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PHARMACOGNOSTICAL AND PHARMACEUTICAL EVALUATION OF *ASHTAMANGALA GHRITA* IN THE MANAGEMENT OF ATTENTION -DEFICIT /HYPERACTIVITY DISORDER (ADHD) IN CHILDREN

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ABSTRACT

Background: ADHD is the most common neurobehavioral disorder of childhood which affects 5% of Children all over the world. *Ashtamangala Ghrita* is an Ayurvedic polyherbal drug was used as *Nasya* and it proved its efficacy and safety in Highly significant and significant results in the management of symptoms of ADHD according to DSM-V in children by acting on *Manas* and *Buddhi* in *Manovaha Srotasa*. **Aim:** to setting a standard authentication profile for *Ashtamangala Ghrita* by Pharmacognostical & Pharmaceutical parameters. **Materials & Methods**: *Ashtamangala Ghrita* was prepared as per classical methods and the drug was subjected to Organoleptic analysis, Powder microscopical analysis, physicochemical analysis and High performance Thin Layer Chromatography (HPTLC) examination. The final observations were systematically recorded. **Results:** Organoleptic evaluation of coarse powder made out of the crude drugs, were within the standard range as per mention in classics. The powder Microscopy evaluation revealed that, diagnostic character of *Vacha* showed Oleoresin content & Starch grains.

Kushta showed Compound starch cells. *Brahmi* showed Pollen grains, Parenchymal cells along with oil globules & Fiber cells. *Siddharthaka* showed Epicarpal cells & Parenchymal cells along with oil globules. *Sariva* showed Brown tannin content, Fiber cells, Simple starch grain with hilum & Rhomboidal crystal. *Pippali* showed Stone cells. Physicochemical evaluation of finished drug showed, Acid Value 2.889, Saponification value 142.708, Iodine value 31.07, Specific gravity 0.9076 and Refractive index 1.4730. High Performance Thin Layer Chromatography (HPTLC) showed 11 spots at 254 nm and 06 spots at 366 nm. **Conclusion:** The Results obtained could be utilized as references standard for quality assurance of *Ashtamangala Ghrita* in the management of ADHD.

KEYWORDS: Attention –Deficit/ Hyperactivity Disorder (ADHD), DSM-V, *Ashtamangala Ghrita*, Pharmacognocy, Pharmaceutics, HPTLC.

INTRODUCTION

Being a commonest neurobehavioral disorder of childhood, ADHD comprises perhaps 50% of referrals to child neurologists, behavioural paediatricians and child psychiatrists.ADHD affects 5% of children all over the world[1] and according to DSM - V Inattention, Hyperactivity and Impulsivity are the core symptoms of this disease. There are no exact references for ADHD in Ayurvedic classics but the behaviours can have correlated with the some *Lakshanas* of *Manasa Vikara* described by Charaka *Acharya* which occurs due to defects in the volitional power of the *Manas, Buddhi* or its constitutes i.e. *Dhee*, *Dhriti*, *Smriti*. Along with *Shareerika Dosha* (*Vata*, *Pitta*), *Manasika Dosha* (*Rajas* and *Tamas*) causing psychosomatic disorders. Symptoms of abnormal behaviours mentioned in classics i.e. *Manovibhrama, Buddhivibhrama, Smritivibhrama, Sheelavibhrama, Cheshtavibhrama, Acharavibhrama, and Anavasthita Chittatva*[2,3] can correlate with the some clinical presentation of ADHD.

Psychostimulants drugs are mainly used in modern medical system for management of disease. Which give better relaxant for the symptoms but several researches reported adverse events[4], those are badly effects to the normal psychosomatic development of the children. When comparing the modern psychostimulant, Ayurvedic polyherbal drug *Ashtamangala Ghrita Nasya* has showed statistically significant results in the management of ADHD in children without any adverse effects.

