

BREWING CONTINUITY IN AN URBAN TIWA SETTLEMENT: PRODUCTION, COST, WOMEN'S WORK, AND THE CULTURAL MEANING OF ZU IN BETKUCHI LALUNG GAON, ASSAM

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ABSTRACT

This paper examines the making of Zu, the traditional rice beer of the Plain Tiwas, in Betkuchi Lalung Gaon, an urban-adjacent settlement in Kamrup Metropolitan, Assam. Fieldwork from approximately 25 January to 10 February 2025 combined household survey, observation, interviews, case studies, and group discussion in 25 of 37 recorded households; respondents comprised 10 men and 15 women. It considers the brewing process alongside women's labour, household expenditure, ritual practice, social exchange, intergenerational learning, and change. Women undertake production by preparing or obtaining Bakhor starter cakes, processing and cooling the rice, adding the starter, monitoring fermentation, filtering the beverage, judging its quality, and managing household sales. Brewing knowledge is acquired through observation and participation within families, while the timing of fermentation depends on season and the judgment of experienced brewers. Zu continues to be used in hospitality, ancestral offerings, festivals, and life-cycle rites. At the same time, limited space, reported legal constraints, scarcity of plants, education, and changing preferences have altered the conditions under which it is made. The economic records require cautious interpretation. Inputs for a five-kilogram batch are reported to cost Rs. 480, whereas the stated yield and price indicate gross receipts of Rs. 200–300; the reported monthly earnings of Rs. 2,000–3,000 cannot therefore be identified as verified profit. The findings show that brewing in Betkuchi Lalung Gaon remains a form of gendered knowledge and cultural work as well as a household economic activity, sustained through adaptation rather than the unchanged repetition of tradition.

Keywords: Tiwa; rice beer (Zu); women's work; indigenous knowledge; household economy; cultural continuity

1. INTRODUCTION

Among the Tiwas of Assam, rice beer is generally known as Zu; participants in Betkuchi Lalung Gaon also referred to it as Laopani. The drink is prepared by fermenting cooked rice with Bakhor, a starter cake made from rice and selected plants. Yet the significance of Zu cannot be understood from the recipe alone. In the accounts gathered at Betkuchi, it appeared in hospitality, worship, festivals, birth, marriage, death, household livelihood, and relations with ancestors. Brewing is therefore at once a material process and a way of sustaining social memory.

Research on rice beer in Northeast India has shown that its preparation relies on community-specific starter cultures and that drinking and offering are closely tied to social and religious life (Das et al., 2012; Nath et al., 2019). Work focused on Tiwa communities has documented plants used in starter preparation, the principal stages of fermentation, reported medicinal uses, and the cultural place of Zu

(Das, 2016; Goswami, 2020). The present study builds on this scholarship but turns to a particular question arising from Betkuchi Lalung Gaon: how is a household-based practice maintained in an urban-adjacent setting where women remain the principal brewers, production is linked to an informal market, and access to space, plants, and affordable ingredients is changing?

Brewing is treated here as skilled work rather than as an ordinary extension of domestic routine. It requires familiarity with plants and rice, control over temperature and timing, sensory judgment, ritual knowledge, and the management of exchange. The study follows these interconnected aspects of production while also examining the economic figures recorded during fieldwork. Those figures do not fully agree with one another. Instead of forcing them into a calculation of profit, the discussion retains the discrepancy and considers what it reveals about the limits of the available household accounts.

2. LITERATURE REVIEW

Background and Context of Tiwa Rice Beer

The preparation of Zu begins with Bakhor. Besides initiating fermentation, the starter embodies knowledge of plants, proportions, handling, and preservation. When women prepare a batch, grain, plant materials, fuel, water, vessels, and labour are brought together with judgments learned over time. The finished beverage may then be consumed within the household, offered in ritual, served to guests, exchanged, or sold. These uses often overlap, making it difficult to separate the cultural life of Zu from its material and economic production. The Betkuchi accounts also make clear that there is no single household formula followed without variation. Ingredients, rice varieties, and fermentation periods may differ. Such variation matters anthropologically because it shows that continuity rests partly on the capacity to adjust practice to season, availability, and household circumstances. The term “Tiwa rice beer” is used in this article as a broader designation, but the ethnographic claims refer specifically to Betkuchi Lalung Gaon. Botanical records and practices documented elsewhere are used for comparison, not as substitutes for evidence from the study site.

