Research Article

www.ijrap.net (ISSN:2229-3566)

A COMPARATIVE STUDY ON SANDHANA PRADESHA (FERMENTATIVE AREA) WITH SPECIAL REFERENCE TO KUTAJARISHTA

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Received on: 15/05/20 Accepted on: 15/06/20

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DOI: 10.7897/2277-4343.1104110

ABSTRACT

In the field of Ayurvedic pharmaceuticals, Self-generated alcohol is regarded as very important due to their long shelf life, better absorption and for its efficacy. Process of fermentation should be carefully carried out to avoid various problems that can be encountered during preparation, which are widely used in clinical practice. Many factors influence the process of fermentation, Fermentative Area is one among, referred in various classical books. The Aim of this study is Influence of Fermentative area in the process of fermentation. Kutajarishta prepared as per the classical reference. Kept in three different places for the process of fermentation as per classical reference and studied on Pharmaceutical and Analytical aspect of them. The pot which is placed in heap of Shalidhanya is completed fermentation earlier than other two samples. Basic physical-chemical characters of the sample like specific gravity, PH, Brix value, Total Alkaloid, total solids and alcoholic content were compared. HPTLC study showed more peaks in the sample which is kept in heap of Shalidhanya. In UV- Visible spectrophotometry prominent peak was observed in all samples. As per the observation in the present study, fermentative area did not significantly influence the quality of the medicine.

Keywords: Preparation, Fermentative area, Fermentation, Temperature

INTRODUCTION

Medicine is one which is ought to be known by physician and from which a physician gets remunerative result by usage of formulation in treatment¹. Among the four pillars of treatment physician, material (substance used for therapeutic purpose or health benefits), nurse and patient², Success for physician and nurse in the treatment is influenced by the presence of material. This material can be taken in consideration with the threefold application i.e. pharmacognostic, pharmaceutical approach and treatment approach. Material (substance used for therapeutic purpose or health benefits) in accordance to the requirements is flourished by undergoing different modulations, preparations are performed to potentate properties of drugs. This branch contributed to aid the physician to utilize this medicine in various forms and styles to fight the disease. But the base of all these were imbibed in five basic preparations only.³ In this development process Self generating alcohol proved itself as best by competing and conquering each need, in the form of palatability, long shelf life, quick absorption, higher efficacy etc. Self-generating alcohol proves more beneficial as it is having medicinal as well nutritive values, important one is the self-generated alcohol during acts as a solvent for maximum extraction from raw drugs and also acts preservative.

Literature review

Various works carried out in different universities on fermentation among them study of Kutajarishta TLC as a tool for standardisation of Ayurvedic formulations⁴, Role of different containers and methods on Alcoholic Preparations⁵ and experimental study of Kutajarishta.⁶

MATERIALS AND METHODS

The raw material *Holarrhena antidysenterica*, *Vitis vinifera*, *Gmelina arborea*, *Woodfordia fruticosa*, *Madhuka indica* were procured from SDM Ayurveda Pharmacy Udupi. These raw materials were valid before use. Organic jaggery used which was procured from home cultivated sugarcane. LPG cylinder of 14.2 kg provided by Indane Gas Company was used and gas burner for heating purpose. 3 mud pot of 7 litres capacity procured from the market were used as fermenting vessels after proper sanitation. Other requirements required like steel vessels of various sizes steel ladle, non-reacting (cotton) cloth, mud for plastering.

Method of data collection

Kutajarishta prepared as per the guidelines⁷. Three places were selected as per the guidelines in the classical literature. Dark place⁸, Heap of Shalidhanya⁹, Buried in Earth up to neck of the pot.¹⁰

Assessment Criteria

Onset and Completion of Fermentation

- Taste
- Odour
- Sound
- Froth
- Floating of praksepaka dravya
- Candle test
- Lime water test

Finished Product**1. Organoleptic Characters**

Parameters like colour, odour, taste, consistency, touch etc are considered.

