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## ANTIMICROBIAL ACTIVITY OF PIPPALI FRUIT ( *PIPER LONGUM* )

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### ABSTRACT:

*Piper longum* linn is one of the important medicinal plants of the family *piperaceae*, being one among the constituent of *trikatu*, *panchkola*, etc, very widely used in Ayurveda for the treatment of various disorders. The *nirukti* of word *pippali* signifies its action in maintaining total health and also in *dhatu poshna* and *poorana*. Pirpathi paalayathi purusham purayathi cha ksheenam dhatunithi prupalanapurana. In the ayurvedic formulatary of india pippali is being used in 324 formulation. It is used as prakeshepa dravya in many formulation. It is highly valued from the immemorial because of its vast medicinal properties. It is extensively used as Antiinflammatory, coughsuppressor, antibacterial, insecticidal, antimalarial, CNS stimulant, antitubercular, anti-helminthic, hypoglycemic, Antispasmodic, anti-giardial, Immunostimulatory, hepatoprotective, analeptic, antinarcotic, antiulcerogenic activity. The present article provides all necessary information regarding its classical literature.

**KEY WORDS:** *Piper longum* linn, *pippali*.

### INTRODUCTION:

Being the most intelligent and developed animal humans are the most dominating species in this world but that is not the end of story. However, we are best but we are not safe. The world is a deadly war battle. Surviving here is major agenda to all species. Nevertheless numerous gifts from god in the name of Herbs gives us plenty ways to survive Pippali or Piper longum is one of them with hundreds of benefits. So let us explore it. Long pepper reached Greece in the 6<sup>th</sup> or 5<sup>th</sup> century BC through Hippocrates, who was the first person to maintain it, and has discussed it as a medicament and as a spice. Among the Greeks and Romans and prior to the European discovery of the New World, Long pepper was an important and well known spice.

Long pepper, which tastes pungent and sweet at the same time, probably came to Europe much before the now dominant black pepper. It is believed that during

the Roman Empire, it was priced about three times more than black pepper, as it was perfect for Roman cookery, which especially favored these two taste sensations. In India, the long pepper is mainly used in pickles. A scandent perennial aromatic shrub with jointed branches, the entire plant is pungent. The leaves are many and cordate, while the flowers grow on solarity spikes. The male and female spikes are produced on different plants, while the male spikes are slender with narrow bracts. The fruit, which is very small, is sunk inside the flashy spike and is blakish green and shining. Long pepper is the unripe spike of the plant. It is that part of the plant that is used in medicine. The root which is thick and branched is also medically important is called pippali-moolam.

**PLAN OF WORK:** Work was carried out in three stages

- 1) **Review of literature**
- 2) **Standardization**
- 3) **Antimicrobial study**
- 4) **Result & conclusion**

#### REVIEW OF LITERATURE:

The earliest known documentation of plant treatments in Indian literature is found in Vedas, the sacred literature of Hindus. About 300 plants are described here; 'pippali' the drug taken for the study has been found among them. The reference of herb Pippali is found. The use of Pippali was more expanded in Purana period in comparison to Vedic period.

**a) CHARAKA SAMHITA (1000 TO 400 A.D.):-**  
Charaka has mentioned pippali in *krimi chikitsa*, *kasa chikitsa* in *vatvyadhi*. Pippali is used as *Bramha Rasayan*. It is also use as *sutika roga*, *vishghna dravya*, *kanth roga*.

**b) SUSHRUTA SAMHITA (1000 BC. TO 500 A.D.):-**  
*Sushruta* has mentioned both varieties of *pippali* and in *sutika chikitsa*, *arsha*, *aamatisar*.

**c) ASHTANGHRIDAYAM (6<sup>th</sup> century A.D.):-**  
Vagbhata mentioned pippali and in *krimi chikitsa* .in *astang sangrah* mentioned *pippali* in *krimi chikitsa*, *vatvyadhi kashar-chikitsa*.