Review of Literature

The literature on traditional rice beer in Northeast India describes a wide range of cereal fermentations, each associated with particular starter cultures and bodies of local knowledge. In their survey of several communities, Das et al. (2012) documented methods of preparation, plant materials incorporated into starter cakes, and the use of earthen pots for fermentation. Nath et al. (2019) placed these beverages within their wider ethnic and socio-cultural settings and reviewed the challenges facing their continuation. Laboratory research has also examined the microbial diversity and metabolites present in selected Assamese rice beers (Das et al., 2019). Such findings help explain fermentation processes, but they cannot establish the microbiological or nutritional characteristics of the Betkuchi beverage because no local batches were tested. The smaller body of Tiwa-specific scholarship is especially relevant to the present inquiry. Working in Morigaon district, Das (2016) documented nineteen plants associated with starter preparation and recorded their uses as understood within the community. Goswami (2020), drawing on selected villages in Morigaon and Nagaon, discussed the preparation of rice beer together with its religious importance, medicinal beliefs, women's involvement, and the participation of young people. Women brewers and the cultural significance of Zu have therefore been recognized in earlier research; they are not newly discovered themes. Comparative ethnobotanical work has added further detail to the plant record. Duarah et al. (2023) examined plants used in rice-beer starters among several communities of Assam, including the Tiwas, while Borah et al. (2021) compiled plants associated with traditional alcoholic beverages among four ethnic communities in the state. Patar (2019) located rice beer within the broader food

habits of the Tiwas. Read together, these studies suggest that fermentation is inseparable from ecological knowledge, social practice, local ideas of health, and culturally learned technique. They also caution against treating scattered observations as a universal recipe. Ingredients documented in different districts or villages may not be identical, and laboratory findings from other beverages cannot simply be transferred to Zu in Betkuchi. In the same way, reported medicinal applications are ethnographically meaningful without constituting proof of clinical efficacy. The literature provides a comparative frame; the claims made in this article remain grounded in the study locality.

3. RESEARCH GAP

Existing studies have examined the ethnobotany of starter cultures, methods of preparation, cultural and religious meanings, medicinal beliefs, and women's participation. Less attention has been given to the way these dimensions meet within the everyday economy of one urban-adjacent Tiwa settlement. In particular, the literature considered here does not closely connect the labour of brewing with household expenditure, informal sale, ritual obligation, and the practical adjustments required when plants, space, and preferred rice become difficult to secure. The gap addressed by this study is therefore deliberately modest. It does not rest on a claim that Zu or women's involvement has been ignored. Instead, it offers a site-specific account of how production, gender, economy, and cultural continuity interact in Betkuchi Lalung Gaon. The conflicting cost and revenue figures also expose a methodological problem: rice beer may be described as a livelihood resource, but such a claim requires production and sales data that distinguish gross receipts from net income.

4. OBJECTIVES OF THE STUDY

1. To document the stages and materials reported in the preparation of Tiwa Zu in Betkuchi Lalung Gaon.
2. To examine the reported costs, yield, selling price, and income associated with household production.
3. To analyse women's participation in brewing, marketing, and the transmission of knowledge.
4. To interpret the cultural, ritual, and social significance of Zu in the settlement.
5. To identify evidence of continuity, adaptation, and decline in the practice.

