

# Antibacterial Screening for Selected Medicinal Plants in Northern Province.

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## Introduction:

Siddha system of Medicine has so many preparations for diseases. Siddha drugs are herbal based medicine. We use the herbal plants for preparing the drugs. All the plants are the backbone of Siddha Medicine. Several medicinal plants are used in skin disease. Siddha drugs are very effective for skin diseases. Piththa thosam is imbalanced from its ordinary level in skin disease and also raththa thaathu (blood) is affected by particular causes. We should give the causative and symptomatic treatment. The drugs can liberate the toxin from the body, purify the blood and neutralize the thosam.

The emergence of new infectious diseases, several infections that appeared to have been controlled and the increase in bacterial resistance have created the necessity for studies directed towards the development of new antimicrobials. Considering the failure to acquire new molecules with antimicrobial properties from microorganisms, the optimization for screening methods used for the identification of antimicrobials from other natural sources is of great importance.

Antibacterial property means having the ability to suppress their growth or their ability to reproduce and destroy the bacteria. Heat, chemicals such as chlorine, and

antibiotic drugs all have antibacterial properties.

The shelf life of the products can be extended by taking hygienic measures during the manufacturing process. As the consumer trend today is towards preservative-free foods with a long shelf-life, industry is being forced to rethink its manufacturing methods. A clean and hygienic manufacturing environment is an essential prerequisite in order to keep contamination-related reject rates low.

## Justification

- Following plants are commonly available in Northern Province. So we can easily collect the plants.
- Selected medicinal plants are commonly used to treat skin diseases without any side effects and their action has not been proved scientifically.

## Literature Review

*Heliotropium indicum* is a medicinal plant known as the kodukku (Njs;nfhLf;F). A coarse annual herb, 30-60m tall. Stems stout, erect with ascending branches, hispid

with with long spreading hairs, internodes 3-6cm long hispid. Leaves are Simple, often sub opposite, 3.5-6 cm broad ovate, often unequal sided. Rounded and suddenly contracted to a decurrent base, acute or margin, bristly hairly on both sides with longer hairs on prominent veins beneath. Petides 1-2cm long. Winged, bristly hair.

“thq;Fj;jp dPu;thq;Fk; thj FUthFk;

Jq;fj;ij fhz;gpf;Fk; el;ghW vq;f

Kupr;R tplhky; tsu;f;Fnkd; - ehSk;

tpUr;rpfs; \$ykpJ nka;”

“Njs; nfhLf;Fs; lhapw; wpstlq;Fj; jg;ghJ

ehl;gl;l Gz;fug;ghz; ehrkhk;- fPl;gl;l

khw;;w fzKkWk; rpy;tplk; Nghk;

Nghw;w kUe;jhFk; Gfy;”

*Cassia alata* medicinal plants known as vandu kolli (tz;Lnfh;yp) in Englishwinged alata. Description - A large shrub with very thick , finely downly branches. Leaves – large , sub sessile , 30-60 cm long , pinnate , leaflet 8 – 12 pairs , each 5 – 15 cm long , oblong obtuse , minutely mucronate , rigidly subcoriaceous , glabrous OR odscurely downly beneath , broadly rounded and oblique at the base , rachis narrowly winged on each side of the base , stipules deltoid , rigid , persistant , articulate , 6mm long. Leaves are commonly used in medicine.

*Aristolochia bracteolata* medicinal plants known as aadutheenda paalai (MLjPz;lhg;ghiy).A weak prostrate

perennial herb with slender branched glabrous stem. Leaves : Simple, alternate, 1.2-5cm long and as broad , reniform/ broadly ovate , deply correlate at base, rounded but often apiculate at apex, minutely crisped on margin , petioles 1.2-1.8cm long. Leaves and roots are commonly used in medicine.

*Thespesia populneais* medicinal plants known as poovarasu (g+tuR). Description: A small tree 10-15cm high with arough lenticelled bark and dense top all parts covered with peltate scales. Leaves, bark and flowers are commonly used in medicine.

