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Paper Title:	Microfluidic device for detection of Somatic cells by Spectroscopy Technique
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Abstract

Mastitis is a microbial infection caused by pathogenic bacteria. White blood cells in raw milk, also known as the somatic cell count, increase in cows, goats, sheep, camels, buffalo, and other animals as part of their immune response to fight infection. The somatic cell count serves as an indicator of milk safety and quality, directly impacting farmers' income. Generally, an uninfected cow has a somatic cell count of less than 100,000 cells per milliliter, while a cow infected with major pathogens has a count exceeding 250,000 cells per milliliter. Therefore, monitoring the somatic cell count in milk is essential to prevent the spread of mastitis. The common method used by farmers is the California Mastitis Test (CMT), which has an error rate of over 40%, significantly contributing to the ongoing spread of mastitis. A new microfluidic device has been developed to detect mastitis, classifying the disease into three states: normal, latent, and severe. This device provides accurate analysis results within seconds and was designed and fabricated using X-ray lithography and synchrotron light techniques. It is intended for somatic cell screening and enhances the staining process for single-cell analysis by utilizing fluorescence to detect the infection status in milk. The analysis is performed using a small-scale spectrometer with a 95% accuracy rate to determine the infection status. Additionally, the infection can be detected using the PCR technique, which indicates the infection status based on the somatic cell count. This innovative microfluidic device is expected to help reduce the spread of mastitis in dairy cows.