**D) Yogaratnakar and sharangdhara (17<sup>th</sup> century):-** Yogaratnakar has mentioned *pippali* in *krimi chikitsa or jwara*, *kushta*

#### NIGHANTU PERIOD:

Almost all nighantu granthas have mentioned pippali

1) Bhavprakash Nighantu	-	Haritakyadi varga
2) Dhanwantari Nighantu	-	shatpushpadi gana
3) Shodhal Nighantu	-	shatpushpadi gana
4) Raj Nighantu	-	Haritakyadi varga
5) Kaiyav Nighantu	-	shatpushpadi gana
6) Shaligram Nighantu	-	Pippalyadi varga
7) Nighantu ratnakar	-	pippalyadi varga
8) priya Nighantu	-	Haritakyadi varga
9) Siddha Mantra	-	kaphpittaghna varga
10) Sarswati nighantu	-	Chandandi varga
11) Nighantu aadarsh	-	pippalyadi varga
12) Guna ratnamala	-	Haritakyadi varga
13) Abhidana ratnamala	-	katudravya skandh

Synonyms and gunkarma of pippali are well described in all nighantu.

#### Rasa grantha period:

pippali and is trace from various Rasagranthas ,Rasendra sarsangraha,Ras kamdhenu,Bhaishajya ratnawali, Rasraj sundar, yogatarngini, Rasratnasamuchaya, etc. in these text various formulation like agnitundi vati,shankhvati etc have been mentioned which are used in current medical practiced.

#### Authentication & Standarization

Sample was sent in a standard & well known certified lab for investigation & following tests were performed

- 1) Organoleptic characters
- 2) Total Ash
- 3) Alcohol soluble extract
- 4) Acid insoluble ash
- 5) Water Soluble extract
- 6) Moistur contain
- 7) Loss on drying
- 8) Water soluble ash
- 9) Fineness
- 10) TLC(thin layer chromatography)

**Organoleptic Evaluation of Pippali Fruit:**

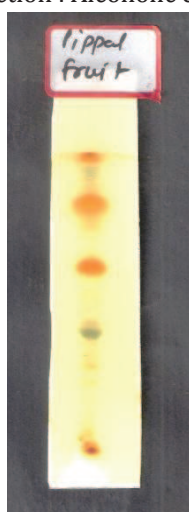
SR NO	Test	Observation
1	color	dark Greenish
2	odour	aromatic
3	taste	pungent
4	touch	hard

**Physiochemical Standardization of pippali Fruit:**

1	Total Ash	6.09%	not more than 11%
2	Acid insoluble ash	0.32%	not more than 1%
3	alcohol soluble extract	5.97%	not less than 15 %
4	water soluble extract	8.14%	not less than 15%
5	moisture contain @ 110°C	4.16%	
6	loss on draying @110°C	4.16%	
7	water soluble ash	<0.1%	
8	fineness	98% powder passes through 120 mesh	

**Name of sample : pippali Fruit (*piper longum*)****Thin layer chromatography :**

Extraction : Alcoholic extract



Adsorbent used: silica gel G60F254

Mobile phase: Toluene : Ethyl Acetate: Formic acid ( 5: 4: 1)

4 spot were observed

sr. no.	Name of sample	Result obtained
1	pippali fruit	Done

**Antimicrobial – Study**

Antimicrobial activity of pippli and gajapippali Root or Fruit

In the modern medicine micro organisms are cause of so many diseases.

These diseases are effectively treated with antimicrobial drugs. But these antimicrobial drug having lot of side effects eg- Skin rash fever, epigastric pain. According to ayurveda principles the treatment should be curative without any side effects.

Now it's the time to use herbs as antimicrobial agents, so there is much scope for research as antimicrobial agents. After going through many kromighna dravyas mentioned in ayurveda literature we have decided to study most commonly used, Drugs that is pippli and gajapippali.

Sources of the drug – Root and Fruit of Aqueous extract of pippli and gajapippali, pippli and gajapippali was taken for study.

