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DETECTION AND ESTIMATION OF *CURCUMBA LONGA* IN AYURVEDIC PREPARATIONS

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ABSTRACT: *Methods were evolved for the detection of Curcuma longa in ayurvedic preparations. A simple method was also found out for the estimation of Curcuma longa in Vachalasunyadhi Taila using the formula –a = b/.32. Where a is the actual weight of Curcuma longa in Vilupatra Tailam and b is the weight obtained from graph of concentration of Curcuma longa VS OD. The methods evolved are so simple that it does not require any sophisticated instruments and hence it can be carried out in any quality control lab.*

INTRODUCTION:

Ayurveda is a positivistic system based on measurable and ascertainable physicochemical facts. An important aspect of ayurvedic treatment is its availability and abundance of its medicinal ingredients. But the commercialization of the ayurvedic medicines has made the ayurvedic physicians dependent on market preparations. But due to lack of proper standardization these formulations have not been able to maintain their proper efficacy. Hence standardization has become essential to protect the efficacy and genuineness of these medicines. This paper deals with detection and estimation of *Curcuma longa* in ayurvedic preparations. Though some early analysis[1] were carried out, no procedure has so far been reported for its estimation in finished products.

MATERIALS AND METHODS

Authentic samples of turmeric *(Curcuma longa)*[2,3,4] were collected and identified pharmacognostically. Single drugs required for the preparation of kashayam were procured from the local market and identified. Ayurvedic formulations used for detection namely, *ghirtam, tailam, enna, choornam, gulika, lehyam* etc. were obtained from Ayurvedic Research and Consultancy Services, Trivandram. Different samples of *kashayam* containing *Curcuma longa* were prepared under the supervision of an expert. *Vachalasunadi tailam (Vilvapatra tailam)* for the estimation study was prepared according to Sahasrayoga[5]. Samples of Vilupatra tailam were also prepared with different percentage weights of *Curcuma longa*. TLC techniques[6] were used for detection and colorimetric method[7] for estimation.

RESULTS AND DISCUSSION

Methods evolved for detection of *Curcuma longa* in various types of Ayurvedic preparations like *tailam, keram, enna ghritam, legyam, Choornam, gulika* etc. have been reported[8]. Detection was based on colour reactions of curcumin with boric

acid, acetic acid and onalic acid. The evolved tests were:-

1. Boric acid crystals were added to the alcoholic extract of the ayurvedic preparations. Deep yellowish orange color shows the presence of *Curcuma longa.*

2. Acidified boric acid reagent gives a deep orange color with alcoholic extract of the sample.

3. Glacial acetic acid, boric acid crystals, oxalic acid crystals were added to the sample and heated for one hour on a water bath. Crimson red color shows the presence of *Curcuma longa.*

4. A piece of filter paper impregnated with sample was dried, and boric acid in HCl was added, and again dried. Pink or reddish brown color develops which on addition of alkali becomes blue or greenish black. Results are given in Table – I.

For detection of *Curcumalonga* in *kashayam* four samples of *Kashayams,* namely *Padhyamalakadi Kashayam, Nishakaduakthi Kashayam, Nannaryadhi Kashayam,* and *Mustarishadi Kashayam* were prepared. Above *Kashayams* were also prepared omitting *Curcuma longa* (Blank) *Kashayams* were extracted with ethyl acetate. The ethyl acetate was then evaporated off and residue dissolved in alcohol. Similar procedure was followed for the 4 blank also. This alcoholic extract was used for further studies. This extract gave all the four color reactions mentioned above. The presence of *Curcuma longa* in the *Kashayam* was further confirmed by TLC studies. Solvent system selected 1. Benezene methanol 80:6. 2. Ethyl Cylophexance 1:1 3. $CHCl_3$: HAC 9:1

The alcoholic extract of *Kashayam*, blaks, *Curcuma longa* and curcumin were spotted on silica Gel 'G' plates. Three yellow spots were obtained for the *kashyam* and *Curcuma longa* in solvent system I and III and a single spot in solvent system II. Blank did not give any spot. Curcumin gave a single spot in all the three solvent systems, which was present in the *Curcuma longa* and *kashayam* but missing in the *kashayams* prepared omitting *Curcuma longa* Table-2. This revelas the fact curcumin is present in the *kashayams* without any chemical change.

Estimation

Vilvapatra taila (Sample 1) prepared with different percentage weight of *Curcuma longa* as shown below were taken for this colorimetric study.

