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Anti-bacterial activity of siddha polyherbomineral drug Gandhaga rasayanam

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Abstract

Gandhaga Rasayanam is a Polyherbo-mineral drug mainly used in treating vatha diseases as indicated in classical siddha text "Athmaratchamirthaam". Sample of Gandhaga Rasayanam was prepared and tested scientifically for Anti-bacterial Activity. Different concentration [10, 20, 30mg] of the concentrated aqueous Gandhaga Rasayanam extracts was tested for its Anti-bacterial activity using *Bacillus cereus*, *B.subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *E.coli* by antibacterial sensitivity test. Maximum zone of inhibition was observed in *B.cereus* with represented by 14mm.

Keywords: Siddha Medicine, Gandhaga Rasayanam, Antibacterial activity.

Introduction

Siddha system of medicine is an ancient system of medicine originating in ancient tamilakam in south India. Siddha focused to ASHTAMASIDDHI the 8super natural powers. The drugs used in siddha medicine were classified on the basis of 5 properties. They are suvai, gunam, veeryam, pirivu, mahimai. Some of the Siddha formulations may be considered as an ideal replacement for treating certain bacterial infection.

Gandhaga Rasayanam is one amongst those drugs. It has a wide range of therapeutic properties. It is Considered one of the Rasayana which Promotes good health and Stamina; Anti-aging; improves digestion; Skin Complexion and Immunity. It also Plays an important role in treating disease like Chronic fever; UTI; Skin Disease; Diarrhoea; Pruritis; Bleeding disorder and Oligospermia. It also acts as a very good blood Purifier and Cures Scabies; Eczema; Leprosy and cystic Acne.

Antimicrobial efficacy of gandhagam (Raw sulphur) as well as, purified gandhagam and gandhaga mezhugu were evaluated against six pathogens *E. coli*, *P. vulgaris*, *K. pneumoniae*, *S. aureus*, *S. mutans*, *C. albicans* which are associated with various disease conditions. The agar well diffusion was used to determine the sensitivity of the samples, whilst the micro-dilution method was used for the determination of the minimal inhibition concentration (MIC). Of the samples assayed, the samples of gandhaga mezhugu were observed to be the more effective against all the tested pathogens. The results provided evidence that the studied samples might be potential sources of new antimicrobial drug (Shanmugapriya et al., 2013).

Traditionally Sulphur in Tamil language, is synonymously known as Gandhagam, Kaarizhai Natham, Parai natham, Parai Veerayam, Atheetha prakasam, Beejam, Selvi vindhu, Sakthi, Sakthi peesam, Chendurathaathi, Theviuram, Natham, Naatram, Parai natham, Ponnvarni, Rasa sronitham (Thiyagarajan, 1992).

Materials and Methods

Medicine preparation:

Ingredients:

Piper nigrum,
Zingiber officinalis,
Piper longum;
Syzygium aromaticum;
Elettaria Cardamomum;
Cinamom umverum;
Cinamom umtamala ;
Myristica fragans;
Abies spectabilis;
Mesua nagassarium;
Plectranthu svertiveroides;
Trachyspermum roxburghianum;
Cuminum cyminum;
Hyoscyamus niger;
Curcuma zedoaria;
Alpinia galanga;
Plumbago indica;
Scindapsus officinalis;
Nigella sativa;
Maranta arundinacea;
Santalum album;
Anacardium occidentale;
Takkol;
Glycyrrhiza glabra;
Cyperu srotundus;
Nardostachys grandiflora;
Coriandrum sativum;
Phoenix dactylifera;
Three myrobalans;
Vetivera zizanodides;
Crocus sativus;
Curculigo orchioides;
Withania somnifera;
Smilex chinensis;
Mucuna pruriens;
Hydrophylla auriculata;
Tribulus terrestris;
Asparagasus racemosus.

Sugar; Ghee; Honey; Purified Sulphur.

Preparation:

The raw drugs are collected and dried in sunshade it is then pulverised to make a fine powder (Chooranam). Sugar syrup is made with thaneervittankizhanguchaaru (*Asparagas usracemosus*).

Sulphur purified with cow's ghee and chooranam is added to sugar syrup and stirred well. The mixture is allowed to cool and then honey is added.

