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SHORT COMMUNICATION

# Effect of inulin addition on the sensory attributes of dairy beverage (*Rab*)

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**Abstract:** Being a traditional part of Rajasthani cuisine, *Rab* is widely consumed and relished for its taste. Inulin (prebiotic) has been proven beneficial for gut health. The addition of inulin in *Rab* results in a superfood; containing characteristics of traditional as well as functional beverages. The investigation was performed to prepare and standardize pearl millet (PM) and horse gram dal (HGD) *Rab* with the inulin. The inulin was added at 0%, 1%, 3%, and 5% rates and let ferment for 6-7h, at 35$^0$C. All the fermented treatments were stored at 4$^0$C. All treatments were evaluated for sensory characteristics. All treatments were tested for sensory characteristics including color, consistency, taste and flavor, mouthfeel, aftertaste, and overall acceptability on the Nine-point Hedonic scale and obtained scores above 7 points. It was concluded that the inclusion of inulin significantly improved the sensory characteristics of the functional beverage.

**Keywords**: Functional *Rab, Rabadi* inulin, Prebiotic drink, Pearl millet beverage, Buttermilk

From ancient times, native people of dry and semi-arid areas of western India consumed a cereal and dairy-based beverage called *Rab*. It is made up of the region's staple cereal and buttermilk. Mostly, dry mint, salt, cumin, or even ghee is added as per their preferences. Pearl millet has a large content of phosphorus which is good for bone health. Pearl millet is high in iron and zinc and is a gluten-free grain, a great alternative food for patients with celiac disease (Satnakar and Kumar, 2020). Ramachandra et al. (2021) concluded that *Lactobacillus* sp. obtained from domestic *dahi* samples showed a probiotic nature and sensitivity against various antibiotics. Prebiotics are the fiber that stimulates the growth and metabolism of the human microbiota. Inulin and FOS are mainly used as natural sources of prebiotics. In a review article, Shams and Wadhawan (2021) mentioned that inulin improves the mouthfeel and texture of processed foods and can be used as an important functional ingredient in food processing. In 2022, an article published by Cuamatzin-García et al. stated consumption of fermented foods and beverages improves human health by positively working on immunity, gastrointestinal tract, metabolic disorders, lipid levels, and body fat accumulation. Fornelli et al. 2014 studied the effect of oligofructose and inulin on the sensory characteristics of symbiotic dairy beverages. The investigation mentioned that the addition of inulin and oligofructose did not adversely affect the overall acceptance and marketability of the beverages. Similarly, Moghadam et al. 2019 also stated that Inulin fortification improved yogurt's probiotic viability and textural and flavor characteristics. Therefore, in the present study, an attempt was made to prepare and study the sensory properties of an Inulin-fortified pearl-millet-based fermented beverage (*Rab*)

Buttermilk was procured from the local dairy. Good quality pearl millet (PM) flour, horse gram dal (HGD) flour, salt, and roasted cumin powder were procured from the local market. Inulin powder (brand name- Urban Platter) was procured from the online retailer (Amazon. in).

For the preparation of *Rab*, 80 g PM flour and 20 g HGD powder were cooked with 500 mL water for 15 minutes. The mixture was cooled and then 1500 mL of buttermilk (BM), 0.5% salt, and 0.4% RCP were added, mixed, and divided into 4 treatments. Inulin was added as 0% (controlled), 1% ($PMT_2$), 3% ($PMT_3$) and 5% ($PMT_4$). The mixture was blended with an electrical blender, sieved (18-mesh size strainer), and sat to ferment for 7 h. The final product was packed in pre-sterilized polypropylene cups (200 mL capacity) and stored at 4$^0$C for further analysis.

