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TO EVALUATE THE EFFECT OF *SHODHANA SAMSKARA* OF *ASHODHITA* AND *SHODHITA DATURA BEEJA* – A ANALYTICAL STUDY

Dr. Madhu Pathak*[1], Dr. Dhanpat Mishra[2] and Dr. Vishnu Prasad Gautam[3]

[1]PG Scholar, Department of Agada Tantra, KLEU, Shri BMK Ayurveda Mahavidyalaya, Belgaum, Karnataka.

[2]PG Scholar, Department of Kaya Chikitsa, KLEU, Shri BMK Ayurveda Mahavidyalaya, Belgaum, Karnataka.

[3]Associate Professor, Department of Ras Shastra, B.P.S.Mahila Vishwavidyalaya, Khanpur Kalan, Haryana.

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***Corresponding Author**
Dr. Madhu Pathak
PG Scholar, Department of Agada Tantra, KLEU, Shri BMK Ayurveda Mahavidyalaya, Belgaum, Karnataka.

ABSTRACT

Datura metel Linn. is a well known herbal drug and easily available worldwide. *Ayurveda* has mentioned mainly two types of poison – *sthavara and jangama visha, Datura* is included under *sthavara visha*. All parts of *Datura* are poisonous but seeds are more toxic as compared to the parts of the plant. To reduce the toxicity of a noxious drug *Ayurveda* mentions s*amaskara* (procedure) known as *shodhana* (purification). The phytochemical analysis is very effective to see the active principles of plant to check its therapeutic value. The present study will evaluate the same through physicochemical parameters in *Ashodita* (unpurified) and *Shodhita* (purified) *Datura beeja*. After the analysis of the *Datura* beeja reduction of percentage of total ash, loss on drying and increase in the extractive values of *Shodhita Datura beeja* as compared to the *Ashodita Datura beeja*. Thus the current study shows the importance of *Shodhana samskara* to minimize the toxicity of the drug.

KEYWORDS: *Shodhana samskara, visha*, physicochemical analysis, *Datura.*

INTRODUCTION

Datura (*Datura metel* Linn.) is a delirient poison of vegetable origin, mentioned under *Upavisha.*[1] Its seeds are highly toxic, but after proper purification it attains medicinal value

and is widely used in medicine. According to *Ayurveda* any potent poison can be utilized in treatment as an excellent medicine if used judiciously, on the contrary a potent medicine that can act as a potent poison if used injudiciously.[2] One of the best example for such use of potent poison in treatment is *Datura* but such poisonous plant or drug should use after *shodhana samskara*. *Datura metel* is a perennial herbal plant belonging to the Solanaceae family.[3] In *Ayurvedic* formulations leafs, seeds, bark of *Datura plant* is useful and it is known for its anti-cholinergic and delirium properties. All parts of *Datura* contain dangerous levels of tropane alkaloids which are highly poisonous and maybe fatal if ingested, it can produce symptoms like dryness of mouth, nausea, vomiting, dysphasia dysarthria, diplopia, delirium, halluation, dry and hot skin (due to inhibition of sweat secretion), and red (due to the dilatation of cutaneous blood vessels) skin especially in the face/ chest, drowsiness later it can lead to coma than death.[4]

Shodhana samskara described in various *Ayurvedic* classics, it is not only a simple procedure for separation or detoxification, but it increases the therapeutic efficacy of the drug also.[5] Specific *Shodhana dravya*'s (purification media) are mentioned for individual *upavisha*. So in present study the *Datura beeja* are subjected to specific *Shodhana* (purification) procedure using *Godugdha* as described in the *Ras targini* as *shodhana dravya* (purification media) to *Datura* seeds.[6]

MATERIAL AND METHOD

Material - Datura seeds, *Godugdha* (cow milk) – quantity sufficient to complete the procedure, Cotton cloth sufficient to make it three folds and to tie a *pottali*, Earthen pot, Gas stove with proper regulator, Iron rod, Spatula and measuring cylinder.

