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PHYTOCHEMICAL SCREENING OF MARKET SAMPLES OF HINGU NIRYAS (*Ferula foetida Regel*)

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ABSTRACT

Background: Excessive demand, scarcity and increased commercial value have lead to adulteration of *Ayurvedic* medicines. *HinguNiryas* is one of the important drug which is widely used in many Formulations. India is not a natural habitat of *Hingu* and Indian market is the only source of*HinguNiryas*. So possibility of its adulteration is high[1]. So market survey is done to observe the genuinity of *Hingu*. **Objectives:** To collect the four market samples of *HinguNiryas* from four different markets of India for preliminary phytochemical screening. **Material and Methods**: Four different market samples of *HinguNiryas* -Common Identification, Test-Physicochemical Study, Preliminary Phytochemical Study, Adulteration Test, Fluorescence Study, TLC - HPTLC. **Results:** Sample H1 showed nearer values as compared to others, in all parameters mentioned in API of *Ferula foetida Regel*. Sample H2 is also having similar features but less than H1, whereas sample H3 and H4 are having more variation. **Conclusion:** Due to regular use of *Hingu* in homemade preparation more than ayurvedic formulations it is found to be being adulterated in some markets. Market samples can be compared on the basis of pharmacological action to evaluate adulteration or substitution.

Keywords: *Hingu, Niryas,*Phytochemical,*foetida Regel;*

INTRODUCTION

*Niryas*of *Hingu Ferula foetida Regel* is main ingredient of various formulations like *Hingvashtakchoorna*, *Hingutrigunataila*etc. In India, market is the only source of *Hingu*for procurement therefore market survey is done to find the genuinity of *Hingu* for better therapeutic use. This plant is native of Afghanistan[2]. It is cultivated in Persia, Afghanistan and from there it is exported to various parts of world markets[3]. But there is lacuna that no comparative work is done on market samples from different markets of India. So, present study is carried out for Phytochemical screening of *Hingu*from different markets of India and to find which market is source of genuine *HinguNiryas*. In this study *Hingu* is collected from four different markets of India i.e. Mumbai, Vadodara, Pune & Bangalore. These samples are collected from markets in the period of March 2007 to May 2007.

MATERIALSAND METHODS:

Samples- Four market samples were collected, each from four main cities of three different states namely Mumbai (SampleH1)Vadodara (Sample H2), Pune (Sample H3), Bangalore (Sample H4). **Method** - All the samples were compared with Standards mentioned in API and in other

authenticated books in terms of Common Identification Test, PhysicochemicalStudy, Preliminary Phytochemical Study, AdulterationTest, FluorescenceStudy, TLC and HPTLC study.

RESULTSANDOBSERVATIONS

1) Organoleptic characteristics[4]

Tests	Sample H1	Sample H2	Sample H3	Sample H4
Physical appearance	Irregular mass contains tear attached witheach other. Hard & Sticky	Dry,Squaricalinshape,Hard big &small masses	Dry, long & irregular masses	Dry, hard irregular big &small masses
Colour	Yellowish brown	Reddish brown	White yellow	Light brown
Size	2cm long 1.3cm broad 4cm in dim.	2cm long 1.5cm broad 5.4cm in dim.	5.5cm long 3.4cm broad 8.5cm indim.	3cm long 2.5cm broad 6.5cm indim.
Smell	Strong alliaceous &Irritant	Strong	Not irritant	Strong
Taste	Strongly Acrid &Bitter	Strongly bitter	Less bitter	Strong bitter

2) Common identification methods[5]

Tests	Sample H1	Sample H2	Sample H3	Sample H4	Standard Result
Triturate with water	Milky white	Light yellowish orange	Light orange	Milky white	Milky white
Treatment with 50% nitric acid	Green	Green	Light Green	Light Green	Green
Treatment with fractured surface with H2SO4	Dark reddish brown	Reddish brown	Light brown	Dark brown	Red /Reddish brown
Combined Umbelliferone test	Dark blue	Blue	Light blue	Blue	Blue Inflorescence
On burning	Yellow flame	Yellow flame	Yellow flame	Yellow flame	Yellow flame