Local of the study- The study was conducted in Bhide lab, Pune

**MATERIALS:**

- i) Nutrients agar plates.
  - ii) Potato dextrose agar plate
  - iii) Nutrient broth tubes.
  - iv) Sterile ear buds
  - v) Sterile filter paper disc
  - vi) Nichrome wire loop
  - vii) 24 hrs grown culture of organism.
- a) aspergillus niger.

- b)Staphylococcus aureus  
c)Escheria coil  
d)Control

Preparation of Media –

Nutrient agar (50 ml)- for b,c organism

Composition- Pepton – 0.25 gm

Nacl - 0.25 gm

Beef Extract – 0.75 gm

Yeas extract – 0.075 gm

PH -

Distilled ueter – 50 ml

Method: All these Contents were added to cleared and washed 100ml Flask. And mixed till all the contents dissolved in water Flask was plugged with cotton.

Potato dextrose agar (PDA) for 'a' organism

Potatoes infusion form : 200 gm/lit

Dexirose : 20 Gms/lit

Agar : 15gms/lit

Plt at 25c :5.6+\_ 0.2

Method save as above mentioned

Nutrient + Broth (50 ml)

Pepton – 0.25 gm

Nacl – 0.25 gm

Beef Extract – 0.075 gm

Yeas extract – 0.075 gm

Distilled water – 50 gm

PH – 7

Method – All these contents were transferred to 100 ml flask and stirred to dissolve the content. Then 4 ml broth was transferred in each test tubes. Tubes

were plugged with cotton.

#### STERILIZATION OF MEDIA AND GLASS WERES

Washed and cleaned glass petry plates were wrapped with papers and kept in autoclave bag.Above flask with media were also kept in autoclaveble bag All these sterilized by autoclaving at 121 c for 20 minutes

#### Preparation of disc-

Disc was prepared by taking wattmans filter paper no.1 and cutting with the help of punch and sterilized in hot air oven.

#### Procedure:

Pure cultures of test organisam were isolated and loop of each organism was transferred in to respective broth presterilized.

24 hr growth culture were taken for the experiment nutrient agar potato dextrose agar were sterilized and poured in petry plates and allowed to solidified The organism were swabbed on the agar plates with the help of sterilized ear buds

Sterile disc of wattman's filter paper were presterillized then deeped into the oil under investigation and placed on the respective plates and for control the disc impregnated with nutrient broth and placed on plate.

All the procedure was done in sterile condition and as per microbiological standards.(general microbiology,rogar.v stanie

#### Sample tested -10 mg

s. no	Sam-ple Name	1					ME AN	2					ME AN	3					ME AN
1	pippali fruit	10	10	11	10	11	11	-	-	-	-	-	-	-	-	-	-	-	

#### Sample tested -5mg

s. no	Sam-ple Name	1					ME AN	2					ME AN	3					ME AN
1	pippali fruit	9	7	9	9	9	10.4	-	-	-	-	-	-	-	-	-	-		

**Sample tested -15mg**

s. no	Sam-ple Name	1					ME AN	2					ME AN	3					ME AN
1	pippali fruit	14	14	15	15	15	14.6	-	-	-	-	-	-	-	-	-	-	-	



Fig.2



fig.3

**RESULTS AND CONCLUSION:**

Each and every study, it may be either conceptual or clinical, is always required to be proved on the basis of logic, fruitful reasoning & supported by achieved practical data as pramana, then only it can be taken as a principle of that science. Hence the discussion & interpretation of the research study becomes an essential and important thing for research scholar.

The physic-chemical result i.e ash value, acid insoluble ash, alcohol and water soluble extractive values are within limits of ayurvedic pharmacopeia

- TLC posses some common rf values found in alcoholic extract samples which represent similar compounds in both extracts
- Anti microbial activity of pippali fruit gave the good zone of inhibition against s.aureus
- Against e.colli extract shown resistance by disc diffusion method in both sample
- But in antifungal aspegillus niger showed resisstance by disc diffusion method. The aim of the study is not to check the incidence or prevalence of disease. The aim of study is to evaluate the antimicrobial activity of Pippali and .thus statistical analysis of data is not considered.

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