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Use of Kombucha in Indian Restro-Bars: A Mixed-Method Study

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Abstract
A non-alcoholic, functional beverage that is becoming more and more well-liked worldwide is kombucha, a fermented tea beverage that is high in organic acids, B vitamins, and a diverse community of bacteria and yeasts. While preserving beverage innovation and economic margins, Indian restro-bars are experimenting with alternative beverage products to cater to health-conscious and sober-curious customers. This study examines the potential of kombucha in Indian restro-bars, outline a mixed-methods investigation and pilot sensory/microbiological methodology to assess viability, and provide illustrative pilot data to show how the findings of such a study could be reported. Sensory acceptance, shelf life, safety (chemical and microbiological), supply and logistics, regulatory compliance, and menu integration tactics are important factors. Practical suggestions for restro-bar owners, beverage managers, and legislators are included in the article's conclusion.
Keywords: *Kombucha, Restro-bar, India, Functional Beverage, Sensory Evaluation, Fermentation Safety.*

1. INTRODUCTION

A symbiotic culture of bacteria and yeast (SCOBY) ferments sweetened tea to create kombucha, a mildly fizzy tea beverage. Its purported health benefits, openness to flavouring, and versatility as a mocktail basis are the main reasons for its growing popularity worldwide. Indian restro-bars are in a perfect position to embrace kombucha as a low-alcohol and non-alcoholic beverage that appeals to expanding segments, including moderation, pregnant customers, designated drivers, and health-conscious consumers. Sweetened tea is fermented using a SCOBY (symbiotic culture of bacteria and yeast) to create kombucha. Depending on fermentation and storage circumstances, the final beverage has a tangy flavour, a slight carbonation, and a low ethanol content. Kombucha is advertised as a functional or fermented beverage both internationally and in India, and it is being offered on tap in hospitality establishments and utilised as a cocktail mixer more and more.

The acceptability, safety, operational viability, and business potential of kombucha integration in Indian urban restro-bars are all examined in this study. The paper includes: (1) a focused evaluation of the literature; (2) a mixed-methods study design that is appropriate for Indian settings; (3) a pilot methodology for microbiological and sensory testing; and (4) useful suggestions.

2. LITERATURE REVIEW

Product attributes: The fermentation of kombucha yields organic acids, aromatic compounds, acetic and gluconic acids, and trace amounts of ethanol (usually less than 0.5% in well-managed non-alcoholic batches, though levels might increase). Depending on the conditions and duration of fermentation, the flavour might be anything from sweet and tangy to vinegary.

Regulation and safety: To keep ethanol levels under control and to maintain a safe pH (<4.2, which is frequently used to suppress microorganisms), quality control is crucial. Kombucha is only considered a non-alcoholic beverage in several areas if the ethanol content stays below a certain level. HACCP, cold chain, pasteurisation versus live product handling, and other food safety procedures are pertinent.

Acceptance by customers: Research indicates that flavoured kombucha is well-received by consumers, especially younger, urban consumers, who view it as a high-end non-alcoholic beverage. Adoption in hospitality environments is boosted by its use as a foundation for cocktails and mocktails.

Operational factors: Control vs convenience, shelf life, and liability are some of the trade-offs between brewing on-site and sourcing from microbreweries. Controlling carbonation, packaging (bottles, kegs), and employee education are crucial.

3. OBJECTIVES

- Examine the sensory acceptance of kombucha among regular customers of restro-bars in an urban Indian environment.

- Under restro-bar circumstances, assess the microbiological and physicochemical safety parameters (pH, ethanol percentage, and total viable counts) over the course of normal storage times.
- Determine the prospects and operational and legal obstacles to kombucha integration in Indian restrobar menus.
- Make practical suggestions for restro-bar operators on staff training, menu placement, formulation, and storage.

4. STUDY METHODS

4.1 Study design

Mixed-methods:

- **Quantitative:** Instrumental analyses (pH, ethanol by GC or enzymatic kits, total viable counts), sensory evaluation (hedonic), and shelf-life challenge.
- **Qualitative:** semi-structured interviews with customers, bartenders, and beverage managers; theme analysis of acceptability and barriers.

4.2 Setting & participants

- Urban restro-bars in Mumbai.
- Patrons: Adults between the ages of 21 and 60 who visit participating sites make up the sample size for the pilot project. (40 Participants)
- Purposive sample of 8–12 interviews with beverage managers and employees.

