

JAYAPALA BEEJA (*Croton tiglium* Linn) SHODHANA W.S.R TO MAHISHAMAYA SAMSKARA AND NIMBU SWARASA BHAVANA-A COMPARATIVE ANALYTICAL STUDY

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ABSTRACT

Acharyas have mentioned various purification methods to improve the therapeutic efficacy of various toxic drugs. *Jayapala* (*Croton tiglium* Linn) which is one among the upavishas is widely used in many formulations. It is well known for its *virechana* property. *Jayapala* beeja contain croton oil and toxic resin which are poisonous in nature. Hence its purification is necessary for therapeutic use. In *Sharangadhara Samhita* there is a reference regarding *Jayapala Beeja Shodhana* by using mahishamaya (buffalo dung) samskara with nimbu swarasa bhavana. Here *Acharyas* have mentioned the importance of *Bhavana* with *Nimbu Swarasa*. By considering this point in view present study was designed to carry out *Jayapala* beeja shodhana by soaking in buffalo dung followed by seven bhavana with nimbu Swarasa. Changes were studied by subjecting to different physico chemical Analytical parameters including chromatography at four stages. On the basis of Analytical parameters, significant changes were noted in *Shodhita Jayapala beeja churna* when compared to *ashodhita jayapala beeja choorna*

KEYWORDS: *Jayapala beeja choorna, Shodhana, Bhavana, Analytical*

INTRODUCTION

Shodhana has been given much importance since ages, as the seers were aware regarding the bad effects of *ashuddha* substances and their hazards after ingestion. Emphasis on removing such impurities is highlighted in classics. It is employed partly to purify / detoxicate and partly to potentiate the effect of various kinds of drugs used in Ayurvedic Medicine with a view to reduce their toxic contents / effects and to enhance their pharmaco-therapeutic properties. Various modes of *Shodana* are mentioned in *Ayurvedic* pharmaceuticals such as *Swedana* (boiling), *Mardana* (grinding), *Manthana* (churning) and *Bhavana*

(impregnation).¹ Amongst them, *Bhavana* is an important *Samskara* with the help of which, not only the potency of a drug can be altered, but is also capable to bring about changes in characteristics of drug viz. regulation, addition of new or deletion of undesirable characteristics.² *Jayapala*, one among the upavisha³ is widely used in many drug formulations. It is a Small evergreen tree 4.5-6 cm in height with ash colored smooth bark and young shoots sprinkled with stellate hairs. It is well known for its *Virechana* property⁴. *Jayapala* seeds contain croton oil and toxic resin which is poisonous in nature⁵. Hence its purification

is necessary for therapeutic use. Many references regarding the purification of *Jayapala beeja* are available in classics. It is also emphasised that the number of bhavana will increase the potency of the drug. Taking this point the present study aims at analysing the changes in the *Jayapala beeja* while doing *shodhana* and repeated *Bhavana*.

AIMS AND OBJECTIVES

1. To conduct the shodhana procedure on jayapala beeja by soaking in mahishamaya
2. To conduct procedure of bhavana with nimbu swarasa for 7 times on the shodhita Jayapala beeja.
3. To find out the effect of shodhana and bhavana on Jayapala beeja by Analytical parameter.

MATERIALS AND METHODS

Pharmaceutical source

Authenticated raw drug was collected from market and purification was done in KVGAMC Sullia at Agadatantra practical Laboratory.

PROCEDURE -1

Materials:

1. Jayapala beeja
2. Mahishamaya and *Nimbu swarasa* quantity required.

Equipments:

Khalvayantra and *Mritpatra*

Jayapala beeja after removing the outer cover and sprout was kept inside buffalo dung for three days. After that it was washed in hot water, grinded, and applied over a new earthen pot and then the powder was scraped and collected.

