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A pH-Sensor Based Approach for Rapid Milk Adulteration Detection

Milk adulteration is a pervasive concern that adversely affects progressing countries like India. The addition of adultrants like glucose, caustic soda, refined vegetable oil, common detergent, etc into the milk lowers its nutritious value thereby posing a risk to health. Hence it is very important to test the purity of milk before consumption as synthetic milk and pure milk appear the same and have the same taste.

This paper presents a pH-sensor-based approach designed for rapid and reliable detection of milk adulteration. The system utilizes a pH sensor integrated with an automated detection algorithm to assess the pH levels of milk samples. The pH readings are compared against established pH profiles for pure and adulterated milk, allowing for quick identification of adulterants such as water, milk powder, and detergents. Experimental results demonstrate the efficacy of the pH-sensor system in accurately detecting milk adulteration within seconds, providing a cost-effective and real-time solution for quality assurance in the dairy industry. Preliminary findings demonstrate the effectiveness of the pH sensor in detecting milk adulteration. Adulterated milk samples consistently exhibit distinct voltage variations compared to pure milk, indicating the presence of adulterants. The pH sensor sensitivity enables the detection of even minute concentrations of adulterants, enhancing the accuracy and reliability of the method.

This proposed detection method offers several advantages over traditional techniques. It provides a rapid analysis process, requiring minimal sample preparation and reducing testing time. The simplicity and affordability of pH sensors make them suitable for widespread implementation. The initial findings demonstrate the sensor's effectiveness in identifying adulterants based on voltage variation in milk samples. Further research and validation are necessary to establish the method's accuracy, robustness, and feasibility for integration into quality control practices within the dairy industry.

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