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Evaluation of the Quality of Kefir with Various Additives (Mango, Pomegranate and Ginger) During Storage

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Abstract:

Kefir was produced following traditional methods in three distinct formulations: kefir supplemented with mango (*Mangifera indica L.*), pomegranate (*Punica granatum*), and ginger (*Zingiber officinale*), whereas additive-free kefir was used as a control in the experiment. Each formulation was prepared with additive concentrations of 0.5%, 1.0%, 1.5%, 2.0%, and 2.5%. The samples were stored under controlled conditions for a period of 15 days. Analyses of chemical composition, physico-chemical properties were conducted on days 1, 3, 5, 7, 10, and 15 of storage. Parameters assessed included total solids, milk fat, protein, sugar, ash, alcohol, and carbon dioxide, as well as titratable (TA) and active acidity (pH). Sensory evaluation of final products included colour, aroma, taste, consistency and overall quality. Statistical evaluation of the analytical data was carried out using the JMP IN 7.0 software package (SAS Institute). Among the samples, additive-free kefir exhibited the lowest concentrations of sugar and alcohol. Kefir supplemented with mango demonstrated elevated levels of sugar and carbon dioxide, whereas kefir with pomegranate showed higher contents of protein, and ash. The kefir with ginger exhibited the highest acidity. The differences observed among the formulations were statistically significant at the 0.05 level. The application of additives at a concentration of 2.5% was found to be the most effective in enhancing technological parameters such as total solids, sugar, ash, and alcohol content, while maintaining a stable pH and exerting no detrimental effects on acidity or carbon dioxide concentration. Compared to the additive-free kefir, all supplemented variants exhibited progressive improvements in several key quality attributes, underscoring the positive influence of additive supplementation. Throughout the 15-day storage period, kefir demonstrated a consistent increase in fermentative activity, as indicated by a rise in titratable acidity, alcohol, and carbon dioxide levels, along with a gradual decline in pH. Protein and ash content remained relatively stable ($P > 0.05$). The statistically significant changes in acidity, alcohol, and sugar content reflect the natural biochemical evolution of kefir during the storage process. Sensory evaluation of kefir with different additives showed that all analyzed variants were assessed as acceptable for consumption by the panel of tasters. The differences in the results between the variants with different additives were statistically non - significant ($p > 0.05$), which indicates that the type of additive did not significantly affect the perception of the sensory quality of the product.

Keywords:

Kefir, additives, storage, quality.