2. Chemical Parameters

- Total solids
- Ph value
- Specific gravity
- Refractive index
- Alcohol percentage
- Sugar (total, reducing, non-reducing)
- Qualitative test for alkaloids, tannins.

3. Special Instrumental Methods

- TLC
- HPTLC
- UV- Visible spectrophotometer.

Details of Assessment criteria**Taste, odour, sound, froth and floating of praksepaka material**

These were assessed by sense organs.

Burning Candle Test

During onset of fermentation burning candle gets put off if taken near to the fermentation liquid surface, due to carbon –di-oxide production during fermentation.

Lime Water Test

At time of sealing the vessel for fermentation the lid should be connected and sealed with a small pipe of half to 1cm width by making a hole in a lid. The test was done every week after onset of fermentation. The turning of lime water to milky white indicates the production of carbon-di-oxide.

Total Solids

Here total solids samples were evaporated to dryness to get the value of solutes present in the arista preparation.

pH

It was measured by using digital pH meter.

Specific Gravity

Specific gravity of the sample was measured using a specific gravity bottle.

Refractive Index

It is measured through Refractometer.

Brix Value

Brix was found by using the conversion table.

Alcohol Content

The percentage of ethyl alcohol in the sample was determined from the reference ethyl alcohol table.

Sugar (total, reducing, non-reducing)

It was assessed by Revised Hammond table for Clag dextrose.

Total Alkaloid

The percentage of alkaloidal content of the sample was calculated in terms of total kurchi alkaloid.

Chromatography**Thin Layered Chromatography**

Extraction solvent: Chloroform

Solvent System

Chloroform:	Hexane:	Toluene:	Methanol
5.6	: 1.6	: 2.6	: 0.2

Detection: UV 365

HPTLC

Mobile phased used Toulene-Methanol (80%-20%v/v)
Visualization long wave U.V (365nm)
Camag Software (c) 1998 with scanner 3:06031

UV- Visible Spectrophotometer

Visualization 200-500nm
Measuring mode Abs
Scan speed: Fast
Slit Width: 2.0
Sampling Interval: 0.2

Table 1: Ingredients of Kutajarishta

S. No.	Name of drug	Botanical name	Official part used	Quantity
1.	Kutaja	<i>Holarrhena antidysenterica</i>	Root	6 Kg
2.	Draksha	<i>Vitis vinifera</i>	Dried fruit	3 Kg
3.	Kashmarya	<i>Gmelina arborea</i>	Root	600 Gm
4.	Dhatakpushpa	<i>Woodfordia fruticosa</i>	Flowers	600 Gm
5.	Madhuka Pushpa	<i>Madhuka indica</i>	Flowers	600 Gm
6.	Guda	Jaggery		6 Kg
7.	Jala	Water		60 Lt

Method of preparation

15 Lt of Kashaya was prepared by using *Holarrhena antidysenterica*, *Vitis vinifera* and *Gmelina arborea* as per classical reference. Jaggery dissolved in Kashaya to get a blend of 18 Lt. Preparation of mud pot was done by application ghee inside the pot and fumigation done. 6 litres of mixture poured

each into three pots Pot A (Dark place), Pot B (Heap of Shalidhanya) and Pot C (Buried in earth up to neck of pot) the pot for the process of fermentation.

On set of fermentation was observed in all the three pots and Sealing done.

RESULTS AND DISCUSSION**Table 2: Results of End Products**

	Pot A	Pot B	Pot C
Time taken for onset of fermentation	7 days	7 days	7 days
Time taken for completion of fermentation	50 days	43 days	50 days
Final yield	5,800 ml	5,850 ml	5,700 ml

Table 3: Organoleptic Characters

Character	Pot A	Pot B	Pot C
Color	Dark brown	Dark brown	Dark brown
Odour	Alcoholic odour	Strong Alcoholic odour	Alcoholic odour
Taste	Bitter	Bitter	Bitter
Touch	Like thick syrup	Thick syrup	Mild thick syrup
Consistency	++	+++	++