The drug administration in form of *Sneha* formulations have ability to acting on brain by crossing the blood brain barrier. This factor may have correlation for using *Ghrita Kalpana* as Varity of *Sneha Kalpana* to treatment in Ayurvedic classics for brain and *Mind* effected disorders like *Unmada Roga*, *Apasmara* and *Grhaha Dosha* ect. *Ashtamangala Ghrita* is one of the most potential *Sneha Kalpana* in Ayurvedic preparations which is mentioned in Bhaisajjya Ranavali, *Balarogadhikara.*[5] Which is claimed to be having properties for *Medha* (Intellectual), *Smruti* (Memory), *Buddhi* (Logical Thinking) enhancement with the help of eight ingredients i.e. *Vacha, Kushtha, Brahmi, Siddharthaka, Sariva, Saindhava lavana, Pippali* and *Go Ghrita.* The therapeutic effectiveness and safeness always comes with good quality of the finished product of drug. Pharmacognostical & Pharmaceutical studies are the main tests when used to authentication and standardization of drugs. Therefore, in this study Pharmacognostical & Pharmaceutical studies were carried out for setting a standard authentication profile for *Ashtamangala Ghrita.*

AIM

To setting a standard authentication profile for *Ashtamangala Ghrita* by Pharmacognostical & Pharmaceutical parameters.

MATERIALS AND METHODS

Collection of raw drugs

Majority of drugs of were obtained from Pharmacy of Gujarat Ayurved University and the drugs which were not available from the pharmacy of Gujarat Ayurved University were procured from local market of Jamnagar. The ingredients & parts used in the preparation of the final product are listed in the Table no:01.

Table No. 01: Ingredients of *Ashtamangala Ghrita.*

Sr.No.	Ingredients	Botanical Name/ English Name	Part used	Ratio
1.	*Vacha*	*Acorus calamus* Linn.	*Shushka Mula*	1 part
2.	*Kushtha*	*Saussurea lappa* C.B.Clarke	*Shushka Mula*	1 part
3.	*Brahmi*	*Bacopa monneri* Linn.	*Ardra Panchanga*	1 part
4.	*Siddharthaka*	*Brassica campstris* Linn.	*Shushka Phala*	1 part
5.	*Sariva*	*Hemidesmus indicus* Linn.	*Shushka Mula*	1 part
6.	*Saindhava lavana*	Rock salt	-	1 part
7.	*Pippali*	*Piper longum* Linn.	*Shushka Phala*	1 part
8.	*Go Ghrita*	Cow Ghee	-	28 parts

Preparation of *Ashtamangala Ghrita*

Ashtamangala Ghrita was prepared as per the rules of Sharangadhara Samhita *Sneha Kalpana*[6] at Department of *Rasa Shastra* and *Bhaishajjjya Kalpana*. I.P.G.T & R.A Gujarat Ayurved University, Jamnagar, Gujarat, India.

Pharmacognostical study of ingredients of *Ashtamangala Ghrita*

Pharmacognostical study was carried out at Pharmacognosy laboratory, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.

Organoleptic evaluation - The coarse powder of raw drugs were evaluated by organoleptic characters like taste, odour, colour and touch.[7]

Powder microscopy evaluation - The coarse powders of *Vacha, Kushtha, Brahmi, Siddharthaka, Sariva, Saindhava lavana,* and *Pippali* were studied separately with and without staining. staining was done with Phloroglucinol and HCl for identification of Lignified elements. The micro photographs were taken under Corlzeiss binocular microscope attached with camera.[8,9]

Physico-chemical study of prepared drug *Ashtamangala Ghrita*

Physico-chemical study was carried out at Pharmaceutical chemistry laboratory, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.

Ashtamangala Ghrita was analysed by using various parameters such as Acid Value Saponification value, Iodine value, Specific gravity, Refractive index and high performance thin layer chromatography (HPTLC) was performed as per the guideline provided by API. HPTLC was performed by using Toluene + Ethylacetate + Acetic acid (14:4:2) solvent system and observed under visible light. The colour and Rf values of resolved spots were noted. Methanolic extract of drug sample was used for the spotting.[10,11]

OBSERVATIONS AND RESULTS

Results of Pharmacognostical Study

Organoleptic parameters - Organoleptic parameters of coarse powder of *Ashtamangala Ghrita* are mentioned in Table No. 02.

