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How acoustic emissions technology will impact microbiology

A coustic emissions (AE) generated by three strains of *Escherichia coli* (5024-parent, 8279-mutant and 8279-random/ unrelated) and *Lactococcus lactis* ssp. lactis C2 infected with three bacteriophages (c2, sk1, and ml3; infected at 90 min) will be overviewed to demonstrate the sensitivity and accuracy of this technique. An acoustic sensor with an optimum range between 35-100 kHz was inserted into the growth vessel to capture AE data. *E. coli* were used to determine if the AE technique could be used to differentiate closely related strains while *L. lactis* bacteriophage infections were used to determine if AE techniques could track host stress and infection cycles. AE data was collected for Absolute Energy (ABE), Peak Frequency (PF) and Centroid Frequency (CF). When the CF for the parent and mutant *E. coli* strains were analyzed at 5 kHz intervals 14 areas within the frequency pattern were significantly different and almost all patterns were different for the 8279 strain suggesting that AE could be a powerful tool in identifying microorganism strains that were closely related. When the *L. lactis* host was infected with bacteriophage ml3, sk1 or c2, sufficient differences in ABE, CF and PF occurred, allowing for the identification of the bacteriophage and tracking of the infection cycles. The AE data suggested that bacteriophage sk1 and c2 caused greater stress on the host, *lactis* C2, than bacteriophage ml3. After infection, when the bacteriophage replication began, the AE information being emitted increased significantly from that of normal host activity.

Biography

Clair L Hicks has completed his PhD at University of Wisconsin, USA in 1974 and began his Research and Teaching career at University of Kentucky. He has served as Commodity Leader for the Food Science Faculty and as their Director of Undergraduate Studies. He has published more than 73 refereed papers and 127 abstracts. He has served as a Board Member for the American Dairy Science Association and for the Institute of Food Technologist Bluegrass Section. He has also served as Board Member and Chair of the Editorial Board for the *Journal of Dairy Science*.

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