A PRELIMINARY STANDARD FOR NILAAVARAI CURNAM - A SIDDHA PREPARATION

ANANDAKUMAR. A., BALASUBRAMANIAN. M., and MURALIDHARAN. R.

Analytical Laboratory, The Indian Medical Practitioners' Co-operative Pharmacy and Stores Ltd., Adyar, Madras-600 020, India.

Received: July 21, 1983. Accepted: August 8, 1983.

ABSTRACT: Nilavarai Curnam, a compound drug formulation in Siddha System of Medicine was analysed. The Microscopic methods of identifying their ingredients, Chemical analysis, Fluorescence, and Thin Layer Chromatographic studies of the drug have been reported here.

Introduction :

In Indian System of Medicine, the standardisation of Compound formulations poses a big problem, as they contain a large number of ingredients with wide array of chemical constituents. Not only the identification of the ingredients, but also the chemical aspects of the formulation have prime importance in evolving the standard. As no concrete steps have been taken regarding the standardisation of the indigenous compound preparations, an attempt has been initiated in our laboratory to evolve a preliminary workable standard. The present paper deals with the identification of the ingredients present in Nilāvarai Cūrnam, the Chemical studies, Fluorescence analysis and the T. L. C. Studies.

Materials and methods

Nilāvarai Curnam is a compound drug formulation in Siddha system of medicine, indicated for gaseous distention of stomach, hiccup, vomiting and biliousness. It may be used as a mild laxative.

It is prepared as described in the "Formulary of Siddha Medicine, IMPCOPS Ltd. The Cūrṇam is prepared by powdering and sifting the clean and well dried crude drugs in the ratio mentioned here under.

A good record of powder analysis of the individual crude drugs (Raw material ingredients) is essential before examining their presence in the compound formulation Nilāvarai Cūrnam. The powder analysis of the above crude drugs which were procured from the local market, was carried out individually as suggested by Trease and Evans 1966, Johanson D. A. 1939, and their salient anatomical features were recorded using the microscope and camera lucida. Then the compound formulation Nilāvarai Cūrṇam was subjected to the microscopical examination for the identity of their ingredients.

S.N.	Common Name	Botanical Name	Part Used	Ratio
1.	Senna	Cassia angustifolia Vahl.	Leaves & Pods	1 Part
2.	Dry Ginger	Zingiber officinale Rosc	Rhizome	1 Part
3.	Ajowan	Trachyspermum ammi Sprague	Fruits	1 Part
4.	Black pepper	Piper nigrum Linn	Fruits	1 Part
5.	Embelia	Embelia tsjerium cottam DC	Fruits	1 Part
6.	Sugar	Saccharum officinarum Linn	Extract	5 Parts

The proximate Chemical analysis like loss on drying, ash content, water insoluble ash, alkalinity of water soluble ash, water soluble extractive, alcohol soluble extractive, pH of 2% solution, Reducing sugar, total sugar, non–reducing sugar, percentages of volatile matter, petroleum ether extract and % of Nitrogen were determined for the compound formulation Nilāvarai Cūanm as suggested by Standard Pharmacopoeal methods (AOAC XIII edition 1980 - Pharmacopoeia of India 1970 Methods). The results are furnished in Table II.

Thin Layer Chromatography studies of the compound formulation and the individual drugs were carried out after extracting them with various polar and non–polar solvents with different developing system according to the nature of the active ingredients as suggested by E. Stahl 1969 and J. B. Harbourne 1973. The ether extract of the Nilāvarai Cūrṇam and the individual ingredients gave prominent spots than the extracts of other solvents, when subjected to T.L.C. on Silicagel. G. Layer using Benzene and Ethyle acetate (95 + 5) as solvent system. After development the plates were dried and viewed under the U. V. Long Wave radiation. The number, colour and h. R. f. values of the spots observed are furnished in Table – III.

Observation and results:

The salient anatomical features of the powder analysis of the individual drugs;

0.01 gram powder of the randomly collected samples were mounted in different glass slides, with glycerol, chloral hydrate, iodine water, sudan, phloroglucinol etc., examined under microscope and the important characteristics were recorded.

