

# Betel leaf gel formulation in the management of antifungal and antimicrobial activity

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## **ABSTRACT :**

In recent years, the increase in resistance in known fungal Mater pathogens to the available antifungal drugs has raised enormous challenges to public health issues [1-3]. In addition, conventional antifungal drugs have undesirable side effects and are very toxic such as chlorhexidine, imidazole and amphotericin B [4]. Moreover, several studies have suggested that a number of plant species possess promising Antimicrobial compounds,significance in this context is to search for novel antifungal & antimicrobial agents that would be less toxic and more effective. Several medicinal plants have been extensively investigated in order to find novel bioactive compounds [5]. [6-9]. Piper betle Linn. (Piperaceae),is one of them.This paper will provide an overview of the antimicrobial & antifungal activity shown by Piper betle crude drug gel formulation

## **I. INTRODUCTION**

The family of Piperaceae belonging to superorder Nymphaeifolia, order Piperales and genus Piper of family Piperaceae commonly known as pan comprises about 10 genera, 2000 species.Piper betel was attributed to its antioxidative property. A preliminary study has reported Piper betel leaves extracts contain large numbers of bioactive molecules like polyphenols, alkaloids, steroids, saponins and tannins [12]. The leaves extract of Piper betel have also been reported to exhibit biological

capabilities of detoxication, antioxidation[37], and prevention against photosensitisation induced biological damage [28] .In addition, it also acts as a breath freshener, a digestive and pancreatic lipase stimulant and a pain killer in joint pain [11,13].The role this formulation is to evaluate the antimicrobial & antifungal activity in form of crude drug gel of Piper betle .

## **Phytoconstituents:**

Specific spicy burning taste of betel leaf is derived from the presence of volatile oil consisting of phenols and terpenes etc.The taste and aroma depends on the presence and proportion of the various components in the oil which vary markedly among the cultivars and makes them differ in aroma and taste. Its minerals and vitamin contents are Calcium, Riboflavin, Carotene, Niacin, Thiamine, Vitamin B and C.[5] .

The essential oil is a light-yellow liquid of aromatic odour and sharp burning in taste. It contains a phenol called chavicol which has powerful antiseptic properties. Essential oil of the leaf gives it the aromatic flavour. Importantly,  $\beta$ -sitosterol is present in the root. The alkaloid arakene has properties resembling cocaine in some respects. Several terpenes and monoterpenes are present in betel oil. Nutrients like nicotinic corrosive, ascorbic corrosive, carotin corrosive(1, 2).

**Table 1 : Active Phytoconstituents**

Component	Percentage of Components
Chavibetol	53.1
Caryophyllene	3.71
Chavibetol acetate	15.5
Allylpyrocatechol Diacetate	0.71
Chavibetol methyl ether	0.48
Campene	0.48
f-Pinene	0.21
Eugenol	0.32
u-Limonene	0.14
a-Pinene	0.21
1,8-Cineol	0.04
Saprobe	0.11
Allylpyrocatechol Monoacetate	0.23

## II. MATERIAL AND METHOD :

Serial No.	Ingredient	Quantity
1	Carbopol	1 gm
2	Distilled Water	100 ml
3	Methyl Paraben	0.02 gm
4	Liquid extract	1 ml
5	Triethanolamine	q. s
6	Rose water	q. s

Table 2 : Material Used For Formulation Of Gel

**Method of gel preparation :** The gel Formation Is done by Mixing 1 gm Carbopol in 100ml of Distilled water followed by Mixing Methyl Paraben , Triethanolamine on Magnetic Stirrer .

**Pharmacognosy of betel leaf :**

Synonyms: Betel pepper , Piper betel

Biological source: Piper Betel L.  
Family: Piperaceae  
Kingdom: Plantae  
Genus: Piper  
Species: P. betel  
Order: Piperales

**BETEL LEAF EXTRACTION**

Take 50 Betel leaves, clean & wash it properly with distilled water.

