Title of the project: DEVELOPMENT OF FUNCTIONAL FERMENTED DAIRY PRODUCTS WITH ZINC FORTIFIED MILK

Funding agency: University Grant Commission, New Delhi

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Tenure of the Project: 3 years w.e.f. 1.07.2015

Total amount approved: Rs, 11,85,000/-

Total Grant Received: Rs, 8,93,253/-

Achievements of the project

- Zinc fortified functional goat milk yoghurt was prepared which can be very useful for combating zinc deficiency in India.
- Yoghurt was acceptable from sensory throughout the 15 days storage period
- Yoghurt with 7.0 ppm of Zn^{2+}presents the shortest fermentation time (<4 h).

Summary of the findings

In the present UGC major research project entitled **"**Development of functional fermented dairy products with zinc fortified milk (F.No 43-381/2014(SR) an initial investigation of using different Zn^{2+} concentration to evaluate acidification, the fermentation time, pH and the viable counts of bacteria of fermented milk during fermentation were studied. Fermented milk with 6.0 and 7.0 ppm of Zn^{2+}presents the shortest fermentation time (<4 h) compared with other samples (more than 4 h) except that of the control and sample with 1 ppm of Zn^{2+} (5 h). Among all fermented milk samples, the counts of *S. thermophiles* and *L. bulgaricus* were significantly highest in the addition of 7.0 ppm of Zn^{2+}. Zinc at the concentration of 1.0 ppm had no significant difference compared to the control sample in fermentation time and viable count of *S. thermophillus* and *L. bulgaricus.*

The physiochemical and microbiological characteristics of yoghurt prepared from zinc fortified goat milk was performed. Zinc fortified goat milk yoghurt had percentages of fat (5.33±0.01), protein (3.88±0.01), whey separation (9.92±0.02), total solid (13.88±0.01) and acidity (0.92±0.01), lactose (3.03±0.02), ash (0.72±0.01) and pH (4.24±0.01) percentages. The storage period for zinc fortified goat milk yoghurt had a significant effect ($p \leq 0.05$) on FFA value, whey separation, acidity, coliform, yeast and mold, total lactic acid bacteria count and sensory parameters of yoghurts. Significant increase was observed in free fatty acid value, acidity and whey separation, while the lactic acid bacteria count was observed to be decreasing significantly during refrigeration storage 15 days in zinc fortified goat milk yoghurt. Sensory scores of the yoghurt prepared from goat were significantly ($p<0.05$) affected during the storage period (Table 4). Zinc fortified goat milk yoghurt sensory scores during storage study followed linear trend and highest scores were observed in flavor, mouthfeel, texture on the initial day while least scores were observed on the 10^{th} day of storage. Also least scores on initial day were observed in colour and appearance, whey syneresis, overall acceptability while highest scores were observed for these parameters on the 10^{th} day of storage. Storage period of zinc fortified goat milk yoghurt did not affect the flavour score significantly. Overall acceptability scores were increased significantly in zinc fortified zinc fortified goat milk yoghurt from (6.85±0.30) at initial day of storage to (7.21±0.25) on 10^{th} day of storage. However, yoghurt was acceptable from sensory throughout the storage period. It seems clear that the prevention of zinc deficiency among young children remains the best policy, not only on moral ground, but also on economic ones. These results of present study will contribute a great deal of work to find an adequate way to prevent zinc deficiency via fermented milk.