The above prepared medicine is preserved in a pot and kept in Nerpudam for 10days.

Dose:

5gm twice a day with hot water

Duration:

40 days

Preparation of the plant extract:

Preparation of the extracts was assessed by following method as described by Janarthanam *et al.*, (2013). 0.5 gram of Gandhaga rasayanam dried powder of product materials were extracted with 20 mL aqueous for 1 min using an Ultra Turax mixer (13,000 rpm) and soaked overnight at room temperature. The sample was then filtered through Whatman No. 1 paper in a Buchner funnel. The filtered solution was evaporated under vacuum in a rota-vator at 40 °C to a constant weight and then dissolved in respective solvents. The dissolving rate of the crude extracts was approximately 100 %. The solution was stored at 18 °C until use.

Analytical study:

The Standard Method of diffusion disc plates on agar extarct et.al was being used to measure the Anti-Bacterial activity of GR. On Agar plate Surfaces, 0.1ml of each cultural of bacteria was being Spread. All Bacterial Strains were grown on Mueller Hinton Broth Medium for 24 hrs at 37°C and plated on Mueller Hinton Agar for Agar diffusion Experiments.

Paper disc were placed on the Agar Medium to load 20ml of different Concentration of GR extract was tested. Inhibition diameters were measured after incubation for 24-48 hrs at 37°C.

Results

Table 1 Composition of Gandhaga rasayanam extract

S.No	Tamil Name	Botanical Name	quantity
1	Thirikaduku	<i>Zingiber officinalae</i> <i>Piper nigrum</i> <i>Piper longum</i>	16.8gm each
2	Kirambu	<i>Syzygium aromaticum</i>	16.8gm
3	Elam	<i>Elattaria cardamomum</i>	16.8gm
4	Elavanghapattai	<i>Cinnamomum verum</i>	16.8gm
5	Elavanghapatri	<i>Cinnamomum tamale</i>	
6	Sathikkai	<i>Myristica fragrans</i> Henlt	16.8gm
7	Omam	<i>Carium copticum</i>	16.8gm
8	Jeerakam	<i>Cuminum cyrinum</i> Linn	16.8gm
9	Poonaikkali	<i>Mucuna pruriens</i> Linn Dc.	16.8gm
10	Neermulli	<i>Hygrophylla auriculata</i>	16.8gm
11	Nerunjil	<i>Tribulus terrestris</i> Linn	16.8gm
12	Ashwagandhi kizhanghu	<i>Withania somnifera</i> Linn	16.8gm
13	Kumkuma poo	<i>Crocus sativus</i> Linn	16.8gm
14	Sathipathri	<i>Myristica fragrans</i> Henlt	16.8gm
15	Triripalai	<i>Terminalia chebula</i> <i>Terminalia bellarica</i> <i>Embelica officinalis</i>	16.8gm
16	Perichampalam	<i>Phoenix sylvestris</i>	16.8gm
17	Kothamali	<i>Coriandrum sativum</i>	16.8gm
18	Sadamanjil	<i>Nardostachys grandiflora</i> Dc	16.8gm
19	Athimadhuram	<i>Glycyrrhiza glabra</i> Linn	16.8gm
20	Thakkolam		16.8gm
21	Candanum	<i>Santalum album</i> Linn	16.8gm
22	Munthirikkai	<i>Anacardium occidentale</i> Linn	16.8gm
23	Karunjeerakam	<i>Nigella sativa</i> Linn	16.8gm
24	Paranghipattai	<i>Smilax chinnensis</i> Linn	700gm
25	Ananithippili	<i>Scindapsus officinalis</i> Schott	16.8gm
26	Thippili moolam	<i>Piper longum</i>	16.8gm
27	Citramoolam	<i>Plumbago indica</i> Linn	16.8gm
28	Kurosaani omam	<i>Hyoscyamus niger</i> Linn	16.8gm
29	Vilamichhu veer	<i>Plectranthus vettiveroides</i>	16.8gm
30	Sirunagha poo	<i>Mesua nagassarium</i> Kosterm	16.8gm
31	Talisa patri	<i>Abies spectabilis</i> Mirb	16.8gm
32	Poolangkizhanghu	<i>Curcuma zedoaria</i> Mirb	16.8gm
33	Vettiver	<i>Vetiveria zizanoides</i> Rosc	16.8gm
34	Tanner vittan kizhanghu saru	<i>Asparagus recemosa</i> Wild	7.81
35	Koovai neer	<i>Maranta arundinaceae</i> Linn	16.8gm
36	Nilapanai kilanzhu	<i>Curculigo orchioides</i>	16.8gm
37	Muthakkasu	<i>Cyperus rotundus</i> Linn	16.8gm
38	Sitrathai	<i>Alpinia galangal</i> Linn	16.8gm
39	Sarkarai	Sugar	2450g
40	Gandhagam	Sulphur	140g
41	Then	Honey	1.31

