



ISSN: 0975-833X

RESEARCH ARTICLE

ANALYSIS OF COUNTRY MADE MAHUA LIQUOR

*Azra Kamal

Forensic Science Laboratory, C.I.D (Police), Patna-800023, Bihar, India

ARTICLE INFO

Article History:

Received 25th September, 2015
Received in revised form
07th October, 2015
Accepted 18th November, 2015
Published online 21st December, 2015

Key words:

Madhuca longifolia ,
Liquor , Fermentation,
Ethyl alcohol,
Methyl alcohol.

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Citation: Azra Kamal, 2015. "Analysis of country made Mahua liquor", *International Journal of Current Research*, 7, (12), 23453-23455.

ABSTRACT

Mahua (*Madhuca longifolia*) belongs to Sapotaceae family. The flowers of Mahua tree are fermented to produce an alcoholic drink called Mahua, country liquor. The cost of dried mahua flowers is quite less in comparable to other raw materials source. Tribal men and women consider the tree and Mahua drink as a part of their cultural heritage. They consumed this liquor in all the social gatherings and ceremonies. It is cheaper than IMFL (Indian Made Foreign Liquors) and other country liquors so for a common public, it is quite available, and they consume a huge amount. *Madhuca longifolia* has found many important properties yet its several other potential have to be finding out or fully explore by research workers along with the people of tribal community so they may have more and valuable knowledge. Further studies are needed to find out the comparative economics of ethanol production from the mahua flower and other cheap carbohydrate sources.

INTRODUCTION

Madhuca (*Madhuca longifolia*) commonly known as mahua or butter nut tree, 17m high with a large top. It belongs to the family Sapotaceae (Akshatha *et al.*, 2013). Mahua flowers are very rich in fermentable sugars (glucose, fructose and maltose) (Wealth of India., 1954) and the tribal people prepare country liquor ('mahuli') from these flowers by typical yeast (*Saccharomyces cerevisiae*) fermentation (Bhagmol and Joshi, 2002). The tree is considered a boon by the tribal's who are forest dwellers and keenly conserve this tree. The tribes consider the mahua tree and the mahua drink as a part of their cultural heritage (Mishra and Padhan, 2013). It is one of the universal plant having medicinal activities also (Yadav *et al.*, 2012). Dried mahua flowers are an attractive source of fermented products due to the high sugar content. Preparation of mahua wine from fresh flowers has also been reported (Yadav *et al.*, 2009). Various products like alcohol, brandy, acetone, ethanol, lactic acid and other fermented product have been prepared from the dry mahua flowers (Patel and Naik *et al.*, 2010). Ethanol fermentation of mahula (*Madhuca latifolia* L.) flowers using free and immobilized yeast *Saccharomyces cerevisiae* has been studied by Swain *et al.* The ethanol yields were 193 and 148 g kg⁻¹ (using free cells) and 205 and 152 g kg⁻¹ (using immobilized cells)

from fresh and 12-month-stored mahula flowers, respectively (Swain *et al.*, 2007). Mahua flowers were also used for extraction of sugar where 1 kilogram of mahua flowers autoclaved with 2 liters of water at 1 steam pressure for 15 minutes (Rao *et al.*, 1961). Studies including physico-chemical parameters for the production of ethanol from mahua flowers (*Madhuca latifolia* L.) in submerged fermentation (SmF) using immobilized cells of *Saccharomyces cerevisiae*-3044. The results shows that mahua flowers proved to be cheap and suitable substrate, since it consists high sugars 72-74%, which can be obtained from any part of India (Mandal and Kathale).

MATERIALS AND METHODS

Five samples of Mahua liquor were subjected to chemical evaluation for the detection of methyl alcohol, ethyl alcohol and their percentage using conventional method (Furniss *et al.*, 1989).

Test for Functional group

In 1ml sample few drops of ceric ammonium nitrate reagent was added, red colour appeared indicates presence of alcoholic group.

Test for Ethyl alcohol

Iodoform Test

5 ml sample was taken in which 3 drops of iodine solution was added then sodium hydroxide solution was added drop by drop

*Corresponding author: Azra Kamal,
Forensic Science Laboratory, C.I.D (Police), Patna-800023,
Bihar, India.

until colour of Iodine was almost discharged. The solution was warmed for few min. then cooled, brown colour of Iodine was disappeared which indicates presence of ethanol.

