

Employ the native microbiota of Ecuadorian “Amazonia” tropical rainforest as reservoir of microorganism’s with possible biotechnological applications

The Amazon tropical forest is the Earth’s largest reservoir of plant, animals and bacterial diversity. According to the new territorial redistribution several zones of Ecuador known as “undeveloped natural areas” were included in the governmental policy as important resources to be considered as new source of microorganisms with possible biotechnological characteristics to be investigated. Among them, tropical wild-type fruits draw our attention from nutritional or medical point of view as the consumption is limited to the local tribes; however, the bacterial microbiota of those fruits is not well investigated. It is believed that the microorganisms from this region might provide a newly source of functional compounds to be exploited industrially. In addition, in Ecuador considerable human illness related to food contaminants such as *salmonellosis* y *shigellosis* were reported by the Ministry of Public Health. Most artisanal minimally processed foods, typical dishes (i.e. mote) and natural fruit or cereals fermented drinks (i.e. chicha), maintained in defective storage conditions or manipulated incorrectly appears to pose significant number of pathogens, therefore the risk of developing diseases is elevated. *Might be a cultural habit or inappropriate manipulation of products?* Consequently, an increasing attention at policymaker’s level was assumed to increase the control and protection of consumer by preventing contamination, improving communication about safety with producers, packers, processors and distributors by facilitating relevant research on food preservation.

For more than a decade, lactic acid bacteria (LAB) attracted significant attention for food industry due to their GRAS status (Generally Considered as Safe). Therefore, we proposed a large scale study with regards to the selection and characterization of novel LAB species isolated from wild-type fruits collected from different regions of tropical rainforest and exploited their valuable functional properties for further application in food industry. The study has been published in September 2016 in the journal *Revista Argentina de Microbiologia* and was the first report describing the presence of LAB with probiotic potential and antagonistic activity isolated from native biota of Ecuador. The selected strains resists in acidic conditions, in the presence of bile, grew at temperature ranges from 15-45°C and different concentration of sodium chloride, showed different antibiotic profile as well as antimicrobial activity against pathogenic bacteria.

Could those selected lactic acid bacteria be a solution for natural food preservation? Yes, due to the presence of antimicrobial compounds (bacteriocin-like substances).

Therefore, in the search of new food preservatives to control the growth of microbial spoilage in foods we evaluated the inhibitory activity of several selected LAB strains towards *Salmonella enterica* subsp. *enterica*, *E. coli*, *Shigella sonnei*, *Staphylococcus aureus*, property commonly associated with the prolongation of its shelf life. We showed that the active synthesized components released in the neutralized and hydroxide peroxide eliminated in the cell crude extract

were of proteinaceous nature, activated by acidic conditions, ionic and anionic substances, as well as stable upon exposure to high heat and different ranges of sodium chloride (4-10%). Moreover, we showed that the active peptides of some bacteriocins contrast effectively, in a bactericidal manner, the growth of food borne pathogens *E. coli* and *Salmonella* found in the local foods at the early stage of the target cell growth. When applying crude extract containing bacteriocin to artisanal contaminated beverages a significant reduction of pathogens was observed demonstrating the efficacy on controlling the pathogenic growth *in vivo* (unpublished).

This research offers the advantage of discovering the functional properties of native microorganisms for further develop new strategies to control the pathogen growth as overall good manufacturing practice to ensure an adequate safety and desired quality of food product.

Gabriela N. Tenea, Ana B. Benavidez, Mario Ulcuango, Lucía Yépez
*Faculty of Engineering in Agricultural and Environmental Sciences,
Technical University of the North, Ibarra, Ecuador*

Publication

[Assessment of the in vitro bioactive properties of lactic acid bacteria isolated from native ecological niches of Ecuador.](#)

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