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The Sensory, Physicochemical, and Microbiological Properties of a Milk Beverage Infused with Bee Honey and Pepper (*Piper nigrum*)

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INTRODUCTION & AIM

Flavored milks are ready-to-drink products made from unfermented milk of different fat contents, mixed with ingredients such as sugar or other sweeteners and additives (Linehan *et al.,* 2024). This study explores the trend of adding natural ingredients, to enhance the value of flavored milk .

Honey possesses antioxidant and antibacterial qualities, while black pepper offers medicinal benefits and enhances digestion and nutrient absorption (Chirsanova *et al.,* 2021).

This study assessed the sensory, microbial, and physicochemical characteristics of a pasteurized milk beverage infused with bee honey and pepper.

METHOD

1. *Raw milk*
2. *Cream separation*
3. *Pre-heat the milk (40 ± 1°C)*
4. *Adding ingredients (Honey and Pepper powder) and Mixing*
5. *Straining*
6. *Pasteurization*

Final Product

Sensory evaluation

- *9-point hedonic scale*
- *30 untrained panelists*
- *Five attributes*

Honey 16% and Pepper 0.6% (The highest consumer-accepted blend of flavored milk)

Microbiological analysis

- *Total Plate Count*

Physicochemical properties

- *Moisture*
- *Total solids*
- *Ash*
- *Total sugar*
- *Free fatty acids*
- *Titratable acidity*
- *Viscosity*
- *pH*

RESULTS & DISCUSSION

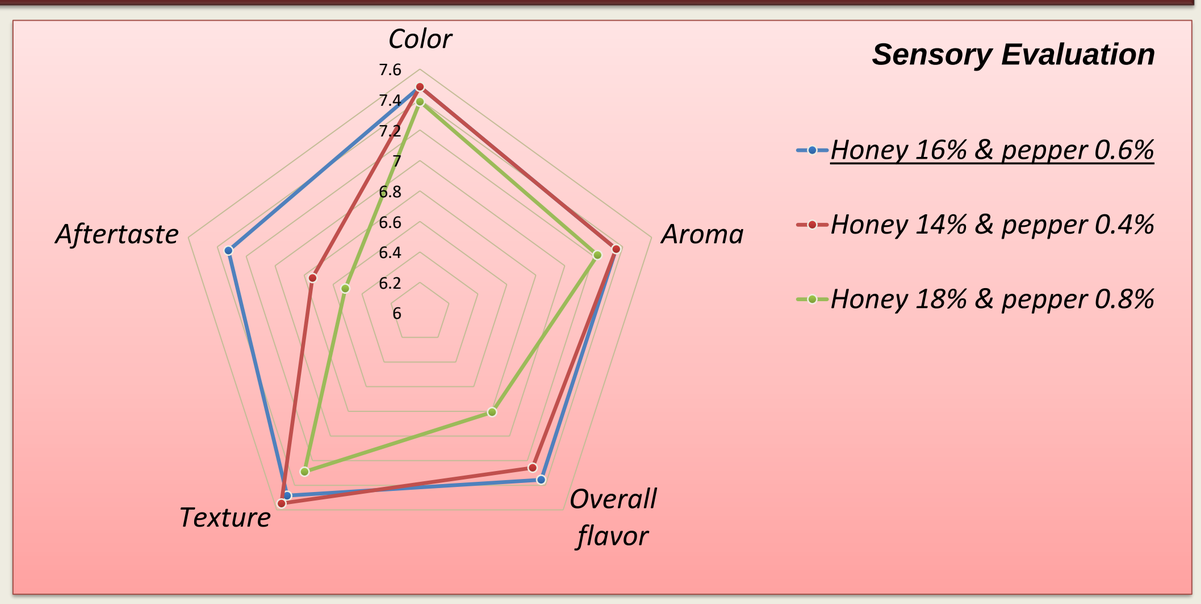

Figure 1. Mean sensory evaluation scores of three milk beverages

Physicochemical characteristics

Table 1. Chemical composition of flavored milk during storage at 7 ± 1 °C for 21 days