3) Classical Tests for identification[6]

Tests	Sample H1	Sample H2	Sample H3	Sample H4	Standard Result
Triturate with water	Milky white emulsion	Yellowish orange emulsion	Light orange emulsion	Milky white emulsion	Milky white emulsion

Odour or Smell	Strong alla-cious&Irritant	Strong	Not irritant	Strong	Strong allia-ceous &Irritan
Burning sensation of skin	Absent	Absent	Absent	Absent	Present
Taste	Strongly Acrid &Bitter	Strongly bit-ter	Less bitter	Strong bitter	Strongly Acrid &Bitter
On burning	No residue	No residue	No residue	No residue	No residue

4) Physicochemical Analysis [7,8,9,10,11].

Tests	Sample H1	Sample H2	Sample H3	Sample H4	Standard Result
Total ash value	5.35 %	8 %	8.35%	8%	‹15(Ref.API)
Acid Insoluble ash value	0.19%	0.42 %	1.17%	1 %	3 % (Ref. API)
Water soluble extract	63.2%	63.2%	24.8%	49.6%	<50%(Ref.API)
Alcohol soluble extract	42.56%	42.56%	9.20%	19.6%	<50%(Ref.API)
Total % of mois-ture	27.4%	23.8%	19%	15.6%	NA
Total % of for-eign matters	0.52%	1.17%	0.19%	0.42%	2 % (Ref. API)
Total % of vola-tile Oil	11.11%	10%	7.82%	6%	10 to 17 % (Ref. WP)
Total % of resin	27.14%	21.12%	15.32%	18.84%	40 to 60 % (Ref. WP)
Total % of gum	9.00%	5.36 %	12.16%	10.10%	25 % (Ref. WP)
Total % of ferul-ic Acid	0.85%	1.27%	0.25%	0.10%	1.3 % (Ref. WP)
Total % of starch	Nil	Nil	2.42%	2.75%	Nil
Specific gravity of aqueous ext.	1.0%	1.0%	1.0%	1.0%	NA
pH of aqueous ext.	4.16%	6.68%	7.72%	6.43%	NA
Saponification value	119	111.4	84.15	98.75	NA
Acid Value	52.43%	25.8%	19.07%	37.02%	NA
Total% of sul-phar	0.30%	0.20%	0.28%	0.25%	NA

5) Preleminary phytochemical tests [12]

A) Organicconstituents (both aqueous and alcohol extract)-

Tests	Sample H1	Sample H2	Sample H3	Sample H4	Standard Result
Carbohydrate(Mollishs test)	Absent	Absent	Absent	Absent	Absent
Reducing test (benedicts test)	Absent	Absent	Absent	Absent	Absent
Monnosaccarides (barfoeds test)	Absent	Absent	Absent	Absent	Absent
Hexose sugar	Absent	Absent	Absent	Absent	Absent
Non reducing sugar	Absent	Absent	Absent	Absent	Absent
Nonreducing polysaccha-rides(Starch)	Absent	Absent	Absent	Absent	Absent
Gums (for aqueous extract only)	Positive	Positive	Positive	Positive	Positive
Volatile oil	Positive	Positive	Positive	Positive	Positive
Proteins	Absent	Absent	Absent	Absent	Absent
Amino acid	Absent	Absent	Absent	Absent	Absent
Tannins & Phenolic com-pounds	Absent	Absent	Absent	Absent	Absent
Steroids	Absent	Absent	Absent	Absent	Absent
Glycosides cardiac glyco-sides	Absent	Absent	Absent	Absent	Absent
Saponin glycosides	Absent	Absent	Absent	Absent	Absent
Alkaloids	Positive	Positive	Positive	Positive	Positive
For Organicacid					
1.Calcium chloride test	Absent	Absent	Absent	Absent	Absent
2.oxalic acid	Absent	Absent	Absent	Absent	Absent
3.tartaric acid	Absent	Absent	Absent	Absent	Absent
4.citric acid	Absent	Absent	Absent	Absent	Absent

b) Chemical Tests for detection of inorganic constituents –

Tests for	Sample H1	Sample H2	Sample H3	Sample H4
Calcium	Absent	Absent	Absent	Absent
Magnesium	Absent	Absent	Absent	Absent
Sodium	Absent	Absent	Absent	Absent
Potassium	Absent	Absent	Absent	Absent
Iron	Absent	Absent	Absent	Absent
Sulphate	Absent	Absent	Absent	Absent
Phosphate	Absent	Absent	Absent	Absent
Chloride	Absent	Absent	Absent	Absent
Carbonate	Absent	Absent	Absent	Absent