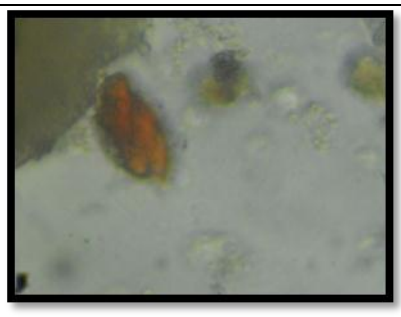
Table No. 02: Organoleptic characters of coarse powders of *Ashtamangala Ghrita.*

Sr.No.	Organoleptic Characters	Results
1.	Colour	Greenish Yellow
2.	Taste	Salty
3.	Odour	Slightly aromatic
4.	Touch	Smooth
5.	Appearance	Powder

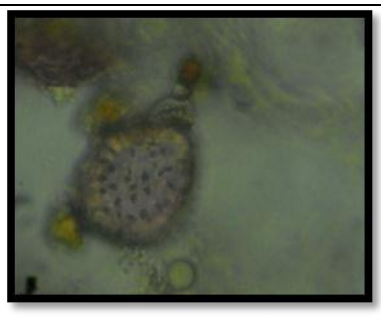
Powder microscopy evaluation - The observations of the powder microscopical evaluation of coarse powder of *Vacha, Kushtha, Brahmi, Siddharthaka, Sariva, Saindhava lavana,* and *Pippali* are mentioned in Table No.03 and Figure No.01.

Table No. 03: Microscopic characters of ingredients of *Ashtamangala Ghrita*.

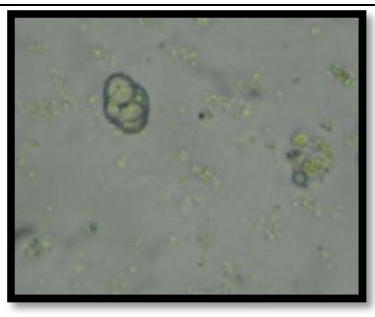
Sr.No.	Drug Name	Microscopic Characters
1.	*Vacha*	Oleoresin content cells, Starch grains cells
2.	*Kushtha*	Compound starch grins cells
3.	*Brahmi*	Pollen grains cells, Paranchymal cell along with oil globules, Fiber cells
4.	*Siddharthaka*	Epicarpal cells, Parenchymal cells along with oil globules
5.	*Sariva*	Brown tannin content, Fiber cells, Simple starch grain with hilum, Rhomboidal crystals
6.	*Pippali*	Stone cells