5. RESEARCH METHODOLOGY

Fieldwork in Betkuchi Lalung Gaon was conducted from approximately 25 January to 10 February 2025. A household schedule recorded 37 households with a total population of 180 persons. From this wider household record, 25 households were selected for detailed qualitative inquiry. The household respondents comprised 10 men and 15 women. Selection gave particular attention to women, traditional brewers, and other persons knowledgeable about the preparation and cultural use of Zu. Permission to undertake the fieldwork was obtained before data collection. The study combined household survey, direct observation, interviews with women brewers and other community members, case studies, and group discussion. Using several methods made it possible to place individual accounts alongside observed production practices and the broader household record. The material was subsequently organized around six themes: the brewing process, household economy, gendered participation, cultural meaning, transmission of knowledge, and change. The numerical material is used descriptively. The cost analysis preserves the quantities and prices as recorded and compares the stated cost of one batch with the reported yield and selling price. The population of 180 provides demographic context; it is not treated as a sample of 180 interview participants. The accounts from the 25 sampled households support a localized qualitative analysis rather than statistical generalization to

Tiwa communities elsewhere. Individual interview dates are not given because dates appearing in earlier case-study notes were inconsistent with the confirmed fieldwork period. Published claims are cited in author-date form, while descriptions of local practices and participant accounts derive from the field research.

Table 1. Scope of the Recorded Field Material

Indicator	Recorded Value	Male	Female
Households	37	—	—
Population	180	80 (44.4%)	100 (55.6%)
Households selected for detailed study	25	—	—
Household respondents	25	10	15

Source/Note: *Household demographic records and research description in the primary field material.*

6. STUDY AREA

Betkuchi Lalung Gaon is an urban-adjacent Tiwa settlement in Kamrup Metropolitan, Assam. The household survey recorded 37 households and 180 residents, of whom 80 were male and 100 were female. Women made up 55.6% of the recorded population and men 44.4%. The available field record does not contain further geographical measurements or a detailed settlement history, and the present description is limited accordingly.

Livelihoods in the settlement extend across business and trade, daily-wage labour, private and government employment, self-employment, household work, and rice-beer production. Students, retired persons, and those recorded as unemployed also appear in the schedule. Some categories overlap, particularly where brewing is listed together with another occupation. The entries in Table 2 are therefore useful as a picture of the settlement's varied household economy, but they cannot be added together as mutually exclusive population groups.

Table 2. Occupational Categories Recorded in the Study Area

Recorded Category	Male	Female	Total
Business/trade	22	12	34
Daily-wage labourer	18	14	32
Private job	10	6	16
Government job	6	4	10
Self-employed	12	8	20
Household work	0	30	30
Students	8	16	24
Retired/pensioner	2	4	6
Other/unemployed	2	6	8
Rice-beer brewing (primary)	0	70	70
Rice-beer brewing (secondary)	5	0	5

Source/Note: *Field demographic records. Categories overlapped and were not summed as a total population.*

7. RESULTS AND FINDINGS

Across the interviews and observations, women emerged as the principal organizers of brewing. Their work joined the preparation of starter cakes and rice with seasonal judgment, ritual practice, household use, and small-scale sale. Although the sequence of production was broadly shared, families varied in their choice of ingredients and fermentation periods. These differences became especially visible when preferred materials were costly or difficult to obtain.

TIWA RICE BEER BREWING PROCESS

Participants described three broad phases of production: gathering plant materials, preparing Bakhor, and fermenting and filtering the rice. Approximately nineteen plant species were said to be known within the local starter tradition, although the field record identifies eight by name. Table 3 retains the botanical names, families, and uses as they were recorded. Since no voucher specimens or taxonomic verification accompanied the list, the identifications remain provisional. The stated uses represent local knowledge rather than clinically tested effects.

To make Bakhor, softened or powdered rice is mixed with selected plant material and powdered starter from an earlier preparation. The mixture is formed into cakes, left to ferment for several days, and then dried for later use. The record does not specify the quantity of each plant, the size of the cakes, the length of drying, or how a starter is first established without material from an older batch. These details are therefore left open rather than reconstructed from practices recorded elsewhere.

Brewing begins by boiling the rice and allowing it to cool before the starter is mixed in. The inoculated rice is placed in an earthen pot and kept at room temperature. Once fermentation is complete, water is added in measured amounts, and the liquid is strained through a clean cloth. No exact rice-to-water ratio was recorded. The women drew attention instead to seasonal timing. In summer, fermentation generally takes three to four days; in winter, it may require as long as one week. Protima Pator regarded the slower winter process as producing a richer taste and better keeping quality. This was a sensory assessment developed through experience rather than a result of chemical testing.