PROCEDURE -2

Materials required:

- 1) Jayapala beeja churna
- 2) Nimbu swarasa

Equipments:

- *Khalva yantra*

Powder of Jayapala beeja subjected to bhavana with Nimbu swarasa for 7 times after 7th bhavana the Jayapala beeja churna is properly dried and collected⁶

ANALYTICAL STUDY

For Analytical study samples were collected at different stages and marked as follows

- Sample A-Market Sample of *Jayapala beeja*
- Sample B-Sample collected after procedure-1(after immersing in buffalo dung and drying by application over a mud pot for 72 hours)
- Sample C-After 1st bhavana with Nimbu swarasa
- Sample D- After Completing 7th bhavana with nimbu swarasa

Above samples were subjected to observational and analytical parameters and results were recorded as follows.

 Jayapalabeeja	 Jayapala beeja after removing sprouts	 Jayapala beeja kept in Buffalo dung	 Jayapala beeja immersed in buffalo dung
 Jayapala beeja after shodhana with buffalo dung	 Jayapala beeja paste applied to earthen pot	 Dried Jayapala beeja paste in earthen pot	 Nimbu swarasa
 Ashodhitha Jayapala beeja churna	 After immersing in a buffalo dung	 After One Bhavana with Nimbu Swarasa	 After Seventh Bhavana with Nimbu Swarasa

OBSERVATIONS AND RESULTS

Pharmaceutical Study

Observations During and After Shodhana Process

- In sample B the crushed *Jayapala* beeja were kept in buffalo dung.
- Crushed *Jayapala* beeja becomes swollen after keeping in buffalo dung.
- Sample B was black in colour.
- The grinded paste of *Jayapala* beeja was applied to new earthen pot and after it got dried, it was scraped out. It was observed

that the colour inside the earthen pot changed to blackish colour and it may be due to the absorption of oily content of *Jayapala* beeja.

- While doing *Nimbu swarasa bhavana*, colour of sample C got changed from rough blackish appearance to smooth oily brownish black in colour.
- During the addition of *Nimbu swarasa* in sample C, it was observed that oil content of *Jayapala* beeja was oozing out of the drug

giving a oily appearance to the sample compared to sample B.

- The sample D i.e.colour got more darker

Table 1: Observation Regarding Weight of Jayapala Beeja

Samples	Weight being before procedure	Weight being after procedure	Weight loss
Sample A	400gm	-----	-----
Sample B	350 gm*	180gm	170gm
Sample C	130 gm*	100gm	30gm
Sample D	50 gm	45gm	5gm

*50gm of the drug specimen was taken out for analytical study

Table 2: Quantity Of Nimbu Swarasa Required for each Bhavana

Bhavana	Volume of nimbu swarasa	Weight of Jayapala beeja	Duration
1 st	60ml	100 gm	1hr
2 nd	20ml	90gm	50min
3 rd	10ml	80gm	40min
4 th	10ml	70gm	30min
5 th	10ml	60gm	25min
6 th	10ml	50gm	20min
7 th	10ml	45gm	15min

ANALYTICAL STUDY

Table 3: Comparative Organoleptic characters of all four samples of *Jayapala beeja churna*

Character	Sample A	Sample B	Sample C	Sample D
Nature	Pale brown sticky	Light brown sticky	Dark brown sticky	Dark brown semisolid
Colour	Brownish	Light brown	Dark brown	Dark
Odour	Irritant	Characteristic	Sour smell	Sour smell
Touch	Hard	Hard	Soft	Smooth

Table 4: Comparison of Percentage of Total ash value of all four sample of *Jayapala Beeja Churna*

SAMPLE	TOTAL ASH %
A	1.56
B	1.99
C	0.18
D	6.05

Table 5: Comparison of Percentage of Acid insoluble ash of all four sample of *Jayapala beeja churna*

SAMPLE	Acid insoluble ash%
A	BDL

B	BDL
C	BDL
D	BDL

Table 6: Comparison of Percentage of Water soluble extractive value of all four Sample of *Jayapala beeja churna*

SAMPLE	WATER SOLUBLE EXTRACTIVE VALUE%
A	9.5
B	5.36
C	14.07
D	37.75

Table 7: Comparison of Percentage Alcohol Soluble extractive value of all four sample of *Jayapala beeja churna*

