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Analytical Study on Effect of Shodhana on Jaypal Beej (*Croton tiglium* L. Seed)

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ABSTRACT

Jaypalbeej (*Croton Tiglium* L. Seed) is classified under Upavisha (Less toxic) category in ayurvedic texts. Though it is toxic, by purification i.e shodhana process, it is used in many formulations. The shodhana i.e purification done with the help of cow's milk. The drug is cooked in cow milk i.e *swedana* in cow milk. The process is repeated for three times. This process is described in classical text purification process of drug, Rasatarangini. In this article analytical tests are discussed of Shodhit Jaypal beej i.e purified *Crotontiglium* L. Seed. Analytical tests like moisture content, total ash value, Water Soluble Extractives, Thin Layer Chromatography (TLC) are carried out. The outcome and results are mentioned in this article. A portion of shuddha Jaypalbeej was analysed for changes in physical & chemical properties as compared to raw Jaypalbeej.

KEYWORDS

Jaypalbeej, *Croton Tiglium*, TLC, Rasatarangini, shodhana



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INTRODUCTION

Agadtantra is classical toxicology in Ayurveda. In Agadtantra “gada”¹ i.e. Visha(Poison) is a substance which when enters in the body produces disturbances in the body function .

These Visha (Toxic substances) or upvisha (Semi-poisonous substances) are toxic to human body in their natural form. These substances cannot be used directly for medicinal purposes. They are used as part of a treatment in human being, after undergoing various procedures which are known as “Shodhan”(purification) , shodhan is an Ayurvedic procedure of detoxification. These methods are authentic since long time.

All old concepts need to be tested against current developments and available parameters .Today one has to prove efficiency of our old treasure against new developed technology. So with the help of physical and chemical tests, analytical study of Jaypal beej (Croton tiglium L Seeds) shodhana process done²

AIMS

To study the effect of shodhana process on toxicity level of drug i.e. Jaypal beej (Croton tiglium L Seeds) with appropriate analytical tests viz Moisture Content, Total

Ash Value, Water Soluble Extractives, Thin Layer Chromatography .

OBJECTIVES

1. Pharmaceutical study of shodhana process of Jaypal beej as per text
2. Analytical study of purified jaypal beej.

MATERIALS & METHODS

SHODHANA PROCESS OF JAYPAL BEEJ

1) Most of the Ayurvedacharya had mentioned the same process (shodhana in godugdha) but only Rastarangini³ mentioned the shodhana process of JaypalBeej in Godugdha (Cow’s milk) for three times.

2) The process is standard, materials are easily available. **Shodhana Process :**

Materials:-

- 1) *Croton tiglium* (Seed)
- 2) Warm water
- 3) Blade
- 4) Godugdha (Cow’s Milk)
- 5) Dolayantra
- 6) Cotton- cloth
- 7) Khala (Grinder)
- 8) Containers

Procedure

1) The seeds were divided in to two groups equally.



2) Authenticated Crude sample 100gm of Jaypalbeej was taken named as group “A”

3) Authenticated sample 100gm of *Croton tiglium* was boiled in water for 3 hrs, named as group “B”.

4) After boiling, covering of the seed was removed. Then the seeds were divided in to two parts with the help of blade.

5) After making the two parts, the tongue like structure which is present inside the seed is removed.

6) Godugdha (Cow's milk) was taken in a dolayantra, the sample of group “B” was kept on a cotton cloth and four corner of cotton cloth was taken together & tied the knot to form a small bag. This small bag (Pottali) containing sample was dipped in to ‘Godugdha’. Sample was fully immersed into Godugdha.

7) Dolayantra containing sample was kept on gas fire, with the help of low flame (Mandagani), sample was boiled for three hrs.

8) After boiling sample was removed from small cotton bag & kept in the shadow for 24 hrs for drying.

9) Next day, same procedure of shodhana was repeated. After shodhana process sample was kept drying for 24 hrs.

