

Culturable Microbial Diversity of Agave Artisanal Fermentations from Central Mexico

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Abstract : Agave atrovirens is the main source of agave sap, the raw material for the production of pulque, an artisanal fermented beverage, traditional since prehispanic times in the highlands of central Mexico. Agave sap is rich in glucose, sucrose and fructooligosaccharides, and strongly differs from agave syrup from A. tequilana, which is mostly a high molecular weight fructan. Agave sap is converted into pulque by a highly diverse microbial community which includes bacteria, yeast and even filamentous fungi. The bacterial diversity has been recently studied. But the composition of consortia derived from directed enrichments differs sharply from the whole fermentative consortium. Using classical microbiology methods, and selective liquid and solid media formulations, either bacterial or fungal consortia were developed and analyzed. Bacterial consortia able to catabolize specific prebiotic saccharides were selected and preserved for future developments. Different media formulations, selective for bacterial genera such as Bifidobacterium, Lactobacillus, Pediococcus, Lactococcus and Enterococcus were also used. For yeast, specific media, osmotic pressure and unique carbon sources were used as selective agents. Results show that most groups are represented in the enrichment cultures; although very few are recoverable from the whole consortium in artisanal pulque. Diversity and abundance vary among consortia. Potential bacterial probiotics obtained from agave sap and agave juices show tolerance to hydrochloric acid, as well as strong antimicrobial activity.

Keywords : Agave, pulque, microbial consortia, prebiotic activity

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