The antimicrobial efficacy of Aqueous Leaf Extract of Gandhaga Rasayanam was evaluated by the agar well diffusion method, using six strains *E. coli*, *S. aureus*, *Bacillus Subtillis*, *Bacillus cereus*, *Pseudomonas aeruginosa*. Table.2 shows the zones of inhibition (mm) of Gandhaga Rasayanam at different concentrations. It was found that the Sample 1

observed a zone of inhibition of 8 mm, it shows good activity against *E.coli*. Sample 2 observed a zone of inhibition of around 10mm, showing good activity against *E. coli*, *S. aureus* and no activity to other all bacterial species. Sample 3 observed a zone of inhibition of 14 mm, showing good activity against *B. cereus* and 11 mm in *S.aureus*.

Table 2. Antibacterial Activity

Micro-Organisms Tested	Concentration of Extract (mg/ml) Zone of Inhibition (mm)		
	Sample 1 10mg/ml	Sample 2 20mg/ml	Sample 3 30mg/ml
<i>Bacillus subtilis</i>	-	-	-
<i>Bacillus cereus</i>	-	-	14
<i>Pseudomonas aeruginosa</i>	-	-	-
<i>Staphylococcus aureus</i>	-	10	11
<i>E.coli</i>	8	10	10



(a) *Bacillus subtilis*



(b) *Bacillus cereus*



(c) *Pseudomonas aeruginosa*



(d) *E.coli*

Plate 1. Antibacterial Activity of bacterial species

Discussion

Making anti-bacterial drug therapy effective, safe, and affordable has been the focus of interest during recent years. Gandhaka Rasayanam has proved its Anti-Bacterial Activity against *Staphylococcus aureus*; *Pseudomonas aeruginosa* ; *E.coli*; *Bacillus cereus*;

Bacillus subtilis. It was found that with different Concentration of Gandhaka Rasayanam, the Zones of inhibition were found to be significant in Bacteria. *Staphylococcus aureus* shows a Significant Zones of inhibition. When Compared with that of *Pseudomonas aeruginosa* and *E.coli*.

Aqueous decoction of black pepper showed antibacterial activity against periodontal bacteria (Chaudhry NM, Tariq P, 2006). The hexane and ethyl acetate extract of *Zingiber officinale* was found to be effective against *Colliform bacillus*, *Staphylococcus epidermis* and *Streptococcus viridians* (SP Mallu *et al.* 2003).

100 g/100 ml concentration of water extract of ginger leaf and root showed 30 and 32 mm zone of inhibition against *Staphylococcus aureus* and *Streptococcus pyogenes* (A Sebiomo *et al.*, 2011)

Piper longum showed potent antibacterial activity against *Bacillus subtilis*. Piperine was found to be more effective against *Staphylococcus aureus* (Bhargava A, Chauhan C., 1968) . The anti tubercular activity of *Piper longum* was also reported (Anon, 1967-68; Gupta *et al.*, 1980). Ethanol, hexane, n-butanol extract of *Piper longum* was effective.

Conclusion

Gandhaga Rasayanam has various Pharmacological Activities among them Anti-Bacterial Activity is more Significant. With different Concentration of Gandhaga Rasayanam, the zones of inhibition were Significant in Comparison to Control. This Study have been proved as an Evidence for the Anti-Bacterial Activity of Gandhaga Rasayanam.

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