10) Next day, same procedure of shodhana was repeated.

11) The sample was kept drying for 24

hrs. Other group A sample was also dried for 24 hrs in the shadow

12) Both the samples were powdered in khala (Grinder,) & a fine powder was prepared.

Phytochemical Investigation⁴

As per textual references shodhana procedure in Ayurveda, reduces the toxicity of the drug. To evaluate the toxicity of the drug, phytochemical investigation were done.

Hence the phytochemical analysis of *Croton tiglium* seed choorna (powder of *Croton tiglium* seeds) before & after the shodhana process were done carefully⁵. The result as follows:-

1. Determination of moisture content

As excessive moisture can induce oxidative damage and easily contaminate the sample. Therefore it is very important to estimate moisture content in the drug⁶. It also affects the shelf life of the drug.

Procedure

Evaporating dish was washed with distilled water & dried in the oven at 110c & put in desiccators, then weight of empty dish was noted as ‘A’. Sample 10gm (before shodhana) was placed in the dish was noted as B. Then the dish was kept in oven at 110⁰ c for 2hrs. It was removed from oven, cooled in a desiccator and weighted as C. Again it was kept in oven at 110c for 6 hrs and weighted as C” Same procedure was



repeated. Next two consecutive weight readings were equal. The final reading was taken for calculation formula,

$$\% \text{ of moisture} = \frac{(B - C) \times 100}{(B - A)}$$

Same procedure was done for the sample of *Croton tiglium* seeds powder after shodhana.

Table 1 Moisture content

	Before Shodhana	After Shodhana
Moisture % (Loss of Drying)	2.18%	Less than 0.5%

Determination of total ash value

Ash value helps in determination of water insoluble ash impurities, it also detects trace elements i.e. Inorganic compounds of many herbal products. Ash value is used for the determination of purity and quality standardization of crude drug.

Procedure

Silica crucible was washed by distilled water and dried in oven at 110⁰c and put in the desiccator and then weighted as “A”. Dried powder of 2gm sample of *Croton tiglium* seeds was taken and labeled as sample ‘B’

Then sample was kept in furnace at 750⁰c for 2 hrs . Then it was transferred to a desiccator for cooling. Accurate weight was calculated after cooling as ‘C’. Ash value was obtained by following calculation formula.

$$\text{Total Ash Value} = \frac{\text{wt} (C - A) \times 100}{\text{wt} (B - A)}$$

The same procedure was done for the powder sample of *Croton tiglium* seeds after shodhana.

Table No 2: Total Ash Value

	Before Shodhana	After Shodhana
Total Ash Value	2.20 %	1.5%

Determination of Water Soluble Extractives

Procedure

dried powder sample of 2 gm of *Croton tiglium* seeds was taken in weighing bottle. It was transferred to a dry conical flask (250ml capacity). Solvent (D / W) 100ml was filled upto the mark. The flask was sealed with cork and set a side for 24 hrs&shaked frequently (maceration).then mixture was filtered in to a cylinder .The filtrate 25ml was kept in thin porcelain dish, for the task determination. It was subjected to water bath. Then drying done in an oven at 100⁰c . Cooled in dessicator and weighted⁷. Water soluble extractives value was obtained by following calculation.

25 ml of water extract gives = X gm of residue.

100 ml of water extract gives = 4 X xgm of residue.

The same procedure was done for the powder sample of *Croton tiglium* Seeds after shodhana.

Table 3 % water soluble Extractive

	Before Shodhana	After Shodhana
% water soluble Extractive	8.68	3.0



THIN LAYER CHROMATOGRAPHY OF JAYPAL BEEI (*CROTON TIGLIUM* L. SEED)

Procedure:

Silica gel 'G' slurry was prepared in distilled water and applied on a clean and dried glass plate. The plate was allowed to dry at room temperature and activated at 110°C in the oven.

Sample Loading A straight line was marked on chromatographic plate at distance of 2 cm from the start point, the samples were spotted on it and named as B & A.