Practice differed to some extent from one household to another. Families varied both the ingredients used and the time allowed for fermentation. When glutinous rice (bora saul) was unavailable or too expensive, women substituted other varieties of rice. Sampa Pator noted that cheaper rice altered the taste slightly but made it possible to continue brewing. Substitution, in this instance, was not simply an abandonment of tradition. It was a practical response to the cost and availability of materials.

Table 3. Selected Plants Recorded for Zu Starter Preparation

Local Name	Plant Name as Recorded	Family as Recorded	Reported Traditional Use
Horubahaka	Justicia betanica	Acanthaceae	Reported antiseptic and pain-relieving use
Bih Dhekia	Polypodium sp.	Polypodiaceae	Reported use for arthritis and pain
Kuhlar	Saccharum (L.)	Poaceae	Reported laxative use and use for menstrual bleeding
Titavekhuri	Solanum indicum (L.)	Solanaceae	Reported use for gastroenteritis and fever
Kothona	Tabernaemontana coronaria (R.Br.)	Apocynaceae	Reported flower or leaf use for eye infection and jaundice

Kharua	Streblus asper (Lour.)	Moraceae	Reported use for urinary and tooth infection
Bor Bahaka	Phlogocanthus thyrsiflorus (Roxb.)	Acanthaceae	Reported use for chest cough, throat infection, and tonsillitis
Durun	Leucas aspera (Spreng.)	Lamiaceae	Reported pain-relieving use and use for nose bleeding

Source/Note: Adapted from Goswami (2020). Botanical names and families are reproduced as recorded in the source document and were not taxonomically verified in this study.

ROLE OF WOMEN IN RICE BEER PRODUCTION

Women carried out most of the technical and organizational work observed or described during fieldwork. They selected ingredients, prepared Bakhor, processed the rice, added the starter, monitored fermentation, filtered the drink, judged its quality, and dealt with customers who came to the household. Each stage called for more than physical effort. It involved knowing which plants to use, recognizing the effect of temperature, maintaining cleanliness, evaluating taste, and deciding when a batch was ready. The field record includes a chart in which 40% is assigned to commercial sale, 20% to household and ritual use, 10% to other purposes, and 30% to non-involvement. Since neither the denominator nor the persons classified are identified, these percentages cannot support an estimate for the recorded population. The interviews and observations, however, consistently placed women at the centre of the work. Protima Patar, aged 40, had more than twenty years of brewing experience. She learned from her grandmother and continued a practice of praying to her ancestors before sealing the fermentation pot. Her remark, "I don't do it for money ... I do it because it's part of who we are," expressed a sense of inherited identity without denying that brewing may also contribute to the household economy. Sampa Patar, aged 50, likewise spoke of brewing as knowledge handed down within the family and as a source of part-time income. She was concerned, however, that educated younger women were becoming less interested in work that demands considerable time and effort. In both accounts, knowledge passed through watching, assisting, and repeated practice rather than through written instruction. Men brewed less often, but their participation was not unknown. Khagen Patar, aged 58, had learned by watching his mother and brewed by choice for household rituals and social occasions. He observed that a small number of men take over when a wife or female relative is ill. His experience shows that brewing knowledge is not exclusively female, even though the prevailing division of work makes women its main practitioners and transmitters.

COST AND ECONOMIC ASPECTS OF PRODUCTION

The available cost estimate refers to a batch prepared from 5 kg of glutinous rice. At Rs. 50 per kilogram, the rice accounts for Rs. 250. Five to six Bakhor cakes are priced at Rs. 5 each, with Rs. 30 entered as their total cost. Four logs of firewood, each priced at Rs. 50, add Rs. 200. Clean water and earthen pots are listed as necessary inputs but are not assigned monetary values. The resulting total in the field record is Rs. 480.