Method - The earthen pot containing godudha was taken then earthen pot with pottali was kept on a gas stove and then gas stove was on. The *shodhana* was given for three hours on mandagni (low medium flame). As the boiling continued the milk was slowly started to evaporate. So the fresh milk was added to the pot to keep the *pottali* immersed in milk as the quantity of milk in the pot was reduced. The fresh milk was added according to the quantity of evaporation of the milk till the end of three hours. At the completion of three hours the gas should turned off and it was kept undisturbed till the milk attained room temperature

Physico-chemical analysis[7,8]

Determination of Moisture content/Loss on drying

Procedure: 1.5gm.of powdered test sample (Datura seeds) was weighed. A china / glass dish was placed and dried in oven at 100 – 105^{0}C. The sample was taken out, it was cooled in desiccators and loss in weight was recorded. This procedure was repeated till constant weight was obtained. Loss on drying (%) = Loss in weight x 100 /w.(Where 'W' is = Weight of the drug powder in gram).

Determination of Total ash value

Procedure: 2 gm of weighed test sample was taken in a silica crucible, previously ignited and weighed. The powdered sample was scattered at the bottom of crucible. The muffle furnace was incinerated by gradually increasing the temperature till to 450^{0}C, i.e. until the sample powder is free from carbon. Then cooled in dessicators. The ash was weighed, and percentage of ash was calculated with reference to the air-dried drug sample.

$$\text{Ash value (\%)} = \frac{100 \times \text{Wt. of ash}}{\text{Wt. of sample}}$$

Determination of Acid – insoluble ash value

Procedure: -Using 25 ml of dilute HCl (0.5N), the ash from the dish, used for the total ash value determination was washed into a beaker. Wire gauze was placed over a Bunsen flame and the washed HCl was boiled for 5 minutes. Filtered through ash less filter paper, washed with hot water, then the filter paper with residue was folded and placed in a crucible. The muffle furnace was incinerated till 250^{0}C. Then cooled and the residue was weighed. The acid insoluble ash of the crud drug with reference to the air dried sample of crude drug was calculated.

$$\text{Acid insoluble ash value (\%)} = \frac{100 \times \text{Wt.of residue}}{\text{Wt. of sample}}$$

DETERMINATION OF EXTRACTIVE VALUE

Determination of Alcohol-Soluble Extractive:- About 5 gm. of the powdered drug was weighed in a beaker and transferred to a dry 250 ml Iodine flask.100 ml graduated cylinder was filled to the required mark with the solvent, 90% alcohol. The flask was stoppered and set aside for 24 hours shaking with frequently at the interval of 6 hours (maceration). Filter into a 50 ml cylinder after sufficient filtrate has collected; then 25 ml of the filtrate was transferred to a weighed 25 ml beaker. This was then evaporated to dryness on water bath and

the drying was completed in an oven at 100^0C for about 10 –15 minutes. Cooled in desiccators and weighed. The percentage w/w of extractive was calculated with reference to the air dried drug.

Determination of Water soluble extractive: Same as determination of alcohol soluble extractive value. Instead of alcohol chloroform water was used.

Aqueous Extraction (Water extract): About 5 gm of the powdered drug was weighed in a beaker and transferred it to a dry 250 ml Iodine flask.100 ml graduated cylinder was filled to the required mark with the Methanol and add in iodine flask. The flask was close and set aside for 24 hours shaking with frequently at the interval of 6 hours (maceration). Filter into a 50 ml cylinder after sufficient filtrate was collected; transfer 25 ml of the filtrate to a weighed 25 ml beaker. It is then evaporated to dryness on water bath and completes the drying in an oven at 100^0C for about 10 –15 minutes. Cooled in desiccators and stored in glass bottle for further use

PHYTO-CHEMICAL SCREENING: Chemical tests were performed on both extracts (ethyl alcohol and water) obtained from using non-polar and polar solvent. It helps to find out organic compounds like carbohydrates, proteins, glycosides, alkaloids, steroids, tannins and phenol compounds, oxygenic acids enzymes, fats and oils etc.