Sample No.	**Seasame Oil**	***Acorus calamus***	***Aegle marmelos juice***	**Garlic**	***Curcuma longa***
1.	10 ml	0.8	40 g / 40 ml	0.8	0.8
2	10 ml	0.8	"	"	0.6
3	"	"	"	"	0.4
4	"	"	"	"	0.2
5	"	"	"	"	0.0

This preparation has the quantities of ingredients as per *Sahasrayoga*

Accurately weighed about 0.2gm of above samples and dissolved in 2ml of pet ether. This was made upto 50 ml, in a standard flask, using ethyl alcohol. Optical density of the samples was measured at 425 nm. The results are given in Table-III.

To prepare a standard graph of *Curcuma longa* 0.1 gm of *Curcuma longa* was accurately weighed and refluxed with 30ml of ethyl alcohol for 2.5 hours. This was filtered and made up to 100 ml with absolute alcohol, 1,2,3,4,5,6 mls of this solution were made up in 10 ml standard flasks. These solutions contained 0.1, 0.2, 0.3, 0.4, 0.5, 0.6 mg/ ml of *Curcuma longa*. Optical density of these solutions was measured at 425 and a graph was drawn (fig.I).

The graph, concentration of *Curcuma longa* vs optical density was found to be linear. In the case of *Vilvapatra tailam,* the weight of *Curcuma longa* present per ml. of made up solution was calculated. Then a graph was plotted with weight of *Curcuma longa* mg / mlvs O.D. Linear graphs was obtained for this also (Fig.I).

From the graph it is observed that for same concentration of *Curcuma longa*, the optical density is different for *Curcuma longa* alone and *Curcuma longa* in *Vilupatra taila.* i.e. There is a deviation, this may be due to presence of other ingredients of *taila* which mask the colour of *Curcuma longa*[9,10] i.e. the optical density for any concentration of *Curcuma longa* in *Vilvapatra taila* is less than that for *Curcuma longa* alone. Hence the concentration of *Curcuma longa* obtained from graph II will also be less. To get the actual value of *Curcuma longa* in *Vilvapatra taila* a formula was derived taking the decoction into consideration as follows.

The actual weight of *Curcuma longa* present in the *Vilvapatra taila* (a) and value obtained from graph of *Curcuma longa* Vs O.D. (b) (graph II) are given in Table IV. It is found that difference in weight divided by actual weight is a constant equal to 0.68 i.e (a-b)/a = 0.68 where a is actual weight b is weight obtained from graph (II). From this the actual weight of *Curcuma longa* can be calculated.

a-b = 0.0.68 a

a = b / 0.32

ie actual weight of *Curcuma longa* in *Vilvapatra taila* = Weight obtained from the graph / 0.32

Thus the *Curcuma longa* content in *Vilvapatra taila* can be estimated using a standard graphy of *Curcuma longa* with this formula.

The *Curcuma longa* content of *Vilvapata tailam* can be determined using a standard graph *Curcuma longa* with the formula.

Weight of *Curcuma longa* in *Vilvapata taila* = Weight from graph / 0.32

CONCLUSION

Colour reactions and TLC techniques evolved for detection of *Curcuma longa* in *kashayams* and other preparations are simple and could be carried out in any lab.

The parameters evolved above can be considered as viable which will go a long way in prescribing dependable standards which in turn will provide the necessary

tools for an enforcement agency to check and ensure the quality of medicine.

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TABLE NO. I
Detection of *Curcuma longa* in the Finished Product

S.No.	Name of Sample	Tests			
		I	II	III	IV
1	*Nalpamaradi Tailam*	+	+	+	+
2	*Taleenishadi Tailam*	+	+	+	+
3	*Vilwapatra Tailam*	+	+	+	+
4	*Sahacharadi Tailam*	+	+	+	+
5	*Parinatha Keryadi Tailam*	+	+	+	+
6	*Lakshadi Tailam*	+	+	+	+
7	*Arimedadi Tailam*	+	+	+	+
8	*Jatyadi Keram*	+	+	+	+
9	*Mahatpancha Gavya Ghritam*	+	+	+	+
10	*Kalyanaka Ghritam*	+	+	+	+
11	*Kurunji Kuzhampu*	+	+	+	+
12	*Haridra Khandam*	+	+	+	+
13	*Rasnadi Choornam*	+	+	+	+
14	*Amirtadi Choornam*	+	+	+	+
15	*Rajanyadi Choornam*	+	+	+	+
16	*Dharthuradi Vati*	+	+	+	+
17	*Vilvadi Gulika*	+	+	+	+
18	*Nimbarajanyadi Gulika*	+	+	+	+
19	*Kalyanakavelakham*	+	+	+	+