Table 4. General Cost Estimate for One Recorded Batch of Zu

Input	Recorded Quantity	Recorded/Unit Price	Stated Amount
Glutinous rice	5 kg	Rs. 50 per kg	Rs. 250
Bakhor cakes	5–6 cakes	Rs. 5 each	Rs. 30
Firewood	4 logs	Rs. 50 each	Rs. 200

Clean water	Required	N/A	N/A
Earthen pots	Required	N/A	N/A
Recorded total			Rs. 480

Source/Note: Field data reproduced from the primary material. These estimates were not independently audited. The recorded total for 5–6 starter cakes is retained exactly as supplied.

From the same 5 kg of rice, the reported yield is approximately four to five bottles of 750 ml, or 3.0–3.75 litres. Bottles are said to sell for Rs. 50–60 each. If these figures refer to the same production cycle, gross receipts will range from Rs. 200 for four bottles sold at Rs. 50 to Rs. 300 for five bottles sold at Rs. 60. The recorded direct cost would therefore amount to Rs. 96–120 per bottle, leaving gross receipts Rs. 180–280 below the stated batch expenditure. Women's labour and the costs of water, vessels, transport, storage, spoilage, and plant collection are not included in this comparison. This inconsistency makes the reported monthly earnings of Rs. 2,000–3,000 difficult to interpret. The amount may refer to gross sales rather than profit, to batches of another size, or to an accounting arrangement not captured in the field notes. The evidence does not allow one explanation to be preferred. Nor does it record batch frequency, the volume retained for household or ritual use, the working life of pots, the source of firewood, the price of substitute rice, or unsold quantities. Brewing can be described as a source of small home-based earnings, but the present figures do not establish the level of profit.

The manner in which Zu is sold is itself revealing. Brewers do not generally advertise or maintain separate shops. Instead, regular customers—mainly described as daily-wage labourers, workers, and other local residents—know which households brew and come carrying their own containers. The field narrative refers to this arrangement as an “invisible market.” It rests on familiarity and trust and allows women to manage sales from within the household. Residents also referred to legal sensitivity around the activity, although no particular statute, license, enforcement incident, or court case was documented during the study.

CULTURAL AND SOCIAL SIGNIFICANCE

In Betkuchi Lalung Gaon, Zu circulates as an offering, a shared drink, and an expression of Tiwa identity. It is used in worship associated with Hemphu, Mukrang, household deities, and ancestors. The accounts also place it within life-cycle observances: it is linked with protection and blessing at birth, the joining of families in marriage, and relations between the living and the dead at funerals. A batch prepared for such an occasion carries a significance that cannot be reduced to its possible selling price. Festival practices illustrate both persistence and change. Participants associated Zu with Pisu, Borot Utsav, Sogra Puja, Wansuwa or Uwa Juwa, and Langkhon. Pisu was reported to be no longer actively observed in Betkuchi Lalung Gaon, where limited space and contemporary ways of life have made its continuation difficult. Borot Utsav and Sogra Puja are still observed, though on a smaller or more family-centred scale. Prayers connected with Langkhon and Uwa Juwa continue at Maa Bhagwati Than. For fuller celebrations, residents travel approximately 55 km to Jagiroad in Morigaon, where barter exchange may also take place. Movement between Betkuchi and Jagiroad thus helps sustain forms of collective participation that are harder to organize within the settlement itself. Serving Zu to visitors is understood as a gesture of goodwill, and drinking together during ritual and festive occasions reinforces social belonging. Participants also spoke of its use for bodily pain, digestion, common illness, and the care of livestock. These statements record local understandings of health rather than clinical outcomes. Elders' emphasis on moderation is equally significant, since it distinguishes socially appropriate drinking from consumption regarded as excessive or harmful.

CONTINUITY AND TRANSFORMATION

The continuing place of Zu rests on experienced brewers, learning within families, household ritual, and its repeated use in festivals and life-cycle ceremonies. None of these conditions has remained untouched. Protima Patar spoke of the growing difficulty of obtaining plants called Langkhari and Khorikthob, which now have to be bought in distant markets. Their botanical identities were not verified in the research material. Sampa Patar described using cheaper rice when the preferred variety was unaffordable. Other observations point to smaller batches, reliance on rural relatives, and less public celebration within the urban-adjacent settlement. Participants identified education, employment, migration, commercial beverages, limited space, and reported legal restrictions as pressures on brewing. Younger people, particularly educated young women, were said to have less time or inclination to learn a labour-intensive process. Even so, the practice has not simply vanished. Households adjust fermentation schedules, change rice varieties, reduce quantities, sell through private networks, and move some festival participation beyond the village. Sampa Patar suggested branding and tourism as a possible future direction. Her suggestion is retained as one participant's view; the study did not establish wider community agreement, market demand, regulatory feasibility, or permission to commercialize shared knowledge.