S. No.	Name of Drug	CHARACTERISTICS
1.	Senna	Rubiaceous stomata having two subsidiary cells; unicellular hairs of 80 – 170 microns. Calcium oxalate crystal – Rosette type 10.5 – 25 microns dia, prism type 10.5 to 14 microns dia. Vessels with spiral thickening 21 – 31.5 microns dia.
2.	Dry Ginger	Yellow oil globules upto 12 microns diameter, Simple and oval to round starch grannules 10.5 – 38 microns long and 10.5 – 21 microns wide. Tracheids not stained by phloroglucinol and Hcl. Fibres quite long and upto 15 microns diameter.
3.	Black Pepper	Pale yellow to white perisperm cells with full of very small starch granules clubbed together, stained as a blue mass with iodine water. The indvidual starch grains are 2 – 3 microns dia. Light yellow oil globules 7 – 10 microns dia. stained red by Sudan III. Sclerenchymatous seed coat of size 14 – 17.5 – 24.5 × 17.5 – 21 microns. The percap cells are also Sclerenchymatous and upto 42 × 60 microns size stained pink by phloroglucinol and Hcl.
4.	Ajowan	Unicellular hemispherical trichomes upto 35 × 52 microns. Parenchymatous tissues 14 – 21 – 34.5 × 11.5 – 17.5 – 25 microns with full of oil globules stained red by Sudan – III. Allurone grains stained rose by eosin.
5.	Embelia	Reddish brown stone cells 7 – 10 – 14 × 35 – 47 – 54 microns. Starch granules round up to 14 microns dia. Tracheids are spiral thickening. Orange colour transparent masses from testa.
6.	Sugar	Crystals of Sugar slowly dissolves in Water mixed with glycerine.

Powder Analysis of Nilaavarai Curnam:

After recording the salient anatomical features of the powders of the individual ingredients, the compound formulation Nilāvarai Cūrṇam was examined microscopically to detect the presence of its ingredients. 0.01 gram of randomly collected samples were mounted in different glass slides with Glycerol, Chloral hydrate and also in different stains and observed under microscope.

a. Unicellular hairs upto 140 microne long and 14 microns wide, Calcium oxalate crystals of rosette type upto 25 microns dia and prism type 14 microns dia confirmed the presence of *Senna leaves.*

b. Simple and ovoid starch grannules upto 35 × 20 microne size stained blue by iodine water and polygonal parenchymatous cells with yellow oil globules stained red by Sudan III confirmed the presence of *Dry ginger.*

c. Bits of pericarp with Sclerenchymatous cells of sizes 14 – 35 × 17 – 25 microns, stained pink with phluroglucirol and Hcl., and pale yellow perisperm cells with full of starch grannules stained as blue massads with iodine water confirmed the presence of *Black pepper.*

d. Parenchymatous tissue of sizes 20–35–42 × 24 – 30 – 36 microns with full of oil globules stained red by Sudan III confirmed the presence of *Ajowan.*

e. Reddish brown stone cells of some what square and angular type 7 – 14 × 35 – 45 microns; Black pericarp cells; and orange coloured transparent masses and few starch grannules of round in shape upto 11 microns dia confirmed the presence of *Embelia.*

f. Small crystals and white masses upto 150 microns dia slowly dissolves in water and glycerol confirmed the presence of Sugar.

Thus the presence of all the ingredients were identified.

TABLE – I

Fluorescence Analysis of Nilaavarai Churnam

S. No.	Treatment	Day light	U. V. Long Wave
1.	Churnam as such	Pale brown	Rose
2.	Churnam + Water	Brown	Light pink
3.	Churnam + 5% NaOH	Brown	Dirty green
4.	Churnam + 50% Hcl.	Yellowish Brown	Birght Yellow
5.	Churnam + 50% H_2SO_4	Yellow	Bright Yellow
6.	Churnam + Benzene	Brown	Pink
7.	Churnam + Hexane	Brown	Pink
8.	Churnam + Alcohol	Brown	Blue

TABLE - II

Chemical Studies

Proximate Chemical analysis:–

S. No.	Analytical findings	% W/W
1.	Loss on drying	2.619
2.	Ash content	4.613
3.	Water insoluble ash	3.510
4.	Acid insoluble ash	1.212
5.	Alkalinity of ash	0.7896 ml. of (0.1N.Hcl/gm)
6.	Water soluble extractive	50.56
7.	Alcohol soluble extractive	62.56
8.	Reducing Sugar	0.6485
9.	Total Sugar	66.480
10.	Non Reducing Sugar	62.53
11.	Volatile matter	0.55% V/W
12.	Petroleum ether extract	4.737
13.	Nitrogen	7.060
14.	Resin content	0.4124

TABLE - III

(in horizontal nature)

T. L. C. of Ether Extract

1. Stationary phase : Silicagel. G.
2. Developing System : Benzene + Ethyle acetate.
3. Ratio : 95 + 5
4. Run : 12 cm.
5. Detection : U. V. Long Wave radiation.

