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Comparitive Study between Mahua Liquor and Market Whiskey

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INTRODUCTION

Madhuca longifolia (Mahua) belongs to family Sapotaceae. Madhuca commonly known as the Butter nut tree. Mahua is a medium to large sized deciduous tree distributed in Nepal, India and Sri Lanka. Mahua is a large tree, about 17m high with a large top. Leaves clustered at end of the branches; young branches, leaves and petiole pubescent or tomentose.
The flowers are used as tonic, analgesic and diuretic. The bark is used for rheumatism, chronic bronchitis and diabetes mellitus. *Madhuca longifolia* leaves are expectorant and also used for chronic bronchitis and Cushing's disease.

FIG 1 : Dried *Mahua* Liquor

***Mahua* liquor –**

The flowers are collected, dried, and used for making *mahua* daaru, in which the alcohol content ranges from 20% to 40%. It is considered to be inexpensive and is the most popular beverage consumed among the Rajputs of NorthWestern India (Bennett *et al.*, 1999). The *mahua* flowers are mixed with water (1:4) and are allowed to ferment in a container for 2–3 days.

In the fermentation medium, navshadar (Ammonium chloride) is exclusively added, and sometimes jaggery is also added as needed, generally in the ratio of (2:1, flowers: jaggery). Some people also add black pepper to make daaru slightly hot. After fermentation, the fermented mixture is kept for distillation in a special apparatus that has a container (Aluminum pateela) above which a wood structure (Badgi) is kept to collect the distillate, and this is covered with a aluminum container with cold water for condensation of the ethanol vapors .The cold water is replaced when it becomes hot. The distillate is collected in a bottle. It contains around 45%–60% alcohol. The yield of daaru is about 300–400 ml/kg dried flowers. The entire process of *mahua* daaru preparation is depicted.

FIG 2: Distillation setup

FIG 3: Distillation of fermented Mahua

Prepration of *Mahua* liquor –

Raw *mahua* flowers

↓

Dried

↓

Soaked in water

↓

Allow to ferment for 3 – 4 days

↓

Distillation

↓

Collection of distillate as Darru (Liquor)

FIG.4: Prepration of *mahua* liquor

Analysis of *Mahua* liquor –

This study was out in the Food processing and technology laboratory of the University of Atal Bihari Vajpayee vishwavidyalaya Bilaspur (C.G). The work was carried out during the time period of February 2022 to August 2022. Blended liquor was analyzed for various physico-chemical characteristics viz., total sugars and titratable acidity. Wine prepared during study was analysed for various physicochemical and sensory characteristics viz., Ethanol, Titrable acidity, colour, total sugar.

Sample collection –

The study was conducted in the city of Bilaspur. Sample was collected from a local market Golbazaar in Bilaspur. Samples of Harra and Bael were collected from Local market in Chandrapur and Sample of Mahua liquor was collected from Village shish. The entire sample are collected in a pouches and glass bottles and stored at room temperature for further analysis.

Equipments and Glassware's:

UV Spectrophotometer Modal number 218, Alcohol meter, Vortex mixer, Mantle heater/Water Bath, analytical balance, centrifuge, mortar and pestle, graduated cylinder, volumetric flask, Mohr pipette, beaker glass, erlenmeyer flask, Fehlings solution A and B, hot plate, magnetic stirrer, water hose, liebig condenser, burette, stative, clamps, stirring rod, pasteur pipette, blender, filter paper, spatula and funnel .Test tubes, Test tube stand, Pipettes, Beaker, Ice Test tube caps, Tissue paper, Wash bottle.

RESULTS AND DISCUSSIONS

4.1 Alcoholic content –

The increase in alcohol content of liquor samples is shown in From day 1 to day 8, there was gradual increase in alcohol content of the liquor samples and linear increase from day 8 to day 14 of the fermentation period. Maximum alcohol content (40%) is found in sample. From this, we can conclude that with increase in percentage of *Madhuca longifolia* alcohol percentage increase. In general, alcohol content gradually increases as the fermentation proceeds. This is due to utilization of sugar by yeast in favorable must conditions which includes temperature of must, adequate amount of sugar, specific acid and pH conditions and absence of wild yeast and other microorganisms. The internal temperature of the must is very critical during fermentation. This increase in alcohol content may due to absence of wild microbes like lactobacilli because these unwanted microbes causes homo-lactic fermentation and may also be utilized by other fungal species to produce acids. At the end of fermentation period with the rise in alcohol content and decrease in pH causes linear increase in alcohol content due to slow action of yeast.