Table 4: Temperature Gradient

	Pot A	Pot B	Pot C
Before onset of fermentation	25°C	27°C	28°C
After onset of fermentation	26.5°C	28°C	30°C
After completion of fermentation	25.5°C	27.5°C	29°C

Table 5: Physico Chemical Parameter

Character	Pot A	Pot B	Pot C
p ^H	3.53	3.61	3.57
Specific Gravity	1.0602	1.0616	1.0278
Total Solids	16.15	10.4	9.53
Refractive index	1.3660	1.3685	1.3555
Brix value	14.72	14.96	6.81
Alcoholic content%	9.68	10.24	13.56
Total alkaloid (Kurchi alkaloid) in gm	0.024867	0.024867	0.008289

Table 6: Sugar Reduction

Sample	Total % of reducing sugar	Total % of non reducing sugar
Pot A	47.12	52.88
Pot B	38.54	61.46
Pot C	30.97	69.03

Table 7: R_f Value of Sample

Approx. R _f values	Pot A	Pot B	Pot C
0.02	Dark Blackish Yellow	Dark Blackish Yellow	Dark Blackish Yellow
0.10	Dark Blackish Yellow	Dark Blackish Yellow	Dark Blackish Yellow
0.14	Faint Blue--	Faint Blue	Faint Blue
0.18	Faint Blue	Faint Blue	Faint Blue
0.25	Dark Blue	Dark Blue	Dark Blue
0.30	Faint Red	Faint Blue	Light Red
0.37	Faint Blue	Faint Blue	Faint Blue
0.44	Light Blue	Light Blue	Light Blue
0.68	Light Blue	Light Blue	Faint Blue
0.78	Faint Blue	Faint Blue	Faint Blue
0.87	Faint Blue	Dark Blue	Faint Blue
0.94	Light Red	Dark Blue	Faint Blue

HPTLC chromatogram

HPTLC Study of Pot A

HPTLC Study of Pot B

HPTLC Study of Pot C

HPTLC Study showed two peaks in pot A, four peaks in Pot B and pot C showed only one peak, whereas pot B showed four peaks may be due to more Extractive components.

UV- Visible spectrophotometer study

Pot A

Pot B

Pot C

UV- Visible spectrophotometer study is done. The peaks that are observed in the sample are at the wavelength 271 nm, 273 nm and 272 nm in Pot A, Pot B and Pot C respectively, which are more prominent for Kutajarishta. The spectrum observed is all most similar in all the three samples with minor peaks for additional components and prominent two peaks for *Holarrhena antidysenterica*.

It was observed that the onset of fermentation in all the three samples was on the 7th day, concerned to completion of fermentation, in pot B fermentation completed in 43 days. No much changes observed in organoleptic characters. In physicochemical character, total solids in Pot A showed high level which corresponds to the high Brix value, lesser alcoholic percentage of this sample suggest the possibility that unconverted sugar content. No significant change observed in P^H value.

TLC study showed 12 major spots with similar pattern in all the three samples. In the used solvent system (Toluene: Ethyl Acetate 7:3), a common spot with R_f value 0.8 could be observed in all the samples and also *Holarrhena antidysenterica* bark. This is most probably due to Conessinen, the principal alkaloid of *Holarrhena antidysenterica*.

CONCLUSION

Process of fermentation completed earlier in Pot B compared to other two samples. No much remarkable changes seen in organoleptic characters of the samples. HPTLC study more peaks observed in sample in Pot B may be due to more extractive components. UV- Visible Spectrophotometry study prominent

peak was observed in all samples due to maximum quantity of kutaja and sub peak were observed in sample Pot B due to proper extraction of other ingredients. As per the observation in Present study, Sandhana Pradesh did not significantly influence the quality of the medicine.

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Cite this article as:

Sridhar Gokhale and Yeriswamy H. A Comparative Study on Sandhana Pradesha (Fermentative area) with special reference to Kutajarishta. Int. J. Res. Ayurveda Pharm. 2020;11(4):169-173
<http://dx.doi.org/10.7897/2277-4343.1104110>

Source of support: Nil, Conflict of interest: None Declared

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