- 1) Weigh it by using a weighing machine.
- 2) Take Mixer, grind the leaf by using it.
- 3) Take a beaker, collect paste of betel leaf into it.
- 4) Take another beaker, extract the filter 'SVARASA' (fresh juice 50 ml) from pest by using muslin cloth.
- 5) Take a water bath, placed beaker containing liquid extract into it for concentrated 'SVARASA' (thick viscous consistency) for two & half hours.
- 6) Measure concentrated liquid extract by using a measuring cylinder (8 ml).
- 7) And take 1 ml of liquid extract from it .

**The Determination of pH :-**The pH of created gel definitions was resolved to utilize advanced pH meter. 1 gm of the gel was disintegrated in 100 ml refined water and saved aside for two hours. The estimation of pH of every detailing was done in three-fold and normal qualities are determined. The pH which are viewed as worthy to evade the danger of bothering upon application to the skin since grown-up skin pH is 5.26. (3) as application range of gels should lie 4-7 pH range.

**Determination Viscosity :-**

The viscosity of a fluid is a measure of its resistance to deformation at a given rate. For

liquids, it corresponds to the informal concept of "thickness": for example, gel has a higher viscosity than water. The viscosity of betel leaf gel is 48267nsm-2 measured on Brookfield Viscometer .

**Determination Of Spreadability :-** Spreadability was dictated by the device which comprises a wooden square, which was given by a pulley toward one side.

By this technique, spreadability was estimated on the premise of slip and drag attributes of gels. An overabundance of gel under investigation was set on this ground slide. The gel was then sandwiched between this slide and another glass slide having the element of the fixed ground slide and furnished with the snare

Spreadability was dictated by the device which comprises a wooden square, which was given by a pulley toward one side. By this technique, spreadability was estimated on the premise of slip and drag attributes of gels The top slide to cover a separation of 7.5 cm be noted. A shorter stretch demonstrates better spreadability.

**Evaluation of antimicrobial and antifungal activity:** The antimicrobial and antifungal activity were studied by following methods

**Disc diffusion method:**

The antimicrobial activity of ethanol extract of betel leaf gel was screened using disc diffusion technique at following Concentration :

Control	Lactobacillus	Tap Water	Betel Leaf Extract Gel	Std.Drug Azithromycin
-	1/10 ml	1/10 ml	0.01% w/w 0.005% w/w 0.02% w/w	0.01%

**Turbidimetric method for fungal growth**

The antifungal activity of extracted betel leaf gel was performed by using turbidimetric method .

Method for determining the amount of cloudiness, or turbidity, in a solution based upon measurement of the effect of this turbidity upon the transmission and scattering of light (38,15) .

Fungal culture	Betel leaf extract gel	Standard drug (Itraconazole
Yeast	Slightly Turbid than Standard (Itraconazole	Clear Solution

### III. RESULT AND DISCUSSION :

Serial No.	Property	Result	Remark
1	pH (5-6)	5.26	Passed
2	Spreadability	2.39 cm <sup>2</sup>	Excellent
3	Viscosity	48267nsm <sup>-2</sup>	Excellent
4	Washability	good	Excellent
5	Colour	Brown	-
6	Odour	Smoky	-
7	Clarity		-

#### Discussion : Antimicrobial activity

In Lactobacillus culture, the C Zone of inhibition of betel leaf gel extract shows greater inhibition than the A B and D zone . The gel concentration of the C zone is 0.02 % w/w .In H2O mix culture, the C Zone of inhibition of betel leaf gel extract shows greater inhibition than the A, B and D zones . The gel concentration of the C zone is 0.02 % w/w .

#### Discussion: Antifungal activity

Betel leaf extract gel shows slightly turbid than standard drug( Itraconazole) in yeast culture .Standard drug ( Itraconazole ) was clear.

### IV. CONCLUSION:-

The plant betel leaves was selected for the study,whose extract was very useful for various purpose literature survey related that this plant is used traditionally for various alignment especially antimicrobial and antifungal properties extensive scientific studies where not performed on betel leaf gel formulation.This was not undertaken for any sci scientific study.Hence the present performed. Gel formulation of aqueous extract of betel leaves found to be clear,colour, odour, clarity . Betel leaves extract gel formulation gel show antibacterial and antifungal activity against Bacillus, mix strain and yeast. Among them

concentration exhibited good inhibition followed by Azithromicine and Fluconazole.

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