Components	Nilavarai Curnam		Embelia		Ajowan		Dry Ginger		Black Pepper		Senna	
No. of Spots	12 Spots		1 Spot		6 Spots		2 Spots		5 Spots		10 Spots	
	Colour	hRf.	Colour	hRf.	Colour	hRf.	Colour	hRf.	Colour	hRf.	Colour	hRf.
Colour and hRf values of the Spot	Rose Pink	10.00 15.45									Rose	10.90
									Red	17.27	Red	17.20
					Blue	20.90			Red	22.73	Red	22.73
	Red	30.90			Red	30.00					Yellow	35.45
	Light Blue	43.65					L. Blue	43.63				
									Red	46.36	Red	47.27
	Red	59.09			Red	59.99					Pale Blue	52.72
											Yellow	69.09
	Light Blue	76.55							Blue	77.80		
	Greenish Yellow	81.18							G. Yellow	81.36	Yellow	86.36
	Gr. Blue	87.64									Red	88.18
	L. Green	90.27										
	L. Blue	91·99	Blue	91.3								
	L. Green	92.73			D. Green	92.60	L. Green	92.85				
	Red	99.50			L. Pink	99.09					Red	99.5

Discussion:

The Microscopical study confirmed the presence of all the ingredients as stated in the recipe. The T. L. C. study reveals 12 spots in the case of Nilāvarai Cūrṇam, 1 spot for Embelia, 6 spots for Ajowan, 2 spots for Dry ginger, 5 spots for Black pepper and in the case of Senna 10 Spots.

The Blue spot – hRf 91.3 of Embelia correspond with the light blue spot – hRf 91.99 Nilāvarai Cūrṇam.

The light blue spot – hRf 43.63 and light green spot – hRf 92.35 of Dry Ginger correspond with the light blue spot – hRf 43.65 and light green spot – hRf 92.73 of Nilāvarai Cūrṇam.

The blue spot – hRf 77.80 and greenish yellow spot – hRf 81.36 of Black pepper Correspond with the light blue spot – hRf 76.55 and greenish yellow spot – hRf 81.18 of Nilāvarai Cūrṇam.

The red spots – hRf 30.00, 59.99 and greenish blue spot – hRf 88.90 of Ajowan coincides with the red spots – hRf 30.90, 59.09 and the greenish blue spot – hRf 87.64 of Nilāvarai cūrṇam.

The red spot – hRf 99.50 of Senna coincides with the red spot hRf – 99.50 of Nilāvarai Cūrṇam. Hence from the almost similar hRf values and colours of the spots it is possible to conclude the inclusion of the ingredients in the compound formulation Nilāvarai Cūrṇam.

Thus the microscopic analysis, chemical studies, Fluorescence analysis and T. L. C. studies may be taken as one of the quality control measures to assess the quality of the compound formulation Nilāvarai Cūrṇam. Further chemical studies and T. L. C. studies for the active ingredients is in progress in our Laboratory.

Acknowledgement:

The authors are grateful to the Secretary, Dr. B. Vaidyanathan, the Superintendents and the Board of Directors of IMPCOPS Ltd., for their invaluable support and encouragements.

REFERENCES

1. ANONYMOUS 1972: Formulary of Siddha Medicine, *IMPCOPS, Madras. 20.*
2. ANONYMOUS 1969, 1976: The Wealth of India – Raw Materials, *CSIR Publications, New Delhi.*
3. JOHANSON, D. A. 1939: Plant Microtechnique, Second Edn., *Tata Mcgrew Hill Publishing Co., Bombay.*
4. TREASE, G. E. & EVANS, W. C. 1966: A text book of Pharmacognosy, Ninth edition, *Bailliere, Tindall & Co., London.*
5. PEARSON, D. 1975: The Chemical analysis of Foods, 7th Edition, *Edinburghs London & New York.*
6. JACKSON, B. P. & SNOW DON, D. W.: Powdered vegetable drugs, *American Elsenvier Publishing Co., New York.*
7. ANONYMOUS 1970: Pharmacopoeia of India, Second Edn. *Govt. of India, Manager of Publications, Delhi.*
8. ANONYMOUS 1980: A. O. A. C. *(Association of Offlcial Analytical Chemists)* XIII Edition, *Benjamin Franklin Station, Washington DC. 20044.*
9. E. STAHL 1969: Thin Layer chromatography II Edn. *Springer, Verlag, Berlin.*
10. HARBORNE, J. B. 1973: Phytochemical Methods. *Chapman & Hall, London.*
11. ESAU, K. 1974: Plant anatomy, II Edition, *Wiley, Eastern P. Ltd., New Delhi.*
12. ANANDAKUMAR. Et. al. 1981. Standardisation of Churna; Simple microscopic Methods. *(Nagarjun'–July 1981, Vol. XXIV, No. II.*
13. ANANDAKUMAR. Et. al. 1980: Powder Analysis of Thiri Kadu Churnam, *Journal of NIMA, Oct. 1980.*