Sample : Water extracts of *Croton tiglium* Seed.

- Before shodhana (B)
- After shodhana (A)

Solvent System Ethyl acetate: Methanol: Water

100: 30: 10

This mixture was poured in T.L.C. chamber and allow to saturate about 1 1/2 hrs. The T. L. C. Plate was kept in the chamber and allow to run for 1 1/2 hrs. the plates were removed and dried.

OBSERVATION

The plates were observed in day light and visible spots were marked and noted, Similarly the plates were kept in iodine chamber and developed spots were noted. The spots are visualized are of dark brown

,violet to dark yellowish brown colour at the distance given below & its R. F. values were calculated from the formula.

$R.F = \frac{\text{Distance travelled by solvent}}{\text{Distance travelled by solvent}}$

Distance travelled by solvent.

Table no: 4 R. F of samples

Sr. No	Sample No	Spot developed on exposure to iodine fume colour.	R.F.
1	I	Dark Brown	0.10
2		Violet	0.41
3		Yellowish Brown	0.94
1	II	Dark yellowish Brown	0.77
2		Dark Brown	0.08
3		Dark Brown	0.05
1		Dark Brown	0.08
3		Yellowish Brown	0.9

Result: Sample Before shodhana gave 4 spots when exposed to iodine Vapors. Violet spot was the major one. The sample After Shodhana gave 3 spots, but the violet spot was absent. Also the size of each spot was very small, which may be due to Shodhana Process.

Result:

HPTLC reveals that there are definite and significant changes in Concentration of compounds no. 1,3,4& 7 in after shodhan samples. These changes must be responsible for reduction of toxicity (increase in LD 50).

DISCUSSION

In Ayurvedic medicine many herbal drugs are used to cure & prevent diseases. Poisons are also used as remedy in various diseases & maintenance of health, these poisons (visha) are not used directly for medicinal purposes.