SAMPLE	ALCOHOL SOLUBLE EXTRACTIVE VALUE %
A	58.94
B	47.68
C	46.12
D	30.81

Table 8: Comparison of Percentage of P^H value of all four Sample of *Jayapala beeja churna*

SAMPLE	P ^H EXTRACTIVE VALUE %
A	6.0
B	4.4
C	3.9
D	2.8

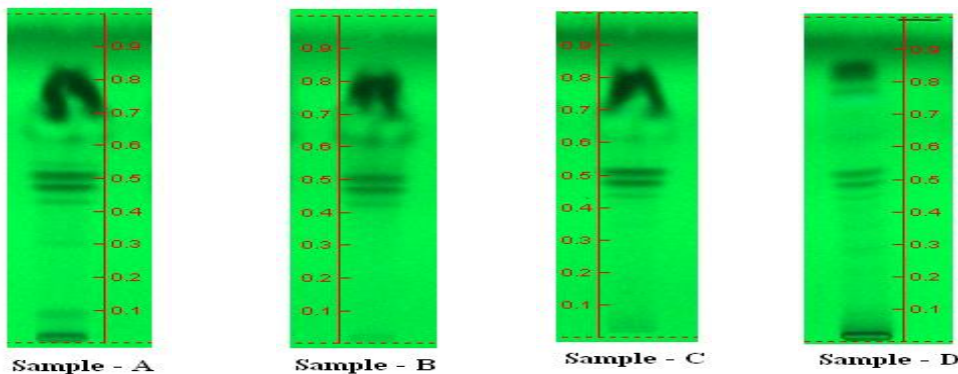
Table 9: Comparison of Percentage of Moisture content of all four Sample of *Jayapala beeja churna*

SAMPLE	MOISTURE CONTENT%
A	3.46
B	4.42
C	7.95
D	15.13

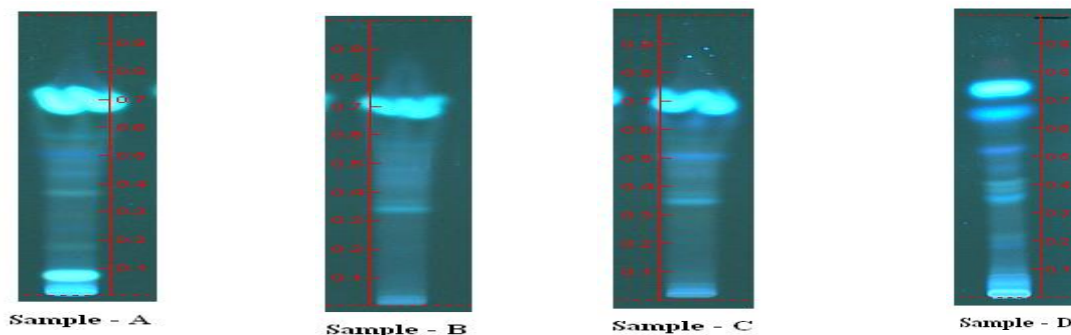
Table 10: Comparison of Percentage of fixed oil of all four Sample of *Jayapala beeja churna*

