month with fumigation.

RESULTS AND DISCUSSION

The microbial flora was studied before and after fumigation and results are summarized. The flora before fumigation was rich in coliforms and many saprophytic fungi as shown in Table (2). After fumigation, the data showed a considerable reduction in microbes. Table (3).

The potential of the plant composition in Aparajitha Dhooma choornam and their phytochemical constituents were looked into. The probable chemical structures, producing an antimicrobial effect are charted in Table (5).

The present study establishes the antimicrobial activity of Aparajitha Dhooma choornam. The choornam showed significantly higher inhibition of various Aspergillus species. But, it was observed that the overall activity was more pronounced against bacteriae as compared to fungi. The key result of the data is that, the continuous fumigation totally inhibited the bacterial growth and reduced fungal growth upto one colony of Aspergillus species per plate. Table (4)

CONCLUSION

Possibilities of future studies include the screening of different phytochemicals and antimicrobial activities by disc method along with these studies. Aparajitha Dhooma choornam can be raised to the level of a novel potential agent in the area of surface sterilization in herbal medicine manufacturing industries.

Table (1) The ingredients of Aparajitha Dhooma choornam

Sl. No	Botanical Names	Malayalam Names	Family	Parts used
1	Acorus calamus	Vayambu	Acoraceae	The rhizome
2	Actiniopteris dichotoma	Nanmukhapullu	Actiniopteridaceae	The whole plant
3	Aquilaria agallocha	Akhil	Thymelaeaceae	The wood
4	Azadirachta indica	Veppu	Meliaceae	The bark
5	Calotropis gigantea	Erukku	Asclepiadaceae	The root
6	Cedrus deodara	Devedaram	Pinceae	The Wood
7	Commiphora mukul	Gulggulu	Burseraceae	The gum resin
8	Shorea robusta	Chenchallyam	Dipterocarpaceae	The resin

Table (2) The results before fumigation in each section

Sl. No	Section Name	Total viable aerobic bacterial count	Total yeast & mould count
1	Fermentation area	No growth found	Abundant growth of Aspergillus species and Saccharomyces cerevisiae colonies
2	Powdering area	Bacillus sp. Were found. The growth was too numerous to count	-do-
3	Main processing area	-do-	-do-
4	Pill making area	-do-	-do-
5	Filling area	-do-	-do-

Table (3) Results after each day's fumigation

Section Names	Total viable aerobic bacterial count					Total yeast and mould count				
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 1	Day 2	Day 3	Day 4	Day 5
Fermentation area	Nil	Nil	Nil	Nil	Nil	1 Aspergillus colony	Nil	Nil	Nil	Nil
Powdering area	Nil	Nil	Nil	Nil	Nil	12 Saccharomyces cerevisiae colonies	2 Aspergillus colonies.	1 Aspergillus colony	Nil	Nil
Main Processing area	Nil	Nil	Nil	Nil	Nil	1 aspergillus colony	Nil	Nil	Nil	Nil
Pill making area	Nil	Nil	Nil	Nil	Nil	15 Aspergillus colonies	7 Aspergillus colonies	2 Aspergillus colonies	Nil	Nil
Filling area	Nil	Nil	Nil	Nil	Nil	Too numerous to count	15 Aspergillus colonies	Nil	Nil	Nil

Table (4) Weekly trials after fumigation

Section Name	Total viable aerobic bacterial count		Total yeast & mould count	
	Day 1	*Day 2*	*Day 1*	*Day 2*
Fermentation area	Nil	Nil	7 Aspergillus colonies	2 saccharomyces cerevisiae
Powdering area	Nil	Nil	2 Aspergillus colonies	1Aspergillus colony
Main processing area	Nil	Nil	1 Aspergillus colony	Nil
Pill making area	Nil	Nil	3 Aspergillus colonies	2 Aspergillus colony
Filling area	Nil	Nil	10 Saccharomyces cerevisiae colonies	1 Aspergillus colony

Table. (5) Phytochemical constituents of Aparajitha Dhooma Choornam

Sl No.	Plant Name	Phytochemicals present.
1	Acorus calamus	Asarone, β - asarone, calamenol,calamene, euginol, camphene, α- pinene, palmitic, heptylic and butyric acids .
2	Actiniopteris dichotoma	The stem and leaves contain rutin, hentriacontane, hentriacontanol, β- sitosterol, its palmitate and β-sitosterol- D(+)- glucoside.
3	Aquilaria agallocha	The wood contain selinene, hydroxy ketone and rhombic sulphur,The main component in agar isoil (agarol).
4	Azadirachta indica	Nimbidin, nimbin, nimbinine, nimbosterol, and numerous steroids were present. Triterpenoids and and polyphenolic compounds were also present.
5	Calotropis gigantea	β - stisterols, α- and β- amyrins , triperiniods , aliphatic esters , aliphatic ketone, and a mixture of n-hydrocarbons were also present.
6	Cedrus deodara	Cholesterin , essential oils , gum, liginins , tannins, β – sitosterol.
7	Commiphora mukul	From the gum resins sesamine , steroids, were reported. A di terpene alcohol, gulggulusterone were isolated from gum resin.
8	Shorea robusta	Tannins, β-sitosterols.

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