DISCUSSION

The findings place Zu within a field of relationships rather than treating it only as a fermented drink. The same vessel in which rice ferments is connected with women's work, ancestral observance, household provisioning, hospitality, and sale. These dimensions are not easily separated in practice. The beverage acquires value through the occasions on which it is offered and shared as well as through the money it may bring into the household. Women's work is central to this process. Besides carrying out the physical tasks, women decide whether a starter is suitable, how long fermentation should continue, when another rice must be substituted, and whether the taste is acceptable. They also preserve ritual gestures and maintain relations with customers. Much of this work remains economically indistinct because it takes place at home, is unpaid, and serves both market and non-market purposes. The contradiction in the batch accounts may result from incomplete household costing rather than an actual loss on every batch, but the available evidence cannot settle the matter. That would require following the same batch from the acquisition of every input through domestic use, ritual distribution, gifting, barter, credit, and cash sale. The material from Betkuchi also suggests that it would be difficult to describe the tradition simply in terms of decline. Although Pisu is no longer actively celebrated in the locality, some of the plants used in brewing have become increasingly difficult to obtain, and younger women appear to show less interest in the practice.

At the same time, several aspects of the tradition continue, although in modified forms. Rituals are now conducted on a smaller scale, preferred varieties of rice are sometimes substituted with other types, and customers often visit brewers' homes directly to purchase rice beer. For larger festivals, residents may travel to Jagiroad rather than organising similar celebrations within the village. These changes indicate that the tradition is neither being maintained in an unchanged form nor simply disappearing. Instead, its continuity is shaped by selective adaptations to changing material and social conditions.

Seen in this way, production, gender, economy, ritual, and urban change are mutually connected. The women who hold brewing knowledge also bear the labour of maintaining it. A substitution made for economic reasons may affect taste; a household sales network may provide income while keeping transactions largely invisible; and restricted space in Betkuchi may reduce local celebrations while

strengthening travel to another Tiwa centre. Bringing these connections into one account is the principal contribution of this study.

CONCLUSION

Zu continues to hold an important place in both everyday and ceremonial life in Betkuchi Lalung Gaon. Its preparation depends on several locally available materials and forms of knowledge, including cooked rice, Bakhor, earthen vessels, seasonal judgement, and skills developed through repeated participation in the brewing process. Women remain the principal brewers and custodians of this knowledge, although the experience of Khagen Patar demonstrates that men can also acquire and practise these skills.

Through brewing and the sharing or sale of Zu, households continue to maintain practices of hospitality, ancestral relations, participation in festivals, life-cycle observances, and a small-scale and relatively discreet market. At the same time, the conditions under which Zu is produced are changing. The availability of certain plants, the cost and accessibility of rice, limited household space, education, migration, the growing presence of commercial beverages, reported legal constraints, and reduced interest among younger people have all influenced the practice. In response, households have made practical adjustments, such as substituting some ingredients, preparing smaller quantities, reducing the scale of certain rituals, relying more on private sales, and travelling to other places for larger celebrations. Continuity in Betkuchi, therefore, does not mean the unchanged preservation of an older form of brewing. Rather, it is maintained through practical choices and selective adaptations to changing social and material circumstances.

The economic dimension of Zu production, however, remains difficult to determine from the available data. The recorded cost of Rs. 480 for one batch exceeds the Rs. 200–300 in gross receipts suggested by the reported yield and selling price. In addition, the stated monthly earnings of Rs. 2,000–3,000 do not clarify whether these amounts represent gross income or net profit. Consequently, a reliable estimate of profit cannot be established from the available figures. What the evidence does demonstrate is that Zu brings together skilled labour, household economic activity, ritual responsibilities, and cultural identity. Its continued presence in Betkuchi depends substantially on the women whose knowledge, labour, and everyday involvement sustain this connection across generations.