FIG5: Alcohol % of 10 days fermented *mahua* Liquor

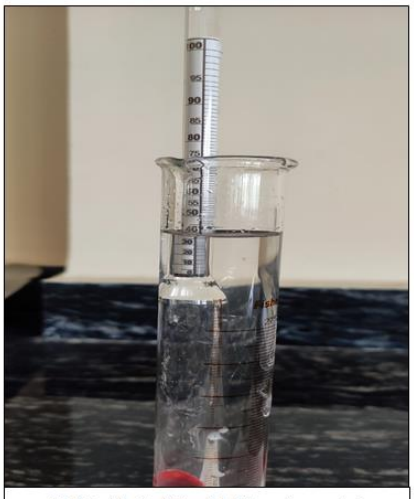

FIG6: Alcohol % of 14 days fermented *mahua* Liquor

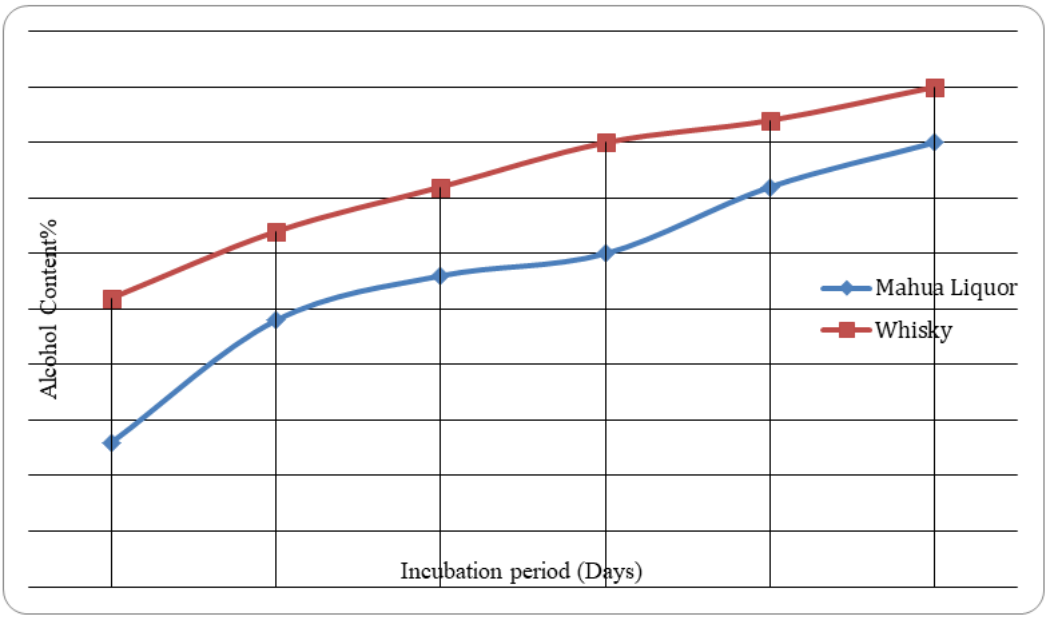

FIG 7: Comparison of alcohol content between *Mahua* liquor and Whisky

4.2 Sugar content –

Sugar content gradually decreases from day 1 to day 14 of the fermentation period . The total sugar content of the must decreased from 76.62 mg/ml to 8.77mg/ml in *Mahua* liquor. Total sugar showed a gradual reduction during the fermentation period because the sugar gets converted into alcohol and carbon dioxide. As the fermentation period proceed consumption of sugar increases. Steinkraus *et al.*, 1992) reported that sucrose level decreases from 15% to 1% during the fermentation period while working on wine production from Agave Americana. Preparation of sugar and analysis of flowers from various districts have been studied, the analysis revealed that mahua contains 65–70% sugars, 48–55% reducing sugars, 14–18% invert sugars, 4.0–6.5% crude protein, 21–48% ferrous, 0.9–1.3 fat, 2.5–5.2% ash, 177–266% calcium.