Five grams coarse powder of the roots was subjected for extraction with methanol (100 ml), keeping it for overnight with initial occasional shaking up to 6 h. and then set aside. After 24 h, it was filtered and alcoholic extract was collected. Similarly, water extract was prepared. Both the extracts were evaporated till dryness on water bath. The dried extracts were weighed, and percentage yield was calculated. The extracts were used for preliminary Phytochemical screening with a set of various chemical tests viz., Dragendorff's Mayer's, Hager's, and Wagner's tests for alkaloids; ferric chloride, lead acetate, potassium dichromate, and dilute iodine tests for tannins and phenolics; and foam test for saponin glycosides.[12]

RESULTS AND DISCUSSION

Table 1: Illustrates the results of physicochemical analysis of *Datura beeja.*

Sr. No.	Parameters	*Datura beeja*	
		Ashodita Datura beeja	***Shodita Datura beeja***
1	Loss on Drying at 110^0C	5.5%	7%
2	Total Ash	3.80%	4.35%
3	Acid Insoluble Ash	1.54	0.15
4	Water Soluble Extractive	18.42%	16%
5	Alcohol Soluble Extractive	7.84%	5.4%

Table 2: Shows Results of organic tests of Aqueous & Alcohol extract of *Datura beeja.*

Tests	Results			
	Ashodita Datura beeja		***Shodita Datura beeja***	
	Aqueous ext	**Alcoholic ext**	**Aqueous ext.**	**Alcoholic ext.**
Carbohydrates	+	+	+	+
Reducing Sugars	-	+	-	+
Non-reducing sugars	-	+	-	+
Phenols	+	+	+	+
Steroids	+	-	-	-
Proteins	+	+	+	+
Cardiac glycosides	_	_	_	_
Saponin	+	+	-	-
Alkaloids	+	+	+	+
Tannins	+	-	+	-

+ Present, - Absent

Table 3: Table shows phyto-chemical analysis of *Datura beeja.*

Tests	Results	
	Ashodita Datura beeja	***Shodita Datura beeja***
Calcium	-	-
Magnesium	-	-
Sodium	+	+
Potassium	-	-
Iron	-	-
Sulphate	+	+
Phosphate	+	+
Chloride	+	+
Carbonate	-	-
Nitrates	-	-

Datura is a toxic drug, at the same time it is therapeutically very effective. In *Ayurveda*, toxic drugs are used in medicinal formulations after *Shodhana* or purification procedure. For the *Shodhana* of *Datura beeja godugdha* is mentioned in *Ras Taragini* text book.[9] The drug *Datura* showed marked physical changes in colour and weight after purification procedures.

Media i.e. Cow's milk showed marked physical changes in colour, taste (*Godugdha*) and smell after purification procedures. The changes mainly physical changes that occur both in media and seeds and the variations in the weight of extracts are preliminary and macroscopic signs of chemical changes that take place during *Shodhana*. The colour change in the *Godugdha* may indicates that some chemical transformation occurred between the media and drug etc.[10] The Preliminary phytochemical studies in the test drugs revealed the presence of Saponins in *Ashodhita Datura Beeja* and it was absent in *Godugdha Shodhita*. In *Shodhita datura beeja* Steroids were found to be present.

The Mayers test which was negative for alkaloid in the raw milk before *Shodhana,* but it was shown positive after *shodhana* which indicates the chemical changes occurred within the milk. The presence of alkaloids in both Datura samples i.e in *ashodhita* and *shodhita* samples indicates that alkaloids have not been completely removed from the *shodhita* sample but some percent of alkaloids reduction might have been occurred in the seeds of *Datura* after *shodhana* which may be responsible for the pharmacological action. The increase value of loss on drying in *Shodhita Datura beeja* samples (7%) may be due to retaining of some moisture factor from media like *godugdha* used for s*hodhana.*[11] Increase in the ash values of the *Shodhita Datura beeja* (4.34%) sample can be hypothesized as the addition or transfer of inorganic constituents of *Godugdha* into *Shodhita Datura beeja* sample. In *Ashodhita Datura beeja* sample was having (3.8%) of ash value.[12] The reduction in the extractive values in the *shodhita* sample might be due to the solubility of chemical constituents of Datura in the s*hodhan*a media.[13] This media might be act as a solvent system to extract the toxic alkaloids. Keeping the *Datura* seeds in *Godugdha* resembles the hot maceration type of extraction, it may be the reason for the reduction in the extractive values in the *shodhita* sample.[14]

CONCLUSION

Shodhana is a *samskara* (procedure) which reduces the toxicity of drug and brings therapeutic value and present study also showed the importance of *Shodhana samskara*.

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