Nitrate	Positive	Positive	Positive	Positive

6) Adultration Tests [13]

Tests for	Sample H1	Sample H2	Sample H3	Sample H4
Colophony	Absent	Absent	Absent	Absent
Galbanum	Absent	Absent	Absent	Absent
Ammoniacum	Absent	Absent	Absent	Absent
Otherforeign resin	Absent	Absent	Absent	Absent
Gum Arabic	Absent	Absent	Absent	Absent
Mineral pigment	Absent	Absent	Absent	Absent
Coal tar dye	Absent	Absent	Absent	Absent

7) Fluroscence Study

Tests	Sample H1	Sample H2	Sample H3	Sample H4
Samples +NaOH	Fluorescent Blue (365nm) Fluorescent White (254nm)	Fluorescent Blue (365nm) Fluorescent White (254nm)	Fluorescent Blue (365nm) Fluorescent White (254nm)	Fluorescent Blue (365nm) Fluorescent White (254nm)
Samples+dil. HCl	Fluorescent Yellow (365nm) **Blue (254nm)**	Fluorescent Yellow (365nm) Blue (254nm)	Fluorescent Yellow (365nm) **Blue (254nm)**	Fluorescent Yellow (365nm) **Blue (254nm)**
Samples +HNO3	Green (365nm)	Green (365nm)	Green (365nm)	Green (365nm)

8) Thin layer chromatography result [14]

Sr.no.	SampleNo.	256nm	365nm
1	H1	**0.04,0.06,0.12**,0.16,**0.20,0.23,** (16spots)	**0.04,0.06,0.12,**0.16,**0.20,0.23,** (13spots)
2	H2	**0.02,**0.07,**0.14,0.20,0.26,** (14spots)	**0.02,**0.07,**0.14,0.20,0.26,** (9spots)
3	H3	**0.03,0.06,**0.09,**0.15,0.23,0.28** (16spots)	**0.03,0.06,**0.09,**0.15,0.23**,0.28 (6spots)
4	H4	**0.05,0.08,0.15,**0.21,**0.26** (13spots)	**0.05,0.08,0.15,**0.21 (4spots)

Note: Bold Rf values shows the compounds common in all samples which are having the near Rf values.

9) High performance thin layer chromatography result[15]

Sr.no.	SampleNo.	2 µl	4 µl
1	**H1**	0.13,0.18,**0.21,0.30,0.39, 0.51,0.72**(7 substances)	0.13,0.17,**0.21,0.29,0.38,0.55,**0.62**0.69**(8 substances)
2	**H2**	**0.21,**0.26,**0.32,0.41,0.52,**	**0.21,**0.27,**0.33,0.39,0.50,**

		0.73(6 substances)	**0.71**(6substances)
3	**H3**	**0.38,**0.46,**0.51,0.74** (4 substances)	0.19,**0.40,0.50,0.73** (4 substances)
4	**H4**	**0.37,**0.46,**0.52** (3 substances)	0.31,**0.38, 0.47,**0.68,**0.72** (6 substances)

For Track I, III, V, and VII - 2-microlitre (µl) extract of sample is used
For Track II, IV, VI, and VIII - 4-microlitre (µl) extract of sample is used
Note: Bolded Rf values which are respectively nearer values shows the common compound present in all samples.

