

W86 Lipid binding characterization of lactic acid bacteria in dairy products. D. Bachiero*, S. Uson III, and R. Jimenez-Flores, *California Polytechnic State University, San Luis Obispo.*

Probiotic bacteria are defined as a supplement that provides well being to the consumer when they are live and active. These microorganisms have gained more attention because of their known health benefits such as gastrointestinal health, enhancement of the immune system and their ability to inhibit pathogenic bacteria. However, there is still disagreement in defining their mechanisms of activity as well as methods of assessing them. An important limitation is the lack of knowledge regarding the nature in which these bacteria interact and bind in the gut as well as in the dairy system. Many studies have focused on the protein binding properties while the binding to lipids has been poorly studied. We focused on developing an assay that gives a quantitative measurement of lactic acid bacteria's (LAB) affinity to bind to various lipids found in dairy foods. LAB strains used in this study were genetically characterized, isolated and typed using pulse field electrophoresis. Cells were used in their exponential phase of growth for the experiments. An immunoblotting technique was used as a quantitative measurement of bacteria's binding to various lipids from milk or buttermilk. Extracted lipids were separated on a TLC silica membrane, blotted on to PDF membranes and then exposed to biotinylated bacteria, to observe binding affinity. The bacteria/lipid interaction was measured using Avidin-HRP and Diaminobenzidine for a visual color reaction. We found two types of lipid binding: non-specific binding to triglycerides (non-polar lipids), in which the lipid concentration was the significant variable, and strain specific binding to phospholipids (polar lipids), where regardless of composition, each strain showed specific binding affinity. More importantly, these results show the specificity of binding as the direct result of the degree of processing of the dairy product. Those powders undergoing supercritical fluid extraction showed an increase in binding to phospholipids. These results will help in the design and formulation of dairy foods containing probiotic strains thus optimizing the bacteria's beneficial effects on health.

Key Words: Lactic Acid Bacteria, Binding, Lipids