Olioresine content of *Vacha*

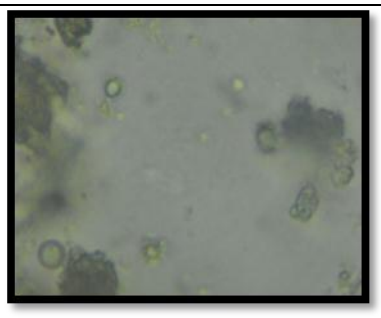


Starch grains of *Vacha*

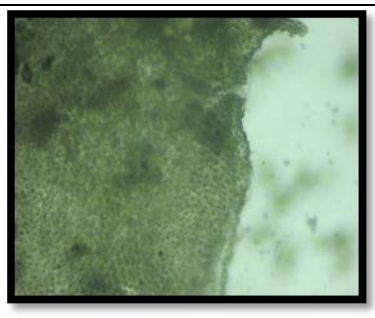


Compound starch grains of *Kushtha*

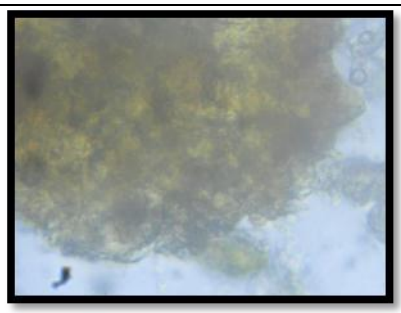
Fibers of *Brahmi*



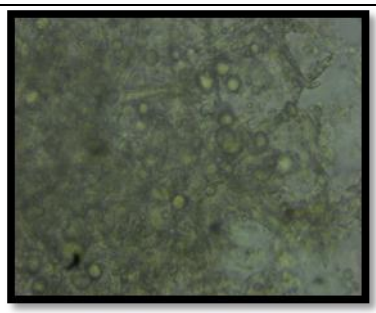
Pollen grains cell of *Brahmi*



Parenchymal cell along with oil globules of *Brahmi*



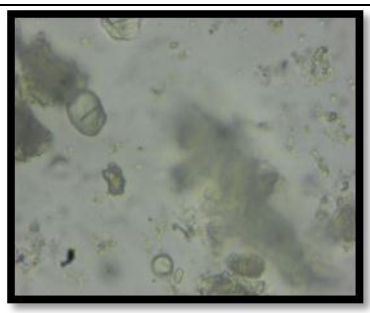
Epicarpal cells of *Siddharthaka*



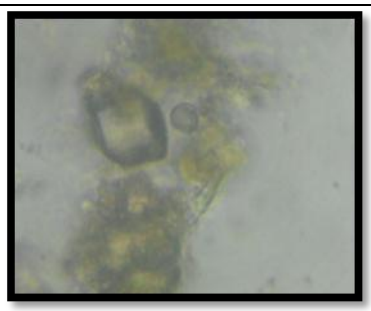
Paenchymal cells along with oil globules of *Siddarthka*

Fibers of *Sariva*

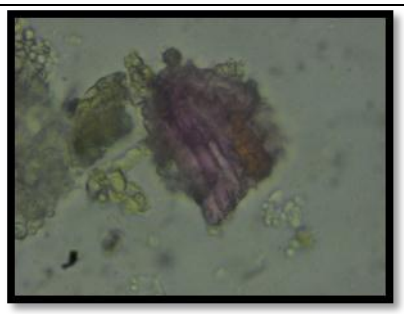
Brown content of *Sariva*



Starch grains of *Sariva*



Rhomboidal crystal of *Sariva*



Stone cell of *Pippali*

Figure No. 01: Microscopic characters of ingredients of *Ashtamangala Ghrita*.

Results of Pharmaceutical Study

Organoleptic parameters - Organoleptic parameters of prepared drug of *Ashtamangala Ghrita* are mentioned in Table No. 04.

Table No. 04: Organoleptic characters of prepared drug of*Ashtamangala Ghrita.*

Sr.No.	Organoleptic Characters	Results
1.	Colour	Greenish Yellow
2.	Taste	Aromatic
3.	Odour	Slightly aromatic
4.	Touch	Smooth
5.	Appearance	Liquid

Physicochemical parameters - Results of Physicochemical parameters of *Ashtamangala Ghrita* are mentioned in Table No. 05.

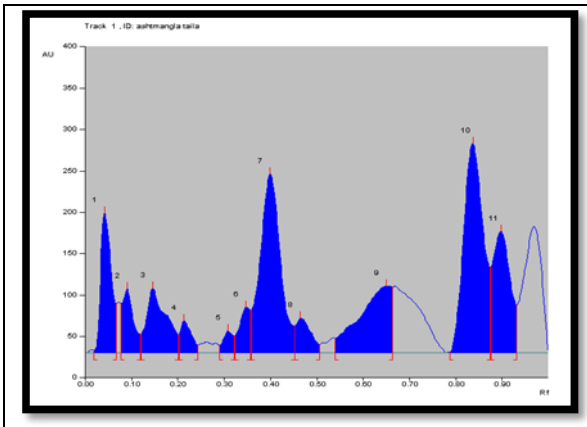
Table No. 05: Physico-chemical analytical results of *Ashtamangala Ghrita.*

Sr.No	Parameters	Values
1.	Acid value	2.889
2.	Saponification value	142.708
3.	Iodine value	31.07
4.	Specific Gravity	0.9076
5.	Refractive index	1.4730