DISCUSSION

In this present study, four market samples are procured from four different cities of India. After the observation of results of all the procedures, we are discussing as below.In organoleptic characteristics of each samples H1 is having stronger, irritant, alliaceous odour & bitter and acrid taste that compiles the API standard. In Physico-chemical evaluation total cash value of the sample H1 is less than others.Water-soluble extractive value of samples H1 & H2 is more than other samples.Alcohol soluble extractive value in sample H1 is nearer to API limit than other samples.Total percentage of Resin, Volatile oil, Ferulic acid, and Sulphur content of sample H1 is more as compared to other samples. Starchis absent in sample H1&H2 and it is present in Sample H3 & H4. Sample H1 has morepH values & Acidvalues than other three samples.In Preliminary phytochemical studies in all the samples alkaloid is present.Qualitative confirmatory test like Thin Layer Chromatography and HPTLC which are carried out by trial & error method in which Dichloromethane extract is used in the laboratory which shows the Rf value of all the samples very close to each other. Dichloromethane solvent is used for chromatographic study because it is having solubility for fluorescent constituent, which are present in Hingu.In this TLC and HPTLC study sample H1 shown more no. of constituents to above solvent with nearer rf values as compaired to other samples.

CONCLUSION

Market sample H1 from Mumbai showed features almost similar to standard, whereas other 3 samples H2 (Vadodara) H3 (Pune) H4 (Bangalore) showed different value. Hence it can be concluded that Mumbai market is possibly a genuine source of Hingu in comparison with other 3 markets. As the study is cross sectional, one time study for confirmation of these findings markets should be regularly monitored.

REFERENCES

1. Sarin Y.K., Illustrated manual of Herbal drugs used in Ayurveda, by CSIR & ICMR 1996 P.No. 332
2. Ross Ivan A., Medicinal Plants of the world – Vol. 3, Human Press, Totoroa, New Jersey, 2005, P.No. 224
3. Raghunathan K. & Miss Mitra Rama, Phamacognosy of Indigenous drugs Vol. I, CCRI Ayurveda & Siddha, New Delhi, Reprint 1999, P.No. 393, 394
4. Wallis T.E. Text Book OfPharmacognosy, CBS Publisher&prakashan, Delhi, 29 th editions 1985, P.No.503 –505.
5. Kokate, Purohit, Gokhale, Pharmacognosy, NiraliPrakashan, Pune, 29 th editions 2004,P.No.403
6. ShriBhavamishra, BhavaprakashNighantu, Choukhamba Sanskrit, Sans-

than, Varanasi, 10th edn 2002, P.No. 40-43
7. Khandelwala K.R., Practical Phamacognosy, NiraliPrakashan, 13th edition April 2005,P.No.157-161
8. Apte B.K and Kulkarni P.H " Research Methodology for studentsAyurveda" Ayurveda Research Institute, Pune IST Edition PP 111-113
9. Pharmacognostical studies on different market samples of Hingu By Dr.MaryAsha Louis, Under the guidance of Dr. D.S. Lucas, 1998(RGUHS)
10. Dr. Purthi J.S. Quality assurance in spices & spice products, modern methods of analysis, Allied Publishers limited, 1 st edition, 1999 P.No. 203
11. Dr.Raghunathan K. Pharmacopeal standards for Ayurvedic formulation, Central Council For Research In Indian Medicine & Homeopathy, New Delhi, 1976, P.No.A41 to A54
12. Khandelwala K.R., Practical Phamacognosy, Nirali Prakashan,13th edition April 2005,P.No.149 to 156
13. Dr. Purthi J.S. Quality assurance in spices & spice products, modern methods of analysis, Allied Publishers limited, 1 st edition, 1999 P.No. 201 to 203
14. British Herbal Pharmacopoeia British Herbal medicine Association,4 th editions 1996 P. No.195
15. Kusture A.V., Mahedik R, et.al, Pharmaceutical analysis, Vol.I, NiraliPrakashan, Pune 8 th edition May 2002,P.No.18-13

Reference for Standards:

The Ayurvedic Pharmacopoeia of India Part I, Volume I, Government of India, Ministry of Health and Family Welfare, Dept. of Indian System of Medicine and Homeopathy, 1st Edition, Reprinted 2001, P. No. 49 - 50.

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