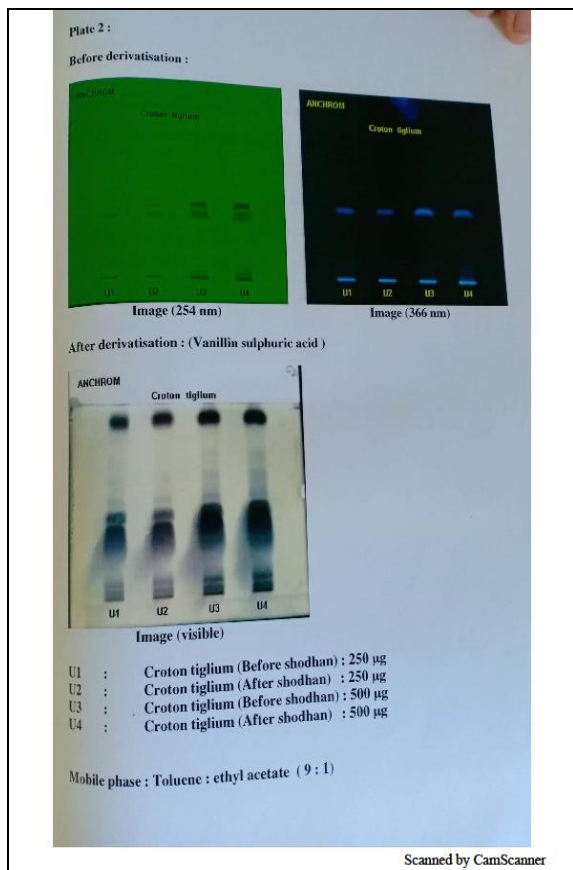


Fig 1 HPTLC readings

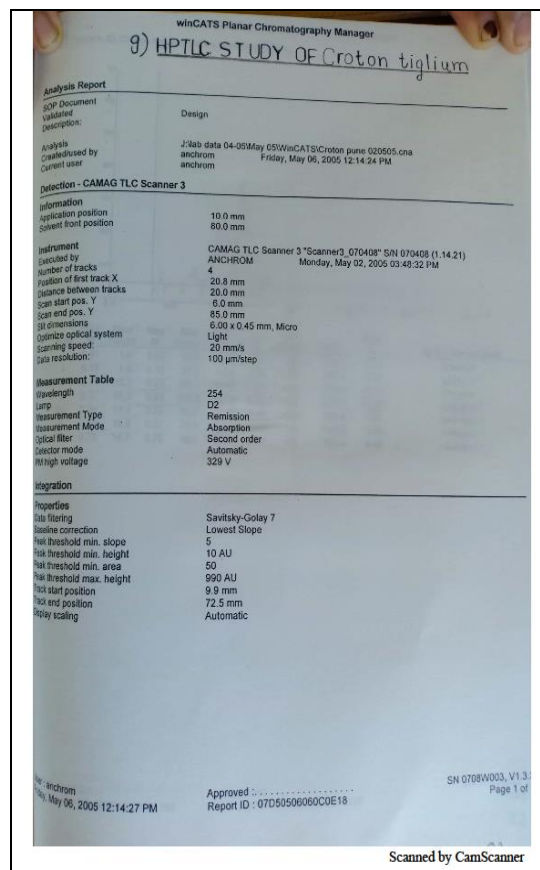


Fig 3.1 HPTLC of Croton Tiglium

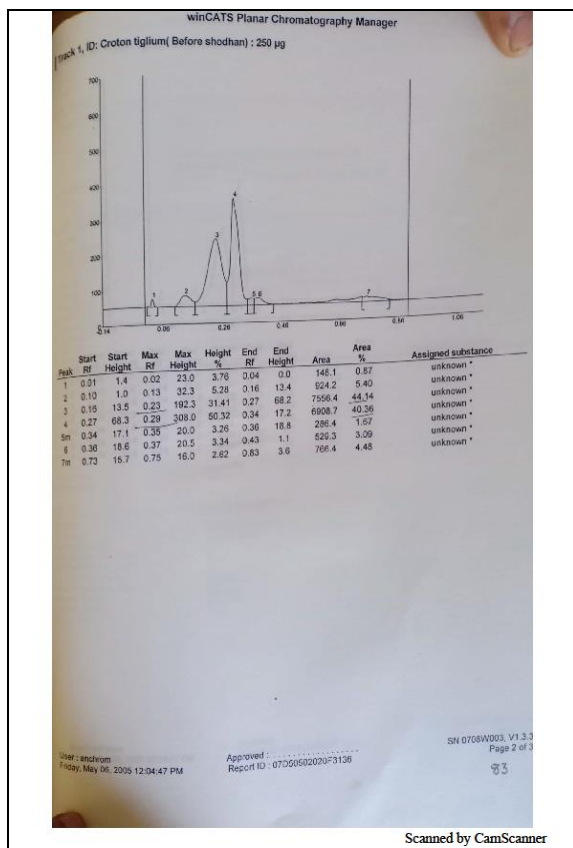


Fig 2 Chromatography before Shodhana

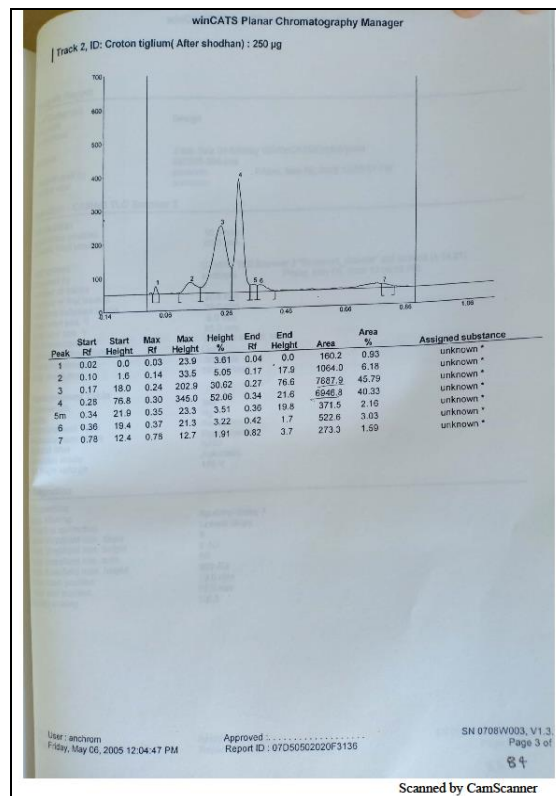


Fig 3.2 HPTLC of Croton Tiglium

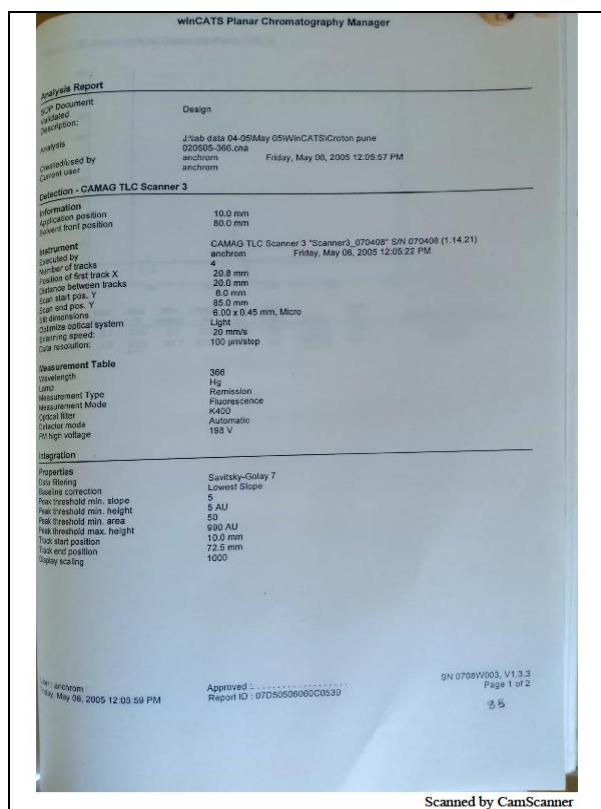


Fig 3.3 HPTLC of Croton Tiglium

They are used as part of treatment in human beings after going through various procedures, which are known as “shodhan”, shodhan is an Ayurvedic procedure of detoxification.

No other organoleptic change was seen in before and after samples in pharmaceutical study of shodhana of Jaypal beej. .

Physical studies of powdered sample of *Croton tiglium* seed before Shodhana revealed that, percentage Ash value before shodhana was more than that of after shodhana (i. e. 2.20% & 1.5 % respectively) (Table no 1).

Percent moisture content before shodhana

was more than that of after shodhana (i. e. 2.18 % & less than 0.5 % respectively)(Table no 2).

% water soluble extractives before shodhana was more than that of after shodhana process(i. e. 8.68% & 3 % respectively)(Table no 3).

From that it can be concluded that shodhana process has affected the % Ash, % moisture content, % water soluble extractives, which may be one of the reasons for the reduction in toxicity.

Thin layer chromatography also showed spots of both (before shodhana & after shodhana) samples.

The color& RF values (Table No 4) of these spots were identical. All the spot observed were dark brown to dark yellowish brown. Thin layer chromatography, sample before shodhana gave 4 spots when exposed to iodine vapors. Violet spot was the major one, The sample after shodhana give 3 spots, but the violet spot was absent also the size of each spot was very small which may be due to shodhana process .

It will be another topic for research to assess quantitative estimation of chemical constituent especially toxalbuincroton of *Croton tiglium* seeds for further comparative studies.



CONCLUSION

Preliminary physical studies showed decrease in Moisture content in after shodhana sample. Total Ash value decreased in after shodhana sample. Water soluble extractives decreased in after shodhana sample.



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