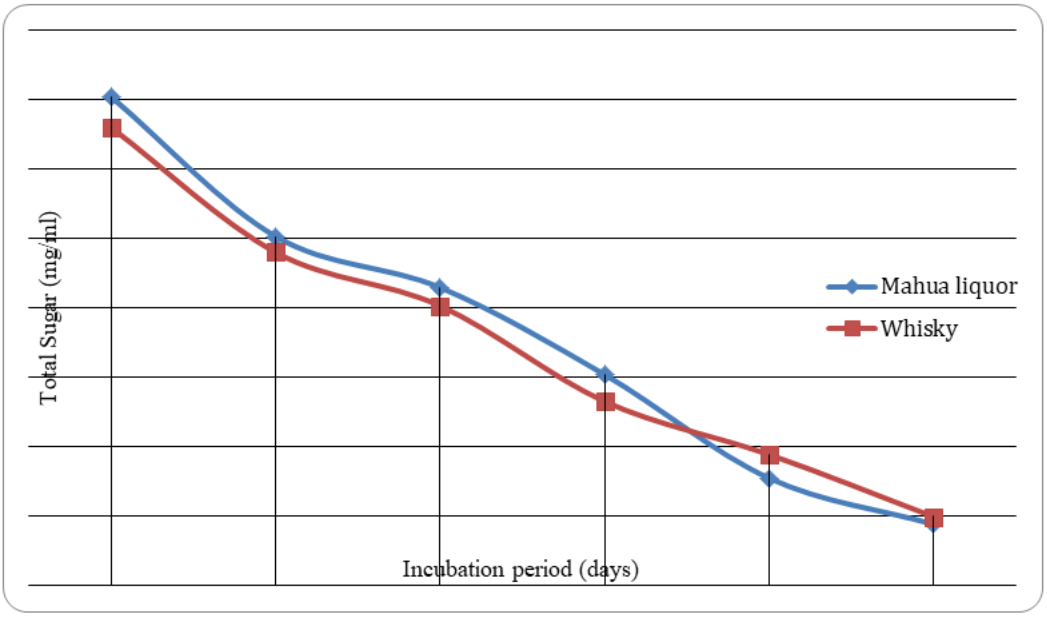

FIG 8: Comparison of sugar content between *Mahua* liquor and whisky

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4.3 Titratable Acidity –

Total titratable acidity gradually increases from day 1 to day 14 of the fermentation period. In all the different must samples total titratable acidity percentage ranges from 0.25% to 0.78%. Liquor quality is directly affected by acid and with increase in titratable acidity quality of liquor also increases. Citric acid, tartaric acid and some amount of lactic acid is generally present in liquor in which lactic acid sometimes undergoes malo-lactic fermentation by replacing malic acid. The presence of acids in liquor enhances the taste, aroma and preservative properties of the liquor.

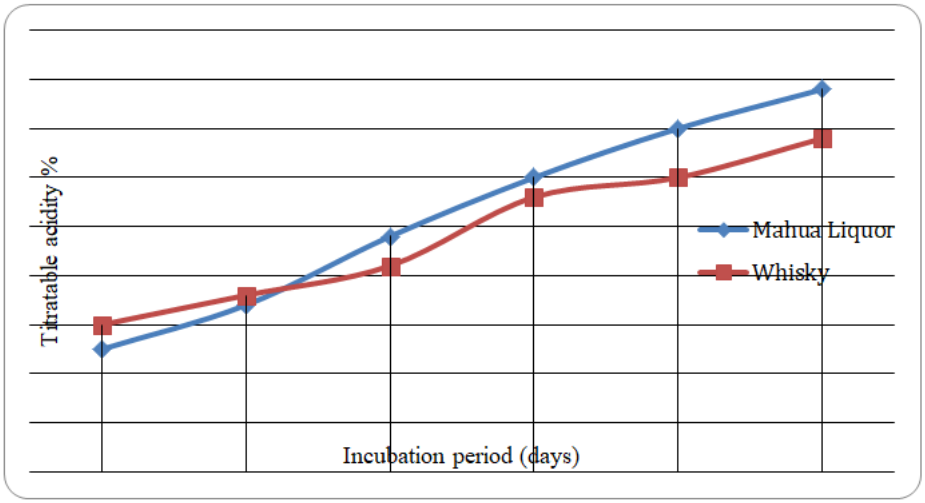

FIG 9: Comparison of titrable acidity between Mahua liquor and whisky

FIG10: Titrable acidity for 4 days fermented *Mahua* Liquor

FIG11: Titrable acidity of 14 days fermented *Mahua* Liquor