4.3 Kombucha samples

- Three variants prepared for the study:

A. Classic black tea kombucha (plain)
B. Fruit-flavored kombucha (mango/ginger-lime)
C. Mocktail sample - kombucha used as cocktail base (kombucha + herbs + soda)

- **Production:** small-scale batch utilising a standardised recipe and food-grade SCOBY; compliance is ensured by measuring the final sugar residual.

4.4 Sensory evaluation

- Overall liking, scent, taste, mouthfeel, and intent to buy are measured on a 9-point hedonic scale (1 being severely disliked and 9 being greatly liked).
- Other Questions: price sensitivity, perceived healthiness, and willingness to suggest.

4.5 Qualitative interviews

- A semi-structured guide that covers topics such as pricing and placement tactics, regulatory awareness, operational issues (supply, storage), and views of kombucha.
- Audio recordings of interviews, which are then transcribed and classified (thematic analysis).

5. PILOT STUDY

5.1 Sensory (n = 40 respondents)

- Overall liking (mean ± SD, 9-point scale):
- A (plain) = 6.1 ± 1.4; B (fruit) = 7.2 ± 1.1; C (mocktail) = 7.6 ± 0.9.
- Willingness to purchase at ₹120–₹180: 72% (B), 85% (C), 50% (A).
- Perceived healthiness (Likert 1–5): median = 4.

Interpretation: In a restro-bar setting, flavoured and mocktail kombucha forms are more well-liked than plain kombucha.

5.2 Qualitative themes (illustrative)

- **Opportunity:** Kombucha is seen as a high-end, healthier substitute that works well with mocktail programs.
- **Barriers:** Shelf life, employee awareness, overfermentation and unexpected alcohol levels, and regulatory classification are among the issues.
- **Operational suggestions:** Use kegs or bottles with date codes; procure from reputable microbreweries with product specifications; and sell within 7–14 days when chilled.

6. DISCUSSION

When served in flavoured or mocktail forms, kombucha shows promise as an addition to Indian restrobars, according to the review and pilot protocol. Mixed and flavoured beverages are more likely to be accepted by consumers. Maintaining product safety (pH, ethanol control), making sure the cold chain

is in place, and training employees to avoid overfermentation in service situations are the key operational concerns.

Clarity in regulations is essential; operators must appropriately categorise items as either alcoholic or nonalcoholic based on local food laws and ethanol levels. Compliance is made easier by working with certified microbrewers or reliable suppliers who offer certificates of analysis (CoA) for ethanol, microbiological counts, and pH.

7. RECOMMENDATIONS FOR INDIAN RESTRO-BARS

1. **Product sourcing:** Join forces with trustworthy kombucha manufacturers who offer CoAs (pH, ethanol, microbial). If live cultures are not needed, choose pasteurised or carefully monitored live goods with a specified shelf life.
2. **Menu strategy:** Introduce kombucha as a base for mocktails and seasonal flavours; emphasise its health advantages without making unsubstantiated claims. Make use of catchy titles and combinations (such as "Tropical Ferment Smash").
3. **Storage & service:** Always keep chilled (≤4°C). Date each batch and use FIFO. Serve cold from brandappropriate glassware. For better throughput, take into account on-tap (keg) systems.
4. **Quality control:** Put basic tests in place, such as carbonation monitoring, eye inspection for strange smells, and pH recording. Establish maximum storage times, such as 7–14 days in the refrigerator.
5. **Staff training:** Teach bartenders about flavour profiles, how to responsibly communicate health claims, and what to do in the event of over-carbonation or off flavours.
6. **Regulatory compliance:** Check local food and drink regulations for definitions and labelling of nonalcoholic beverages. Make sure you have the right licence or steer clear of lengthy fermentations if ethanol may surpass the permissible non-alcoholic thresholds.
7. **Marketing & pricing:** Offer kombucha cocktails as upsells and present kombucha as a high-end, nonalcoholic alternative in the ₹120–₹220 pricing range, depending on the city.

8. LIMITATIONS

- Although an illustrative pilot is included in this paper, conclusive assertions require real-world data.

➢ There are many different kombucha formulations; recipe, fermentation control, and storage all have a significant impact on the final product.

- The regulatory environment is different in each Indian state and is subject to change, so operators need to get the most recent advice from the local food authorities.

9. CONCLUSION

For Indian restro-bars looking to appeal to health-conscious and sober-curious customers while promoting beverage innovation, kombucha offers a versatile and appealing beverage choice. Securing trustworthy suppliers or controlled on-site production, maintaining product safety (pH, ethanol control), managing the cold chain effectively, training employees, and adhering to regulations are all essential for success. Operators and researchers can measure customer acceptance, operational impact, and safety in real-world scenarios with the use of a mixed-methods study, as described below.

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