

**COMPARATIVE THIN LAYER CHROMATOGRAPHY STUDY ON
ALAMBUSHADI CHURNA TABLET AND SIMHANAD GUGGULU PILL****Saroj Kumar Debnath^{1*}, Sudhaben N. Vyas²**

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ABSTRACT

Medicinal plants play a major role for providing health benefits more safely to human beings. The complex composition of plant based drugs is a big challenge for quality control. Most of the Ayurvedic drugs are plant based drugs. Thin layer chromatography is an effective parameter for standardization of the plant based drugs. Two important Ayurvedic drugs i.e. *Alambushadi Churna* tablet and *Simhanad Guggulu* pill had been selected from Ayurvedic famous books named *Bhava Prakasha* and *Bhaishajya Ratnavali* respectively for comparative study on Thin layer chromatography of these two drugs. These two Ayurvedic drugs are mainly used for the treatment of disease *Amavata* (Rheumatoid arthritis). These two drugs preparing and their Thin layer chromatography study both had been done in the Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar. Thin layer chromatographic study concluded that 0.18, 0.19, 0.24 and 0.61 R_f –values (18, 19, 24 and 61 hR_f –values) were present in both the samples of these two drugs and it indicated that four common phytoconstituents were present in these two drugs. It may be due to presence of *Triphala* (i.e. *Amalaki*, *Haritaki* and *Bibhitaka*) into the both drugs as common ingredients.

KEY WORDS: Thin layer chromatography, *Alambushadi Churna* tablet, *Simhanad Guggulu* pill, *Amavata*, Rheumatoid arthritis.

INTRODUCTION

It is being accepted internationally that medicinal plants play an important role to provide health benefits more safely to human beings. Currently the increased demand for plant based drugs and their eventual commercialization has given more importance on their status. Maximum Ayurvedic medicines are plant based drugs. International demands of medicinal plant based Indian drugs are still low due to most probably inadequacy of quality control of plant based Indian drugs. The

complex composition of medicinal plant based drugs has a great challenge for its quality control. Thin layer chromatographic study may be an important parameter for standardization of the medicinal plant based drugs. Thin layer chromatographic finger printing is considered to be very useful parameter for evaluating the quality of medicinal plant based Ayurvedic medicines. There are many plants based drugs described in different Ayurvedic books in context of treatment of different diseases. Two important plant based Ayurvedic medicines

i.e. *Alambusadi Churna* tablet and *Simhanad Guggulu* pill had been selected from famous Ayurvedic books for comparative study on their thin layer chromatography. *Alambusadi Churna* tablet and *Simhanad Guggulu* pill both Ayurvedic drugs are mainly used for the treatment purpose of disease *Amavata* (Rheumatoid arthritis). In context of pathogenesis and clinical manifestations *Amavata* disease is more simulated to Rheumatoid arthritis^{1, 2}. *Alambusadi churna* is mentioned in *slokas* (Information in Sanskrit language) no. 69 to 70 of 26th chapter of *Bhava Prakasha* (Ayurvedic book)³ and *Simhanad Guggulu* is mentioned in *slokas* no. 190 to 195 of 29th chapter of *Bhaishajya Ratnavali* (Ayurvedic book)⁴.

Aims and Objectives: Comparative analysis of Thin layer chromatographic data of *Alambusadi Churna* tablet and *Simhanad Guggulu* pill for better standardization of these two drugs and better differentiation between these two drugs.

MATERIALS AND METHODS

Alambushadi churna tablet and *Simhanad Guggulu* pill both are plant based Ayurvedic drugs. These both drugs were prepared in the Pharmacy of Institute for Post Graduate Teaching and Research in Ayurveda,

Gujarat Ayurved University, Jamnagar and Thin layer chromatographic study of the sample of these Ayurvedic drugs (i.e. *Alambushadi churna* tablet and *Simhanad Guggulu* pill) had been done in the Pharmaceutical laboratory of Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar. Thin layer chromatography (T.L.C) of the methanol extract of the sample of *Alambushadi churna* tablet and *Simhanad Guggulu* pill had been done by using Toluene and Ethyl acetate in the ratio of 9:1 as mobile phase and it was visible under short ultra violet ray and long ultra violet ray. It had been revealed different spots under short and long ultra violet ray and it had been given different R_f , hR_f , hR_f values^{5, 6, 7}. *Alambushadi churna* tablet is a poly herbal Ayurvedic drug and thirteen Ayurvedic medicinal plants are used in it as ingredients and *Simhanad Guggulu* Pill is a herbo-mineral Ayurvedic drug and six ingredients are used in it^{8, 9}. Name of the ingredients (Ayurvedic name and Scientific or Botanical name), used part of the ingredients and quantity of the ingredients into one Tablet or Pill are shown in the table-1 and table-2 respectively.

