

1587 Use of Capillary Electrophoresis (CE) to determine metabolic organic acids in milk. Jesus M. Izco*¹, Monica Tormo¹, and Rafael Jimenez-Flores¹, ¹*Dairy Products Technology Center, Cal Poly.*

The aim of this work is to optimize a CE method for the simultaneous determination of eleven metabolically important organic acids (oxalic, citric, formic, succinic, orotic, uric, pyruvic, acetic, propionic, lactic and butyric). This method was tested to evaluate carbohydrate catabolism in lactic acid bacteria and *Bacillus* spp. Organic acids have little or no UV absorbance, thus indirect UV detection is necessary. Also, a surfactant was used to avoid electroosmotic flow. The separation was carried out on an uncoated capillary (110 cm, 75 μ m I.D.) at 20kV for 18 min. Running buffer was tested at different pH values between 5.0 and 12.0. Addition of methanol was tested to improve the separation. Sterilized permeate obtained from skim milk, was inoculated with spores from 4 different strains (*B. licheniformis* 12759 and DPTC bacillus strains 14580, SL3 and CL6) and incubated at 40C in the BactiAlertTM System until detection by the sensor. Sample preparation consisted on treating 1 ml of permeate samples with sulfuric acid 4.5 mM, containing 15 ppm of boric acid as internal standard. Also, yogurt organic acids were analyzed in order to test the versatility of the technique. Good separation for all organic acids was achieved, except for pyruvic and acetic acids, which migrated as a single peak. Linearity was established between 2 and 100 ppm for most of them, with R² values between 0.97 and 0.99. Citric, succinic, orotic, pyruvic-acetic, propionic and lactic acids were detected and quantified in all of the permeate samples. Values of 85031, 557, 778, 783, 4810 and 1365 ppm respectively were found in sterilized permeate. Depending on the strain, different profiles have been defined. In the case of *B. licheniformis* 12759, the peak area of most organic acids was reduced, indicating a different metabolism. In yogurt, this test showed no presence of butyric acid, the lactic acid peak prevented quantification of propionic acid, and the rest of them were quantified successfully. The proposed method is useful to analyze the metabolism of different bacteria grown in milk substrates giving us a rapid tool to evaluate the quality of dairy products during manufacturing and storage.

Key Words: Organic acids, Capillary Electrophoresis, Dairy products