	Storage Period			
	Day 0	Day 7	Day 14	Day21
Moisture (%)	85.55^{a} ± 0.04	85.21^{b} ± 0.01	83.69^{c} ± 0.12	83.08^{d} ± 0.05
Total Solid (%)	14.45^{a} ± 0.04	14.79^{b} ± 0.01	16.31^{c} ± 0.12	16.92^{d} ± 0.05
Ash (%)	0.51^{a} ± 0.00	0.51^{b} ± 0.00	0.51^{c} ± 0.00	0.52^{d} ± 0.00
Total Sugar (%)	10.31^{a} ± 0.03	11.61^{b} ± 0.06	13.60^{c} ± 0.12	16.00^{d} ± 0.04
Viscosity (mPas)	21.65^{a} ± 0.54	26.57^{b} ± 0.03	29.81^{c} ± 0.04	36.87^{d} ± 0.01
pH	6.61^{a} ± 0.01	6.60^{a} ± 0.01	6.54^{b} ± 0.01	6.14^{c}± 0.01
Titrable acidity (%)	0.17^{a} ± 0.10	0.17^{b} ± 0.05	0.19^{c}± 0.05	0.19^{d} ± 0.10
Free fatty acid (%)	1.14^{a} ± 0.05	1.15^{b}± 0.05	1.27^{c} ± 0.05	1.34^{d} ± 0.00

Data with different superscript lowercase letters in the same row are significantly different (P<0.05).

Microbiological characteristics

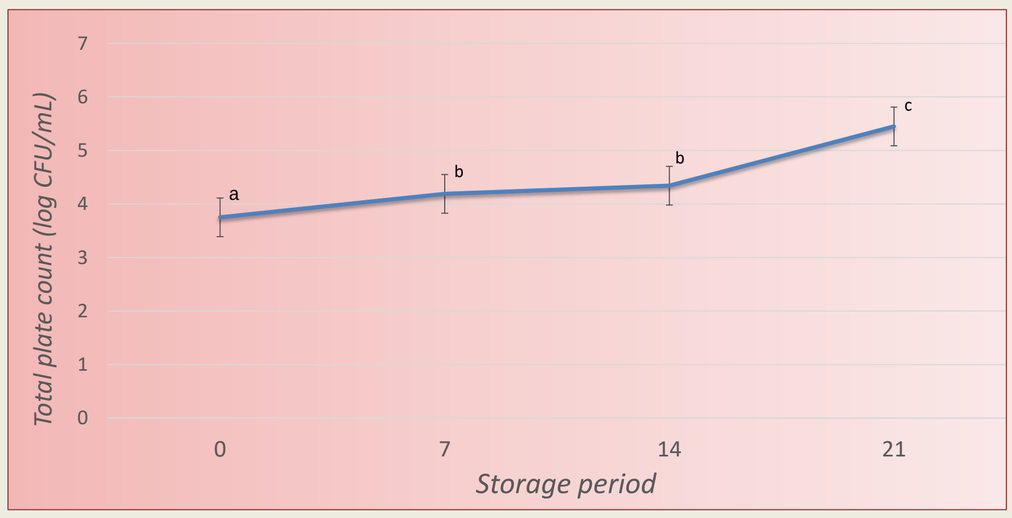

Figure 2. Variation of Total bacteria count of flavored milk during storage at 7 ± 1 °C for 21 days (P<0.05)

CONCLUSION

- Based on the sensory evaluation, bee honey 16% and pepper 0.6% was the most accepted blend of pasteurized milk beverage
- Ash, total solids, total sugar, titrable acidity, free fatty acid content , viscosity and total bacteria count of the milk beverage blended with honey & pepper have increased significantly while the moisture content and pH of the beverage significantly decreased in terms of storage time.

REFERENCES

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- Linehan, K., Patangia, D.V., Ross, R.P. and Stanton, C., 2024. Production, Composition and Nutritional Properties of Organic Milk: A Critical Review. Foods, 13(4), p.550.