SAMPLE	FIXED OIL CONTENT %
A	17.19
B	12.37
C	9.24
D	6.51

HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY (HPTLC)
TLC PLATE VIEWS OF JAYAPALA BEEJA SAMPLES AT 254nm



TLC PLATE VIEWS OF JAYAPALA BEEJA SAMPLES AT 366nm



OVERVIEW GRAPH OF JAYAPALA BEEJA SAMPLES AT 254nm

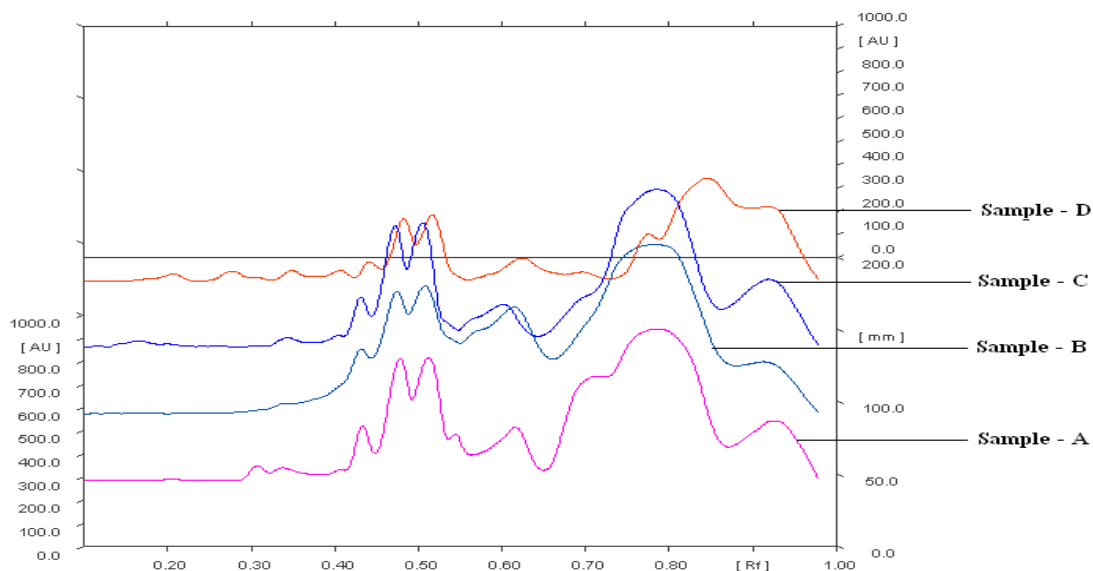


TABLE NO-11 COMPARISON OF AREA & PEAKS OF JAYAPALA BEEJA SAMPLES AT 254nm

Sample - A Peak No	Sample - A Area (AU)	Sample - B Peak No	Sample - B Area (AU)	Sample - C Peak No	Sample - C Area (AU)	Sample - D Peak No	Sample - D Area (AU)
1	632.6	1	150.2	1	568.3	1	831.3
2	448.2	2	1084.3	2	47.8	2	1092.8
3	82.9	3	2771.2	3	501.7	3	502.8
4	2036.4	4	3075.4	4	96.0	4	448.7
5	4576.6	5	8495.1	5	1470.1	5	236.4
6	4693.8	6	49601.8	6	4347.4	6	2351.5
7	482.2	7	4370.5	7	5514.1	7	3193.3
8	4847.4			8	4875.3	8	3109.6
9	4651.8			9	49082.4	9	359.4
10	24189.2			10	10866.7	10	1403.2
11	9499.5					11	8874.7
						12	4472.3

DISCUSSION

As per the reference the *Jayapala beeja* shodhana has two procedures. *Jayapala beeja* soaked in mahishamaya and then application over the mudpot. Second procedure is to give repeated bhavana to this obtained product which is supposed to increase the potency of product.

Discussion on Mahishamaya

After soaking *jayapala beeja* in buffalo dung the seeds become swollen, this might

be because of moisture content present in mahisha mala is absorbed by *jayapala beeja*. There may be action of mahishamaya on the seed by which colour of the beeja become blackish.

On Bhavana procedure

As per reference, number of bhavana is not mentioned but it is mentioned that repeated bhavana procedure increases the potency of drug, this is because the bhavana procedure

reduces the particle size and may bring about certain inherent changes in the drug. Number of bhavanas was fixed as seven, because it is the usual number of bhavana mentioned in classical text.

Croton tiglium Linn., is an irritant poison. Crotin is the toxalbumin, active principle which posses the irritant activity. The mucosa of gastrointestinal tract is having tendency of becoming hyper-sensitive to the *Jayapala* which may lead to the symptoms like burning pain from mouth to oesophagus, nausea, vomiting, bloody stools and dehydration which in turn may lead to weak pulse, loss of body temperature and eventually death.

Here all the four samples of *Jayapala beej churna* have been observed. The results obtained have been prepared in the form of consolidated statement for easy comparison and discussion on the activity observed.

HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY

Analytical Study of Sample A

Analysis of data obtained for sample A indicates that there are 11 components present in the initial mixture of compounds. This means that the initial sample is a mixture of 11 different compounds. The R_f values and peak areas can be seen in the table (table corresponding to table of sample A). It should be noted that some of the peaks are very close to each other as indicated by their close R_f values. This may be due to tailing of the same compound which were probably misinterpreted as separate peaks. For example, the peak numbers 3 and 4 with R_f values 0.41 and 0.43 may be treated to belong to such a case. Also, peak numbers 6 and 7 with R_f values 0.51 and 0.54 also may

have been misinterpreted. The major compound in this purification stage is found to have an R_f value of 0.79 with a peak area of 43.09%.

Analytical Study of Sample B

Analysis of data obtained for sample B at 254 nm, indicates that it consists of a mixture of 7 different compounds. As we can see from the data table (table corresponding to table of sample B), the R_f values of the peaks are considerably far apart, which indicates that these belong to separate compounds. Hence purification of sample A before subjecting the sample to *Nimbu Swarasa bhavana* has rid the sample A of 5 components, if we really consider that sample A consisted of actually 11 compounds. From the decrease in the number of compounds itself it is evident that purification of sample A has taken place effectively. The major compound in sample B was also found to be the one with R_f value ~0.78 with peak area 71.33%.

Analytical Study of Sample C

Analysis of data obtained for sample C (table corresponding to table of sample C) after one *Nimbu swarasa bhavana* at 254 nm, indicates that it consists of a mixture of 10 different compounds. It seems that the number of compounds present in the mixture increased from 7 to 10 when trituration was done once with *Nimbu swarasa*. It is interesting to note here that two new compounds at R_f values 0.17 and 0.20 have appeared which were not present in sample B. But we assume it to be some side product which has come about as a result of the trituration. This can be safely ignored since the peak areas corresponding to these new products are respectively 0.73% and 0.06%

only which is very small a concentration to be taken into account. The major compound in sample C was also found to be the one with R_f value 0.79 with peak area 63.44%.

Analytical Study of Sample D

Analysis of data obtained for sample D (table corresponding to table of sample D) after Seven *Nimbu swarasa bhavana* at 254 nm, indicates that it is a mixture of 12 different compounds. Since this is the fourth and final stage of our purification of *Jayapala Beeja*, we consider that the conclusions drawn from this stage will provide the most significant and relevant aspects to be drawn from this study. Hence this data deserves close scrutiny. Out of these 12 compound peaks, all but one among the 12 compounds were obtained and were seen in all or some of the previous stages of preparation. The compound peak corresponding to R_f value 0.85 has not been obtained in any of the previous stages and is also found to be the largest area peak in the HPTLC analysis. The interesting thing to note here is that we can see that the largest area peak in the first three stages of purification (stages A, B and C), which had R_f value of 0.78-0.79 has disappeared in the last stage and the completely different compound peak pertaining to the R_f value of 0.85 was obtained. It is evident from here that the new compound has been formed from some chemical transformation (reaction) which converted the compound at R_f value 0.78 to the new compound found at R_f value 0.85. Since there is not much difference between the R_f values, it may be assumed that the chemical structure of the new compound formed is very much similar to the precursor. But it is clearly evident that

a new compound has formed from the procedure. From the overview graph also this can be evidently seen. Even a fleeting examination of the graph will reveal the emergence of a new peak beyond R_f value (plotted as X-axis) 0.8, which is otherwise absent in all the other three samples

CONCLUSION

Shodhana with mahishamaya has evidently reduced the fixed oil content of the Jayapala seeds their by reducing toxicity of the seeds. Nimbu swarasa bhavana has also reduced fixed oil content and after seventh bhavanaa emergence of the new component in the drug was point to some change in the drug action which may account for potentiation of the drug.

Scope of further research

- 1) Study can be conducted to know the effect of each bhavana on the drug.
- 2) Number of bhavanas can be increased to know the emergence of more components through HPTLC.

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