Table-1: Ingredients list of *Alambushadi Churna* tablet (500 mg)

Ingredients (Ayurvedic name)	Botanical Name	Used part	Quantity (part)
<i>Alambusha</i>	<i>Sphaeranthus indicus</i> Linn.	Dried mature whole plant	1
<i>Gokshur</i>	<i>Tribulus terrestris</i> Linn.	Dried mature Fruit	1
<i>Guduchi</i>	<i>Tinospora cordifolia</i>	Dried Stem	1
<i>Vridhdadaraka</i>	<i>Argyrea nervosa</i> (Burm.f.) Bojer	Dried Root	1
<i>Pippali</i>	<i>Piper longum</i> Linn.	Dried mature Fruit	1
<i>Trivrit</i>	<i>Operculina terpathum</i> Linn.	Dried Root	1
<i>Mustaka</i>	<i>Cyperus rotundus</i> Linn.	Dried Rhizome	1
<i>Varuna</i>	<i>Crataeva nurvala</i> Buch-Ham.	Dried stem Bark	1
<i>Punarnava</i>	<i>Boerhavia diffusa</i> Linn.	Dried mature whole plant	1
<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	Dried mature Fruit	1
<i>Amalaki</i>	<i>Emblia officinalis</i> Gaertn.	Dried mature Fruit	1

<i>Bibhitaka</i>	<i>Terminalia bellirica</i> Roxb.	Dried mature Fruit	1
<i>Sunthi</i>	<i>Zingiber officinale</i> Roxb.	Dried Rhizome	1

Table-2: Ingredients list of Simhanad Guggulu Pill (500 mg)

Ingredients (Ayurvedic name)	Botanical Name	Used part	Quantity (part)
<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	Dried mature Fruit	1
<i>Amalaki</i>	<i>Emblica officinalis</i> Gaertn.	Dried mature Fruit	1
<i>Bibhitaka</i>	<i>Terminalia bellirica</i> Roxb.	Dried mature Fruit	1
<i>Guggulu (Shodhita)</i>	<i>Commiphora wightii</i> (Arnott) Bhandari	Gum exudates	1
<i>Gandhak (Shodhita)</i>	Sulphar	Mineral	1
<i>Eranda taila</i>	<i>Ricinus communis</i> Linn.	Seed oil	4

RESULTS AND DISCUSSION

Results of Thin layer chromatography study on sample of *Alambushadi Churna* tablet

and *Simhanad Guggulu* pill under short ultra violet ray (254 nm) and under long ultra violet ray (366 nm) are shown in the table-3 and table-4 respectively.

Table-3: Thin layer chromatography data of Alambushadi Churna tablet and Simhanad Guggulu pill under short ultra violet ray (254 nm)

Name of the Drug	Results					
	No. of Spots	Distance travel by Solvent (cm)	Distance travel by Solute (cm) Short UV (254nm)	R _f -value	hR _f -value	hR _f -value
<i>Almbushadi Churna tablet</i>	4	17.2	2.6	0.15	15	
			3.1	0.18	18	3
			6.4	0.37	37	19
			7.5	0.44	44	7
<i>Simhanad Guggulu pill</i>	7	17.2	3.3	0.19	19	
			4.2	0.24	24	5
			5.5	0.32	32	8
			6.8	0.40	40	8
			8.5	0.49	49	9
			10	0.58	58	9
		16.6	0.97	97	39	

Table-3 shows the Thin layer chromatography (TLC) data of the sample of *Alambushadi Churna* tablet and *Simhanad Guggulu* pill respectively under short ultra violet ray (254 nm). TLC data of *Alambushadi Churna* tablet expresses that the distance traveled by the solvent was 17.2 cm, number of spots under short ultra violet ray were 4, the distance traveled by the solutes seen under short ultra violet ray were 2.6cm, 3.1cm, 6.4cm and 7.5cm respec-

tively. The calculated R_f –values were 0.15, 0.18, 0.37 and 0.44 respectively. The calculated hR_f–values were 15, 18, 37 and 44 respectively and the calculated hR_f –values were 3, 19 and 7 respectively. TLC data of *Simhanad Guggulu* pill expresses that the distance traveled by the solvent was 17.2 cm, number of spots under short Ultra violet ray were 7, the distance traveled by the solutes seen under short Ultra violet ray were 3.3cm,

4.2cm, 5.5cm, 6.8cm, 8.5cm, 10cm and 16.6cm respectively. The calculated R_f – values were 0.19, 0.24, 0.32, 0.40, 0.49, 0.58 and 0.97 respectively. The calculated hR_f –

values were 19, 24, 32, 40, 49, 58 and 97 respectively and the calculated hR_f –values were 5, 8, 8, 9, 9 and 39 respectively.

