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A COMPARATIVE PHYTOCHEMICAL ANALYSIS OF TOBACCO AND ITS NATURAL EXTRACT- AN ECCENTRIC APPROACH

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ABSTRACT

Tobacco or Pugailai (Nicotiana tobaccum) has a long history of use by medical herbalist for assorted maladies. Tobacco is probably the only plant which is ever used as the panaceas of panaceas. It was once consider to be one of the god sent remedies. But now it has become the subject of controversy because of addictive tendency of Nicotine present in it. Tobacco leaves have proven Antispasmodic, diuretic, expectorant and sialogogue actions. But its medicinal value has been abstained because of its virtue. As an antiphon a natural method of extracting Pugayillai Uppu has been procured from the Siddha literatures. Literary cue also go in league with the above mentioned pharmacological actions. This is just a prefratory attempt to compare the presence and level of the alkaloid nicotine in Pugailai uppu with that of the dry leaf powder. When this Pugailai Uppu affirmed to have less or no nicotine it will be a preponderant medicine to the society.

INTRODUCTION

Botanical Name	: Nicotiana tobaccum[1]
Tamil Name	: Pugailai[1]
Sanskrit Name	: Tamaghu, Taamraparna[2]
Taste (Suvai)	: Pungent, Bitter[1].
Potency(Viryam)	: Hot(Veppam)[1]
Post Digestive Taste (Pirivu)	: Pungent[1]
Pharmacological actions	: Antispasmodic, Diuretic, Laxative, Sialogogue, Emetic[1],

Tobacco has been used as pain reliever, laxative and also as a pacifier of vitiated vita[2]. It was also used in the treatment of dental caries, inflammations, worm infestations, dyspepsia, arthritis, lumbago, rheumatism, gout, flatulence, hemorrhages, bronchitis, asthma, scabies, skin diseases, ulcers, rhinitis, tubercular glands of the neck, sexual weakness and as a brain tonic[2].The use of tobacco as a medicine has been descended because of the addictive tendency and harmful effects of Nicotine present in it[2].

Nicotine

Nicotine is a liquid volatile colourless alkaloid found in the plants of Solanaceae. It constitutes approximately 0.6% to 3% of the dry weight of tobacco[3]. It is formed during the biosynthesis taking place in the root and accumulation in the leaves[3]. Heart rate, Left ventricular work, Mean aortic pressure, Myocardial O_2 consumption, Total coronary blood flow were known to be increased by Nicotine[4]. It inhibits gastric and duodenal muscle contractile activity[4]. It also produces SA block and AV block[4].

A natural method of extracting a salt from tobacco leaves has been mentioned in Siddha Literatures[1] and since Nicotine is a volatile alkaloid, salt obtained from tobacco leaves was belived to be devoid of Nicotine. This attempt of testing the presence of Nicotine was made to procure another potent medicine.

MATERIALS AND METHODS

The following steps were carried out during the study

1. Extraction of Salt
2. Preliminary Phytochemistry
3. Specific test for Nicotine
4. TLC

Extraction of the tobacco salt[1]

Leaf with stalk were taken and dried. Then it was made into white ash by igniting. 4 parts of water was added to 1 part of ash in a mud pot. The ash was mixed with water and kept in sunlight for 3 days. On the 4th day the supernatant was taken and heated till it turns to colloid form. Colloid form was allowed to dry until it becomes salt.

Preliminary phytochemistry [5, 6, 7]

Tests for Alkaloids

About 0.5g of crude tobacco powder and the salt were separately stirred in a 5ml of 1% aqueous hydrochloric acid on a water bath; Few drops of Mayer's reagent was added to 1ml of the filtrates and another 1ml of the filtrates were treated on the same way with Dragendorff's reagent. The result observed was given in the Table 1.

Test for Tannins

About 0.5g of each portion of the Tobacco powder and the salt were stirred with 10ml of distilled water and filtered. Then a ferric chloride reagent was added to each of them. The results observed were given in the Table 1.

Test for Flavonoids

About 0.5 gm of the tobacco powder and the salt were mixed with 10ml of distilled water and filtered. Then the filtrates were treated with few fragments of Magnesium ribbon and concentrated Hydrochloric acid was added drop wise. The results observed were given in the Table 1.

Test for Reducing Sugars

The filtrates were seperately treated with pyridine and alkaline sodium nitroprusside solution. Another test was carried out with bromine water. The results observed were given in the Table 1.