Ehw;whz;L nrd;wnjhU Eh;g+ turk;Ntu;

Jhwhz;l Fl;ilj; njhiyf;Fq'fhz; - tPwpg;

gOj;j ,iy tpijg;g+g;gl;;lapit fz;lhe;

GOj;j Gz; tpNur;rdKk; Nghk;”

*Azadiracta indica* medicinal plants known as vembu (Ntk;G) in Englishneem. A tall tree with spreading branches a straight brown barked trunk glabrous young parts leaves alternate. Leaflet 2-8 pairs. Ovary superior 3 lobular , with 2 collateral ovules stigmas 5 – lobed. Leaves, bark, flowers and seeds are commonly used in medicine.

“fpUkpFl;l khe;jq; nLtplRuq;fs;

nghUkpak; #upifapd; Gz;fs; xUkpf;f

epk;gj;jpiyapUf;f ePLyfy; ePq;fhky;

jk;gj; jpiyapUf;ff; fhz;”

Plants are a potential source of antimicrobial compounds and several researchers throughout the world are investigating the

antimicrobial activity of medicinal plants, which are utilized in the traditional or alternative health systems. Screening of medicinal plants for therapeutically active bio-molecules including those with antimicrobial properties has gained an unprecedented importance in the recent years and World Health Organization (WHO) has recently shown genuine interest in promoting the development and utilization of indigenous medicinal plant resources in the developing countries so as to extend safe and effective healthcare to maximum number of population in those countries. Therapeutically active principles are extracted from all parts of the plant body, but the concentration of these components varies from part to part. Normally, parts known to contain the highest concentration of principles are preferred to therapeutic purpose and it can either be the leaves, stems, barks, roots, flowers and seeds. It is therefore important to consider the commonly considered or preferred part of the target plant by the traditional healers while exploring effective therapeutic agents.

## Methodology

Plants were collected from the field visit in Jaffna district. Collected leaves were dried in shadow, ground well finely powdered. Then packed and labelled at the pharmacy in Unit

of Siddha Medicine. The powders were sent to laboratory of Botany for the antibacterial screening. Professor Piyal A. Marasinghe, Scientific Officer in charge, Medicinal plant garden, Haldummulla authenticated the taxonomy of plants.

In the Antibacterial screening, Chloroform and Ethanol extracts of *Azadirachta indica*, *Aristolochia bracteolata*, *Heliotropium indicum*, *Thespesia populnea* and *Cassia alata* were used. Dried powders of the leaves of the above plants were sequentially extracted using Chloroform and Ethanol and the solvents in the extracts were evaporated using rotavapor at 50 °C. Then test concentrations were prepared by dissolving the dried crude extract in DiMethyl Sulfoxide (DMSO) and Acetone mixture in 1:1 ratio. Inhibitory capability was detected by agar well diffusion method. Each extract was tested for all selected bacteria *Proteus sp.*, *Pseudomonas sp.*, *Bacillus sp.*, *Staphylococcus aureus* and *Streptococcus sp.* on triplicate plates and the data were analysed statistically using Minitab (one way ANOVA followed by LSD).

## Result and Discussion

Extract	Bacteria				
	<i>Proteus sp.</i>	<i>Pseudomonas sp.</i>	<i>Bacillus sp.</i>	<i>Staphylococcus sp.</i>	<i>Streptococcus sp.</i>
CA	—	—	14.90±0.36 <sup>e</sup>	—	—
CA1	—	—	16.77±0.25 <sup>d</sup>	9.97±0.15 <sup>c</sup>	9.50±0.10 <sup>f</sup>
CT	—	—	13.00±0.20 <sup>f</sup>	—	9.53±0.06 <sup>f</sup>
CP	14.07±0.21 <sup>d</sup>	13.93±0.30 <sup>a</sup>	15.00±0.20 <sup>e</sup>	15.90±0.10 <sup>a</sup>	13.77±0.21 <sup>c</sup>
CV	—	11.90±0.36 <sup>b</sup>	8.97±0.15 <sup>i</sup>	—	—

EA	—	14.03±0.15 <sup>a</sup>	13.00±0.20 <sup>f</sup>	16.00±0.20 <sup>a</sup>	13.10±0.27 <sup>d</sup>
EA1	—	—	11.87±0.23 <sup>g</sup>	9.03±0.21 <sup>c</sup>	—
ET	—	9.73±0.12 <sup>cd</sup>	9.93±0.21 <sup>h</sup>	14.00±0.10 <sup>b</sup>	13.03±0.25 <sup>d</sup>
EP	—	—	21.07±0.21 <sup>c</sup>	—	—
EV	—	10.00±0.10 <sup>c</sup>	9.43±0.12 <sup>i</sup>	—	9.57±0.21 <sup>f</sup>
A	15.00±0.10 <sup>c</sup>	—	38.93±0.40 <sup>b</sup>	—	12.03±0.25 <sup>e</sup>
S	19.97±0.15 <sup>b</sup>	—	40.67±0.67 <sup>a</sup>	—	17.03±0.15 <sup>b</sup>
C	18.87±0.51 <sup>a</sup>	—	20.97±0.15 <sup>c</sup>	10.03±0.25 <sup>c</sup>	20.07±0.31 <sup>a</sup>

