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## New analytical techniques for assessing proteolysis in UHT milk

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Proteolysis during the storage of the ultra-high temperature (UHT) treated milk is one of the major causes which limits its shelf-life. Proteolysis leads to development of bitter flavor and formation of a gel during storage of UHT milk due to activation of enzymes like plasmin and heat resistant protease produced by bacteria. The study was aimed to investigate the suitability of Fourier Transform Infrared Spectroscopy (FTIR) as a rapid technique to assess the proteolysis in UHT milk in comparison with RP-HPLC. The commercially obtained UHT milk samples were stored at 5°C and 30°C and analyzed for four months. The milk samples were treated with 6% TCA to obtain milk extract containing peptides followed by their vacuum concentration. The concentrated extract was applied on FTIR and spectrum was obtained from 400-4700 cm<sup>-1</sup> wavenumber. PCA was carried out in the spectral range 1500-750 cm<sup>-1</sup>. As the storage period increased the sample moved from 1st quadrant to the 2<sup>nd</sup> quadrant in correlation circle indicating a significant change in the absorbance in the said spectral range. This increased in absorbance can be attributed to formation of peptides formed in UHT milk during proteolysis. RP-HPLC, TNBS and fluorescamine method were also performed to validate the FTIR method. The comparison of FTIR spectral data with RP-HPLC chromatograph and increased absorbance in TNBS and fluorescamine method showed correlation for assessment of proteolysis in the UHT milk samples. The milk sample stored at 30°C showed more proteolysis as compared to the sample stored at 5°C. Present study indicated that FTIR based rapid and convenient method can be used as an alternative to available methods for assessing proteolysis in UHT milk.

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