TABLE NO. II
TLC Study of *Kashayams*

S.No.	Name of Sample	Solvent System		
		I Rf	II Rf	III Rf
1	Curcumin	.57	.57	.91
2	*Curcuma longa*	.16 .32 .57	57	.52 .73 .91
3	*Padhymalakadi Kashayam*	.16 .32 .57	.57	.52 .73 .91
4	*Nishakada Kadhi Kashayam*	.16 .32 .57	.57	.52 .73 .91
5	*Nannaryadi Kashayam*	.16 .32 .57	.57	.52 .73 .91
6	*Mustarishitadi Kashayam*	.16 .32 .57	.57	.52 .73 .91

1. Benzene : Methanol 80:6
2. Ethyl acetate : Cyclophexane 1:1
3. Chloroform : Acetic acid 9:1

TABLE NO. III

Sample No.	Wt. of sample taken	Wt. of cl/ml of soln.*	O.D
I	0.09	.1152	.06
II	0.135	.1296	.065
III	0.135	.08832	0.038
IV	0.2	.064	0.255
V	0.205	0	.015

* Solution was upto 50 ml
Density of V.T = 0.8
C.L – *Curcuma longa*

TABLE NO. IV

Actual Wt. of *Curcuma longa* in V.T. wt/ml (a)	**Weight of C.L. from graph I wt/ml (b)**	**a-b/a**
.11	.034	0.68
.16	.05	0.68
.32	.1	0.68
.42	.132	0.68

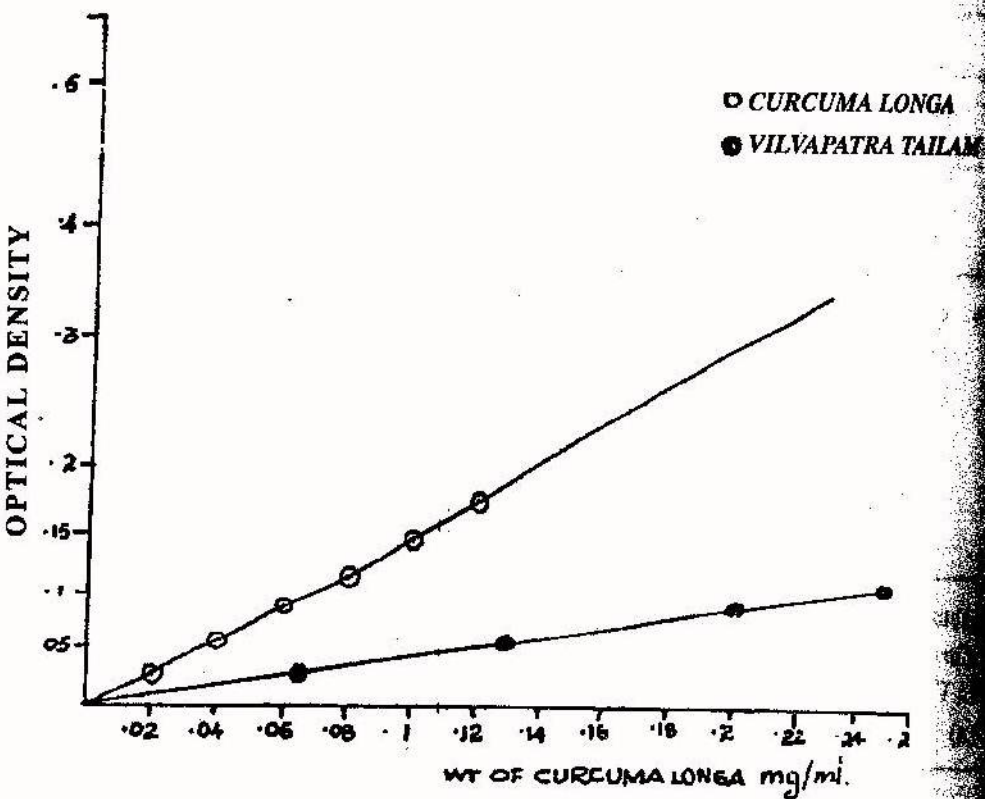
O CURCUMA LONGA
● VILVAPATRA TAILAM
OPTICAL DENSITY
·6
·4
·3
·2
·15
·1
·05
·02
·04
·06
·08
·1
·12
·14
·16
·18
·2
·22
·24
·2
WT OF CURCUMA LONGA mg/ml.

FIG. I

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