Test for Carbohydrates

The filtrates were separately treated with few drops of Benedict's reagent and kept in a water bath. The results observed were given in the Table 1.

Test for Steroids

The chloroform extracts of the Crude tobacco powder and salt were treated with few drops of conc. Sulphuric acid, shaked well and allowed to stand for some time. The results observed were given in the Table 1.

Test for Proteins

The extracts taken from the Crude tobacco powder and the salt were treated with 0.2% solution of Ninhydrin (Indane 1, 2, 3 trione hydrate). The results observed were given in the Table 1.

Test for Terpenoids

About 0.5 g of crude tobacco powder and the salt were dissolved in 5 ml of methanol. A 1 ml of 2, 4-dinitrophenyl hydrazine dissoluted in 100 ml of 2M HCl was added to 2 ml of the each extract. The results observed were given in the Table 1

Specific tests for nicotine[7]

The extracts taken from the crude Tobacco powder and the salt were treated separately with the three solutions viz.i)Iodine Solution in Dry ether ii) Vanillin in Dil.Hcl iii) Cyanogen Bromide and Anniline and results were observed. The observed results were produced in the Table 2.

Thin layer chromatography

Thin layer chromatography was performed on a sheet of glass, which was coated with a thin layer of silica gel. After the sample has been afixed to the plate, a solvent or solvent mixture was drawn up the plate via capillary action. The petroleum ether and methanol extracts of the *Crude Tobacco powder and its salt* were subjected to thin layer chromatographic analysis, to find the presence of Nicotine and to support the Phytochemical Analysis. The details of procedure are as follows:

The silica gel G slurry was poured on the glass plates and analytical TLC plates were prepared. The prepared TLC plates were dried for 30 minutes in air and then in an oven at 110° c for another 30 minutes. By using the capillary tubes, about 2cm from the edge, the petroleum ether extract and the methanol extract were applied as a single spot along one side of the TLC plate. Suitable solvent systems were made by running elutropic series of different solvents on the TLC plates. The TLC plates containing the sample spot were placed in the development chamber at a 45^0 angle covering the bottom of the plate by the solvent nearly up to 1 cm. The solvent front was noted and the plate was allowed to dry. Since Nicotine is a colourless alkaloid it was detected by using Dragendorff's reagent as a detecting agent. The result was showed in the Fig 1.

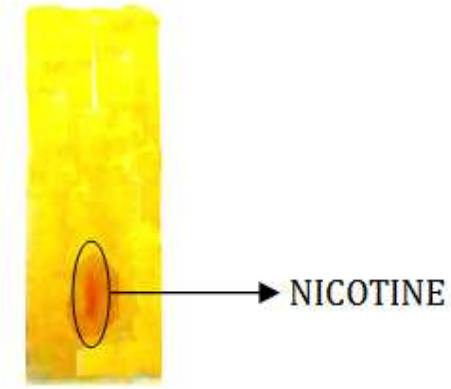
RESULTS

Table 1:

S.I.No	Chemical Constituents	Tobacco Leaf Powder (*Pugailai*)	Tobacco salt(*Pugailai Uppu*)
1)	Tanins	Positive	Positive
2)	Alkaloids	Positive	Negative
3)	Steroids	Negative	Negative
4)	Flavanoids	Negative	Negative
5)	Reducing Sugars	Negative	Negative
6)	Carbohydrates	Positive	Positive
7)	Proteins	Negative	Negative
8)	Terpenoids	Negative	Negative

Table 2:

Solutions	Tobacco *(Pugailai)*	Tobacco Salt*(Pugailai Uppu)*
Iodine solution in Dry Ether	Presence of Red Crystals	Absence of Red Crystals.
Vanillin in Dil. HCL	Presence of Rose colour	Absence of Rose Colour.
Cyanogen Bromide and Anniline	Presence of orange red colour	Absence of Orange Red colour.



TLC Analysis of Pugailai

TLC Analysis for Pugailai Uppu

Fig 1:

CONLUSIONS

The phytochemical analysis of both the crude Tobacco powder and the salt reveals that the chemical constituent of Pugailai and Pugailai Uppu are almost same except for the presence of Nicotine in the former and absence in the later. Since Nicotine is responsible for the addictive tendency and harmful effects, its absence in the salt may be consider a valid evidence for the further scientific studies. This just a preliminary study and the Tobacco salt has to be evaluated for various pharmacological activities mentioned for the Crude Tobacco Powder. This studies when proved, will ponder the society a potent diuretic, Antispasmodic, Laxative etc.

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