

Evaluation Of Herbal Toothpowder For Its Piperine Content

^bMEGHA GUPTA, ^aMANISH LAVHALE, ^bS.NAYAK*

^b VNS INSTITUTE OF PHARMACY, NEELBUD, BHOPAL(M.P.)

^a PHARMACY DEPARTMENT, G.H.PATELBUILDING, The M.S. UNIVERSITY
OF BARODA, FATEHGUNJ, VADODARA – 390002

Received : 12-7-2004

Accepted : 10-12-2004

ABSTRACT:

Objective- A well-known herbal toothpowder was evaluated & standardized for its Piperine contents. *Methods-*The formulation was subjected for physical constants like Moisture content, Ash value, and Extractive values in various solvents including Petroleum ether, Ethanol and Water. Thin layer chromatography and spectroscopic studies was carried out for the qualitative analysis of Piperine content. *Results & Conclusion* _Present study reveals the presence of Piperine in toothpowder. As the present scenario is moving towards the herbal medicines, these evaluation parameter will further help to set up a standard validation process for herbal formulations.

Key words : Tooth powder, Piper nigrum, Piperine, Chromatography.

INTRODUCTION

Market value of herbal products in increasing day by day. Due to variability of phytoconstituents, substituents and adulterants in crude drugs it is essential to standardize these formulations for their quality and purity. Herbal toothpowders are available in market in a wide range, consisting various ingredients. Several Pharmacopoeial monographs on plant materials are lacking in identification and quantification of active compounds. Hence modern methods focusing these aspects are useful for the standardization of herbs and their formulations^{1,2}.

Piperine³ and Isopiperolein B⁴ are the active principles from dried unripe fruits of Piper nigrum, family-Piperaceae commonly known as Black pepper, it is one of the most

commonly used herb in most of the herbal toothpowders available in market, due to its pungency, aroma and antimicrobial property³. Because of its therapeutic utility in cough, cold and malaria, it finds place in many herbal preparations. Piperine is also used as bioavailability enhancer⁵. The present investigation was carried out on herbal toothpowder to develop physical constants, TLC profile and for spectroscopic analysis of the active constituents.

MATERIALS AND METHODS:

A sample of toothpowder was collected from local market of Bhopal and subjected for physical and chemical analysis. A herbal toothpowder used contains the following ingredients.

Ingredients	Quantity
Maulsari Ki chaal (Mimusops elingi)	(150mg)
Akarkara (Anacyclus pyrethrum D.C)	(25mg)
Laung (Syzygium aromaticum Linn)	(25mg)
Vagiding (Embelia ribes Burn.)	(50mg)
Mannifutal (Randia dumetorum)	(50mg)
Elaechi (Elettaria cardamomum Maton)	(50mg)
Soas guru	(50mg)
Kali mirch (Piper nigrum Linn.)	(50mg)
Mulethi (Glycyrrhiza glabra Linn.)	(75mg)
Dal Chini (Cinnamomum zeylanicum Blume)	(20mg)

Powder Characters

The herbal toothpowder was evaluated for Moisture content, Total ash, Acid insoluble ash, Water-soluble ash and for Extractive values using petroleum ether, chloroform, ethanol and water as a solvent⁶. The results are reported in table -1

Extraction with Ethanol

Toothpowder was subjected to extraction (5gm) with 100ml methanol (95%) by refluxation for one hour. The methanolic extract was filtered and concentrated under vacuum and dried as a dark reddish brown semisolid mass (yield - 7.23%), and kept aside for further studies.

Isolation of Piperine

To the methanolic extract 20ml of 20% alcoholic KOH was added and filtered. Filtrate, Kept in refrigerator for 24 hours for crystallization of piperine. Piperine separated and purified by washing with methanol and dried as yellow needle shaped crystals^{7,8}.

Qualitative chemical test

Piperine isolated form formulation forms a solid complex with 1,3,5 trinitrobenzene in ratio of 1:1 as red needles⁸.

Thin Layer Chromatographic studies^{8,9,10}

Thin layer chromatography is an important tool for separation and identification of various phytoconstituents. Methanolic extract and isolated piperine was subjected to thin layer chromatographic studies and compared with standard sample of piperine. Various proportions of mobile phase were tried; the best resolution was obtained in ethyl acetate: benzene(1:2) using silica gel G as stationary phase and Dragendorffs reagent as a detecting agent. Table -2

UV-Spectroscopy

UV-Spectroscopy was carried out for all three samples on JASCOUV30 Spectrophotometer using methanol AR grade. Table-2.

RESULTS AND DISCUSSION

Table -1 reveals the data for physical constants of toothpowder like Moisture – 3.2%w/w, Total ash -5.46%w/w, Acid insoluble ash and Water soluble ash-1.20% of 3.02% respectively. Table-2 reveals Extractive values in selected solvents like Petroleum ether soluble extractive – 1.36% w/w, Chloroform soluble extractive -4.36% w/w, Ethanol soluble extractive -7.24% w/w and Water soluble extractive -10.66% w/w of dry test sample. Qualitative chemical test and melting point (125°C-126°C) confirms isolated crystals as

piperine. TLC profile, as shown in table 2 reveals R_f value for isolated piperine close to that of authentic piperine, λ_{max} in methanol for all three samples are nearly same, Two values of λ_{max} for methanolic extract of toothpowder may be due to the presence of other alkaloids of black pepper along with piperine, Table-2. Thus nullifying the question of purity and identity of the constituents in the toothpowder. These parameters are of preliminary importance for the standardization of herbal toothpowder.

Table – 1 Physical Constants Herbal Toothpowder

S. No	Physical Constants	% w/w	S.D.*
1	Moisture Content	3.2	0.022
2	Total Ash	5.46	0.040
3	Acid insoluble ash	120	0.002
4	Water soluble ash	3.02	0.015
5	Chloroform soluble extractive	4.36	0.042
6	Ethanol soluble extractive	7.24	0.054
7	Petroleum soluble extractive	1.32	0.018
8	Water soluble extractive	10.66	0.018

* Mean of six determinations

Table No.-2 Chemical, spectroscopic and Chromatographic Analysis

S. No.	Sample	Chemical test for piperine	Color of spots			R_f *value	λ_{max} in Methanol nm
			Before spray	After Spray	Under UV lamp at 154 nm		
1	Methanolic extract of toothpowder	Positive	Yellowish brown	Violet	Fluorescent violet	0.20±0.004	243,232
2	Isolated Piperine	Positive	Yellow	Violet	Fluorescent violet	0.02±0.001	245
3	Authentic sample of Piperine	Positive	Yellow	Violet	Fluorescent violet	0.20±0.004	245

*Above values are averages of six determinations.

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