Table-4: Thin layer chromatography data of Alambushadi Churna tablet and Simhanad Guggulu pill under long ultra violet ray (366 nm)

Name of the Drug	Results					
	No. of Spots	Distance travel by Solvent (cm)	Distance travel by Solute (cm) long UV (366nm)	R_f - value	hR_f - value	hR_f - value
<i>Almbushadi Churna tablet</i>	5	17.2	2.3	0.13	13	
			3.2	0.19	19	6
			4.1	0.24	24	5
			10.5	0.61	61	37
			14.1	0.82	82	21
<i>Simhanad Guggulu pill</i>	8	17.2	1.9	0.11	11	
			3.1	0.18	18	7
			4.0	0.23	23	5
			4.7	0.27	27	4
			5.5	0.32	32	5
			6.8	0.40	40	8
			8.8	0.51	51	11
			10.5	0.61	61	10

Table-4 shows the Thin layer chromatography (TLC) data of the sample of *Alambushadi Churna tablet* and *Simhanad Guggulu pill* respectively under long ultra violet ray (366 nm). TLC data of *Alambushadi Churna tablet* reveals that the distance traveled by the solvent was 17.2 cm, number of spots under long ultra violet ray were 5, the distance traveled by the solutes seen under long Ultra violet ray were 2.3cm, 3.2cm, 4.1cm, 10.5cm and 14.1cm respectively. The calculated R_f – values were 0.13, 0.19, 0.24, 0.61and 0.82 respectively. The calculated hR_f –values were 13, 19, 24, 61 and 82 respectively and also the calculated hR_f –values were 6, 5, 37 and 21 respectively. TLC data of *Simhanad Guggulu pill* reveals that the distance traveled by the solvent was 17.2 cm, number of spots under long Ultra violet ray were 8, the distance traveled by the solutes seen under long Ultra vio-

let ray were 1.9cm, 3.1cm, 4.0cm, 4.7cm, 5.5, 6.8, 8.8, and 10.5cm respectively. The calculated R_f –values were 0.11, 0.18, 0.23, 0.27, 0.32, 0.40, 0.51and 0.61 respectively. The calculated hR_f –values were 11, 18, 23, 27, 32, 40, 51 and 61 respectively and also the calculated hR_f –values were 7, 5, 4, 5, 8, 11 and 10 respectively. On the basis of these data it can be evaluated that 0.18, 0.19, 0.24 and 0.61 R_f –values (18, 19, 24 and 61 hR_f –values) were present in both the samples of these two drugs i.e. *Alambushadi Churna tablet* and *Simhanad Guggulu pill* and it indicated that four common phytoconstituents were present in these two drugs. It may be due to presence of *Triphala* (i.e. *Amalaki*, *Haritaki* and *Bibhitaka*) into the both drugs as common ingredients.

CONCLUSION

It can be concluded on the basis of this Thin layer chromatographic (TLC) analysis on the sample of *Alambushadi Churna* tablet and *Simhanad Guggulu* pill that four as well as seven phytocostitutents were present under short ultra violet ray (254 nm) and five as well as eight phytocostitutents were present under long ultra violet ray (366 nm) into the sample of *Alambushadi Churna* tablet and *Simhanad Guggulu* pill respectively. 0.18, 0.19, 0.24 and 0.61 R_f -values (18, 19, 24 and 61 hR_f - values) were present in both the samples of these two drugs and it indicated that four common phytoconstituents were present into the two drugs. It may be due to presence of *Triphala* (i.e. *Amalaki*, *Haritaki* and *Bibhit-aka*) into the both drugs as common ingredients, but more research work is necessary on this subject for more information and accuracy for better and feasible standardization of these two drugs.

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REFERENCES

1 Madhavakara, Rakshita V, Dutta S, Shastri S. *Madhava Nidana with Madhukoksha Vyakya and Vidyotini Hindi Commentry (Part-I)*. Edited by Yadunandan Upadhyaya. 26th ed. Varanasi: Chaukhambha Sanskrit Sanathana; 1996. p. 460-464.

- 2 Harrison TR. *Harrison's Principles of Internal Medicine (Vol-2)*. Edited by Anthony S. Fauci et al. 14th ed. New-York: Mc Graw-Hill; 1998. p. 1885.
- 3 Bhavamishra. *Bhavaprakasha with Vidyotini Hindi Commentary (Part-II)*. Edited by Brahma Sankara Mishra. 9th ed. Varanasi: Chaukhambha Sanskrit Sansthana; 2005. p. 287.
- 4 Govindadassen. *Bhaishaijya Ratnavali with Siddhiprada Hindi Commentary*. Edited by Siddhi Nanda Mishra. 1st ed. Varanasi: Chaukhambha Surabharati Prakashan; 2005. p. 610.
- 5 Harborne JB. *Phytochemical methods*. 2nd ed. Landon: Chapman and Hall; 1984.
- 6 Debnath SK, Vyas SN. *Thin Layer Chromatography Study on Alambushadi Churna Tablet*. *Int Ayur Medical Jour* 2015; 3(9): 2850-2853.
- 7 Debnath SK, Vyas SN. *Thin Layer Chromatography Analysis of Simhanad Guggulu Pill*. *Int Jour App Ayur Research* 2015; 2(2): 248-251.
- 8 Sharma PV. *Dravyaguna Vijnana (Vol. II)*. 8th ed. Varanasi: Chaukhambha Bharati Academy; 1986.
- 9 Chopra RN. *Indigenous Drugs of India*. 2nd ed. Calcutta: U. N. Dhur and Sons Pvt. Ltd.; 1959.

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