CA,CA1,CT,CP,CV - Chloroform extracts of *Azadiracta,Aristolochia,Heliotropium,Thespesia, Cassia alata*

EA,EA1,ET,EP,EV – Ethanol extracts of *Azadiracta,Aristolochia,Heliotropium,Thespesia, Cassia alata*

A,S,C — Amoxycilin,Streptomycin, Chloxyciline

If we look at the results of Chloroform extracts, *Azadirachta indica*,inhibits only *Bacillus sp.* and other bacteria were not at all inhibited. *Aristolochia bracteolata*, inhibits *Bacillus sp. Staphylococcus aureus*, and *Streptococcus sp.* and not others. *Heliotropium indium*, inhibits only *Bacillus sp.* and *Streptococcus sp.**Thespesia populnea* inhibits all tested bacteria. *Cassia alata* inhibits only *Pseudomonas sp.* and *Bacillus sp.* If we look at the Ethanol extracts,*Azadirachta indica* inhibits all the bacteria except *Proteus sp.**Aristolochia bracteolata*,inhibits *Bacillus sp.* and *Staphylococcus aureus.**Thespesia populnea* inhibits all the bacteria except *Proteus sp.* *Heliotropium indium*,inhibits only *Bacillus sp.* and *Cassia alata*inhibits *Pseudomonas sp., Bacillus sp.* and *Streptococcus sp.*

Chloroform extract of poovarasu shows inhibition effect on all tested bacteria. Ethanol extract of vembu and poovarasu also inhibit most of the bacteria tested except *Proteus sp.* Although Chloroform and Ethanol extracts of poovarasu is efficient in controlling a wide spectrum of gram (+)ve and gram (-)ve bacteria, inhibitory effect is greater with chloroform than ethanol.Inhibition of bacteria by standard antibiotics(Amoxyciline,Streptomycin,Chlo -xyciline) vary widely.

Some bacteria were not at all inhibited by standard antibiotics. *Pseudomonas sp.* was not inhibited by all three antibiotics used in the study as positive control.But inhibition by Chloroform extract of *Thespesia,Cassia* and Ethanol extract of *Azadiracta,Heliotropium* and *Cassia.**Staphylococcus aureus* was not inhibited by Amoxyciline and Streptomycin, but Chloxyciline showed some inhibition.*Staphylococcus aureus* was inhibited by Chloroform extract of *Aristolochia,Thespesia* and Ethanol extract of *Azadiracta,Aristolochia* and *Heliotropium.**Bacillus sp.* was inhibited by all plant extracts (chloroform and ethanol).

*Streptococcus sp* also variably inhibited by Chloroform and Ethanol extracts of some

plants. But the inhibition by Chloroform extract of *Thepesia* and *Cassia alata* and Ethanol extract of *Heliotropium* was found to be higher than the inhibition by Standard antibiotic Amoxyciline. The higher inhibitory effect of some plant extracts may be due to the synergistic effect of the compounds present in the crude extract.

Further investigation to report the active ingredients in the crude extracts would be very useful to address the control of diseases.

## Conclusion

Speciality of Siddha System is preventing and treating chronic diseases by means of natural herbs. In this skin diseases are important. There are many herbs used in treating and caring skin diseases. Most of them consist anti-microbial activity. Use of these herbs in certain cosmetics, perfumes, herbal body lotions, facial creams, packs, bath powder etc reduce the act of skin infections by eradicating certain organisms. Even in this century the folks mostly prefer natural and herbaceous products other than artificial substances. In our vicinity the herbs that used in skin problems are with high Anti microbial activity. In case it is much useful in using these herbs as they are readily available from natural habitats like waste lands, river valleys and coastal region etc. and they are free from harmful chemical residues which may be present in herbs from cultivating them using conventional methods.

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