Sensory evaluation of samples was carried out under laboratory conditions by 30 semi-trained panel members who were scientists,

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**Table 1:** Sensory test result of inulin-incorporated pearl millet Rab

| Property | $PMT_1$ | $PMT_2$ | $PMT_3$ | $PMT_4$ | F-Ratio | p-value | Result |
|---|---|---|---|---|---|---|---|
| Color | 7.33 ± 0.48 | 8.17 ± 0.38 | 7.83 ± 0.38 | 8.00 ± 0.59 | 18.04 | 0.000 | *** |
| Consistency | 8.17 ± 0.70 | 7.83 ± 0.38 | 8.17 ± 0.38 | 8.00 ± 0.00 | 3.94 | 0.010 | * |
| Taste & Flavor | 7.00 ± 0.83 | 7.83 ± 0.38 | 7.17 ± 0.38 | 7.83 ± 0.38 | 20.57 | 0.000 | *** |
| Mouth Feel | 7.50 ± 0.97 | 8.17 ± 0.91 | 7.17 ± 0.38 | 7.00 ± 0.59 | 14.07 | 0.000 | *** |
| After Taste | 6.83 ± 0.70 | 7.83 ± 1.09 | 7.50 ± 0.97 | 7.33 ± 0.76 | 6.53 | 0.000 | *** |
| Overall Acceptability | 8.00 ± 0.59 | 7.83 ± 0.91 | 7.50 ± 0.51 | 7.83 ± 0.70 | 2.74 | 0.046 | * |

Mean +SD, n = 30
*** (P<0.001)
* (P<0.05)

and students of the College of Community and Applied Sciences, MPUAT, Udaipur. Each panelist was asked to taste the given samples and rate the sensory properties (Rangana, 2010) including color, consistency, flavor & taste, mouthfeel, after-taste, and overall acceptability; on a 9-point hedonic scale (Jones, Peryam, and Thurstone, 1995).

Mean values and standard deviation (SD) of triplicate determinations were calculated with the help of Microsoft Excel (Microsoft Office, 2010). All statistical analyses were conducted on SPSS 16 software. One-way analysis of variance was used to determine the existence of any differences among treatment means.

As shown in Table 1, sensory scores of PM- *Rab* (without inulin) for color, consistency, taste & flavor, mouthfeel, after-taste, and overall acceptability were 7.33 ± 0.48, 8.17 ± 0.70, 7.00 ± 0.83, 7.50 ± 0.97, 6.83 ± 0.70, and 8.00 ± 0.59; whereas $PMT_2$ obtained 8.17 ± 0.38, 7.83 ± 0.38, 7.83 ± 0.38, 8.17 ± 0.91, 7.83 ± 1.09, and 7.83 ± 0.91; respectively. For color, *Rab* with 3% inulin scored 7.83 ± 0.38 and Rab with 5% inulin scored 8.00 ± 0.59. Scores obtained for taste & flavor, mouthfeel, after-taste, and overall acceptability by $PMT_3$ were 7.17 ± 0.38, 7.17 ± 0.38, 7.50 ± 0.97, 7.50 ± 0.51; and for $PMT_4$ were 7.83 ± 0.38, 7.00 ± 0.59, 7.33 ± 0.76, and 7.83 ± 0.70. Differences among treatments for color, taste & flavor, mouthfeel, and after-taste properties were found to be significant ((P<0.001), whereas for consistency and overall acceptability, differences were found to be significant (P<0.05).

## Conclusion

Being a tropical country India has a variety of drinks to quench the thirst of people as per the weather conditions. The assortment of drinks is according to the different regions and the availability of raw ingredients including local spices, herbs, taste, and abundance of the main ingredient. One such traditional drink in Rajasthani culture is *Rab*, which combines cereal and buttermilk. The inclusion of prebiotics (inulin) resulted in the enhancement of the sensory properties of *Rab*. All developed treatments scored above 7 points on a 9-point hedonic scale concluding that all treatments were well-liked by the judges and can be introduced in the upcoming beverage market. It has proved to be an effective carrier to provide the required hydration and prebiotics.

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