LIMITATIONS

Several limitations should be considered when interpreting these findings. The study drew on a small, purposively selected sample—25 households and 25 respondents out of 37 recorded households and approximately 180 residents—chosen for their knowledge of brewing rather than through random sampling, so the account is not statistically representative of the wider settlement or of Tiwa communities elsewhere. Fieldwork was also conducted over a comparatively short period, from approximately 25 January to 10 February 2025, which limits the extent to which seasonal variation in brewing practice could be observed directly.

The economic figures reported in this study are descriptive rather than audited. Batch frequency, the volume of Zu retained for household or ritual use, unsold quantities, the valuation of women's labour, and the costs of water, vessels, transport, and spoilage were not captured in the field record, and the reported monthly earnings of Rs. 2,000–3,000 could not be reconciled with the recorded batch cost and yield. As a result, no reliable estimate of net profit could be established. Similarly, the chart recording the proportion of women's involvement in commercial sale, household and ritual use, and

non-involvement lacked a clear denominator, so these percentages could not be extended to the wider population.

The botanical names and families listed for plants used in Bakhor preparation were reproduced from a previously published source and were not independently verified through voucher specimens or taxonomic confirmation in this study; of the approximately nineteen plants said to be known within the local starter tradition, only eight could be identified by name in the field record. Finally, because dates recorded in earlier case-study notes were inconsistent with the confirmed fieldwork period, individual interview dates are not reported, which limits the chronological precision of the case accounts. These limitations are noted as a matter of methodological transparency rather than as grounds for discounting the study's central findings.

REFERENCES

1. Borah, D., Gogoi, T., Sarma, J., Borah, P. J., Gohain, B., Mili, C., Upadhyaya, A., Basumatary, J., Neog, K., Wangpan, T., & Tangjang, S. (2021). Compendium of plants used for preparation of traditional alcoholic beverages by four major ethnic communities of Assam, northeast India. *Biodiversitas*, 22(4), 2019–2031. <https://doi.org/10.13057/biodiv/d220451>
2. Das, A. (2016). Medicinal plants used traditionally for the preparation of rice beer by the Tiwa tribe of Morigaon district of Assam, India. *International Journal of Current Research*, 8(11), 40940–40943.
3. Das, A. J., Deka, S. C., & Miyaji, T. (2012). Methodology of rice beer preparation and various plant materials used in starter culture preparation by some tribal communities of NorthEast India: A survey. *International Food Research Journal*, 19(1), 101–107.
4. Das, S., Deb, D., Adak, A., & Khan, M. R. (2019). Exploring the microbiota and metabolites of traditional rice beer varieties of Assam and their functionalities. *3 Biotech*, 9(5), Article 174. <https://doi.org/10.1007/s13205-019-1702-z>
5. Doloi, G., Timung, B., & Bordoloi, K. (2024). The Tiwa community of Assam: A historical and cultural study. *The Review of Contemporary Scientific and Academic Studies*, 4(8). <https://doi.org/10.55454/rcsas.4.08.2024.005>
6. Duarah, R., Kalita, P., & Mishra, A. (2023). Medicinal plants used in rice beer starter culture by different tribes in Assam: An ethnobotanical survey. *International Journal of Pharmaceutical Sciences and Research*, 14(6), 3012–3027. [https://doi.org/10.13040/IJPSR.0975-8232.14\(6\).3012-27](https://doi.org/10.13040/IJPSR.0975-8232.14(6).3012-27)
7. Goswami, N. (2020). Traditional rice beer of the Tiwa community: An analytical exposition. *International Journal of Scientific & Technology Research*, 9(3), 6265–6268.
8. Nath, N., Ghosh, S., Rahaman, L., Kaipeng, D. L., & Sharma, B. K. (2019). An overview of traditional rice beer of North-East India: Ethnic preparation, challenges and prospects. *Indian Journal of Traditional Knowledge*, 18(4), 744–757.