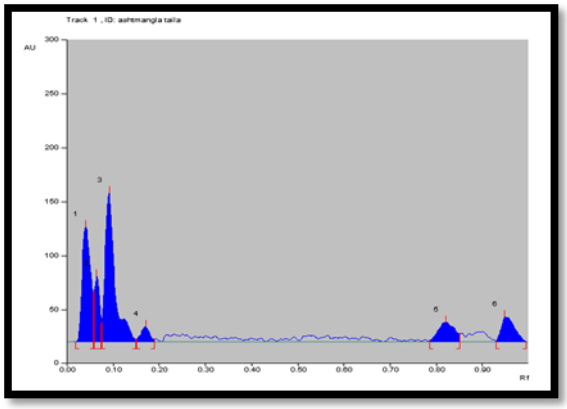
HPTLC results –After completion of HPTLC, the spots were examined under ultra violet light of wavelength 254 and 366 nm. The resolution factor was calculated by using the formula Rf = Distance travelled by solute/Distance travelled by solvent. The final results are reported in the Table No. 06 and the Densitogram of the same is shown in Figure No. 02 and Figure No. 03.

Table No. 06: Chromatographic results of *Ashtamangala Ghrita.*

Conditions	Rf values
Short ultra violet (254 nm)	0.04, 0.09, 0.15, 0.21,0.31, 0.35,0.40,0.40,0.46,0.65,0.84
Long ultra violet (366 nm)	0.04, 0.06, 0.09, 0.17,0.82,0.95



11 Spots at 254 nm



06 Spots at 366 nm

Figure No. 02: HPTLC Study Result of *Ashtamangala Ghrita.*

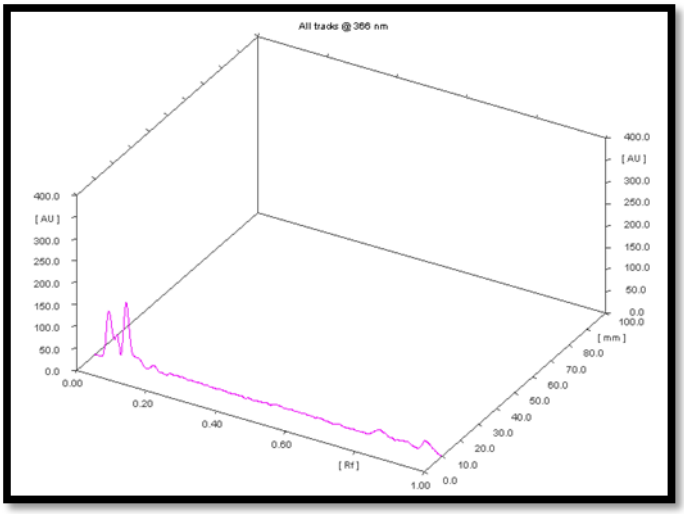


Figure No.03: Densitogram of *Ashtamangala Ghrita.*

DISCUSSION

Pharmacognostical study reveals authentication of ingredients and *Ashtamangala Ghrita* was cross verified with standard reference API.

According to the Physico chemical studies, Refractive index procedure was applied to the *Ashtamangala Ghrita* to confirm the proper formulation of oil based product. In present study the Refractive index was 1.4730, which will help to achieve the accuracy of the sample. Specific gravity is the ratio of the density of the substance to the density of the water. The specific gravity of the current sample was 0.9076, showing that; the sample is not denser than water. The acid value was 2.889 indicating the amount of free fatty acid present in *Ghrita*. The test showed Saponification value as 142.708 It gives the idea of molecular weight of an oil/fat. The Iodine value 31.07 which suggest the amount of unsaturated fatty acid in *Ashtamangala Ghrita*. It means most of the fatty acid found in *Ashtamangala Ghrita* is saturated which will help to work as *Snehana* to the body at macro and micro level. HPTLC is a convenient and simple procedure in which finger printing profile is available in the form of graph and densitogram. In present HPTLC study, *Ashtamangala Ghrita* was showed 11 spots at 254 nm and 06 spots at 366 nm, after completion of chromatographic procedure.

CONCLUSION

Findings of the Pharmacognostical study confirm the ingredients present in the *Ashtamangala Ghrita* and physicochemical analysis was inferred that the formulation showed maximum qualitative standards in all the parameters. Therefore, the results obtained could be utilized as

references standard for quality assurance of *Ashtamangala Ghrita* in the management of ADHD.

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