Dichromate Test

In 5ml of sample about 2 to 3 drops of potassium dichromate solution was added followed by 1 ml of conc. sulphuric acid. The yellow colour of the dichromate changes to green having suffocating odour indicates presence of ethanol.

Test for Methyl alcohol

Chromotropic Acid Test – 0.5 ml of sample was taken in a test tube 0.2 ml of 5% potassium permanganate solution was added. After 5 min. Saturated Solution of Sodium bisulphite was added drop by drop then 0.05 ml of freshly prepared Chromotropic acid solution was added and heated. Violet colour does not appear indicates absence of methanol.

fermentation contains about 8 to 10 (v/v)% ethanol (Yadav *et al.*, 2009).

Mahua flower is abundant in India and it is having good keeping qualities. If the utilization of mahua flower as a substrate for the production of ethanol through submerged fermentation, it will become a great economic advantage in the Indian context (Benerji *et al.*, 2010).

Due to the lack of proper scientific investigation and post harvest processing technologies, they are collected and subjected to open yard sun drying till about 80% moisture is lost, before storage (Patel and Naik, 2008). This process results in heavy microbial load and degrades their food value, finally making them suitable only for the liquor distillation. This way a precious, organic and easily available source of natural sugar is being under-utilized (Mishra and Padhan, 2013).

Table. Analysis of Mahua (*Madhuca longifolia*) liquor

Sl.No.	Test for Ethyl alcohol		Test for Methyl alcohol			
	Iodoform Test	Dichromate Test	Chromotropic Acid Test	Schiff's Reagent Test	Specific gravity	%V/V
1.	+	+	-	-	0.9893	7.71
2.	+	+	-	-	0.9864	10.09
3.	+	+	-	-	0.9849	11.34
4.	+	+	-	-	0.9895	7.55
5.	+	+	-	-	0.989	7.95

Schiff's Reagent Test- 5 ml of sample was taken in a test tube, 0.5 ml of ethanol was added then 2 ml of 3% Potassium Permanganate solution and 0.2ml of phosphoric acid were mixed in it. Kept aside for 10 minutes. 1 ml of 10% oxalic acid followed by 1ml of concentrated sulphuric acid was added. The contents were cooled at room temperature. 5 ml of Schiff's reagent was added to it. After 30 min. colour was observed. Purple colour was not appeared indicates negative test for the presence of methanol.

Specific gravity – Specific gravity of the samples were determined by the following relationship.

$$\text{Specific Gravity} = \frac{A-B}{C-B}$$

Where, A = weight of specific gravity bottle with sample (g);
B = weight of specific

gravity bottle; C = weight of specific gravity bottle with water (g).

RESULTS AND DISCUSSION

Five samples of Mahua (*Madhuca longifolia*) liquor were analysed for the presence of methyl alcohol, ethyl alcohol and their percentage in which all samples given positive result for presence of ethyl alcohol while methyl alcohol were found absent. The percentage of ethanol % (v/v) were found 7.71%, 10.09%, 11.34%, 7.55% and 7.95% respectively. The percent ethanol estimated in this study is in accordance with several workers who reported that wine made from fruit juice

Mahua flowers undergo a series of unit operations before reaching the final step of processing and also for assessing the behaviour of the product quality, require the knowledge of their physical properties that are essential for the design of equipments for drying, cleaning, grading, storage and value added products (Sahay and Singh, 1996). Studies on Physico-Chemical and Nutritional Parameters for the Production of Ethanol from Mahua Flower (*Madhuca indica*) using *Saccharomyces Cerevisiae* - 3090 through submerged fermentation (smf) by Benerji *et al.* it is proved that with all positive features of Mahua flower, it can be used as suitable raw material for large scale production of ethanol (Benerji *et al.*, 2010).

Conclusion

In this study, the potential of mahula flowers, comparatively a cheap carbohydrate source for ethanol production, has been studied. In coming next generation the importance of plant and mahua tree is going to be increase because of their effectiveness, easy availability, low cost and comparatively being devoid of toxic effect. Further studies are needed to find out the comparative economics of ethanol production from the mahula flower and other cheap carbohydrate sources.

Madhuca longifolia has found many important properties yet its several other potential have to be finding out or fully explore by research workers along with the people of tribal community so they may have more and valuable knowledge.

Acknowledgement

I am grateful to my venerable Head of the Department of Biochemistry, Patna University, Patna for their support and encouragement.

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