

ATTACHMENT-23

RAPID METHOD FOR MONITORING PROTEOLYSIS IN FERMENTED DAIRY FOODS X.Q. CHEN, W. Lear, and M.A. Drake, Dept. Food Science & Technology, Mississippi State University, Mississippi State, MS 39762-9805

JUSTIFICATION: Proteolysis is a critical event in the development of flavor and texture of cheeses. Proteolytic activity is often monitored in cheeses to follow and characterize the ripening process. In addition, lactic cultures exhibit different rates of proteolytic activity. The proteolytic activity of lactic cultures is important information for determining appropriate application in dairy foods. Current chemical methods for assessing proteolytic activity in cheeses and lactic cultures are time-consuming and tedious.

OBJECTIVES: The objectives of this study were to determine the feasibility of using a semi-automated dye-binding assay to rapidly monitor proteolysis in cheeses and lactic cultures.

METHODS: Three types of cheese (Cheddar, Swiss, reduced fat Cheddar) were made in duplicate batches and sampled for proteolysis bimonthly through 9 months aging. Twelve strains of lactic acid bacteria were grown in sterile skim milk and sampled for proteolysis every 8 hours through 48 hours. Bacterial counts and pH of the fermented milks were also determined. Proteolysis was monitored using a lithium-ninhydrin assay as a chemical reference method and using semi-automated dye-binding with acid orange 12. All assays were performed in triplicate.

RESULTS: Rates of proteolysis were linear for cheeses and lactic cultures using the ninhydrin assay, and proteolytic rates were different among the samples ($P < 0.05$). The dye-binding assay was inversely correlated with the ninhydrin assay through 9 months aging of the cheeses ($r = -0.92$). For lactic cultures, the dye-binding assay was inversely correlated with the ninhydrin assay through 24 hours ($r = -0.89$).

SIGNIFICANCE: Semi-automated dye-binding can be used as a rapid and easy alternative method to time-consuming proteolysis assays.