Monika Coton et al., Virol Mycol 2016, 5:2(Suppl)
http://dx.doi.org/10.4172/2161-0517.C1.012

Microbial ecology of Kombucha fermentation assessed by next generation sequencing and culture dependent methods

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Kombucha microbial biodiversity and community dynamics were determined on both pellicle and tea samples during industrial scale fermentations by combining culture dependent and independent methods (Illumina sequencing). High yeast and bacterial species diversity was observed with dominant bacterial species belonging to *Acetobacteriaceae* and to a lesser extent *Lactobacteriaceae* while the main yeasts were *Dekkera, Zygosaccharomyces* and *Hanseniaspora* genera members. In particular numerous acetic acid bacterial (AAB) species were identified while only 2 main lactic acid bacterial (LAB) species were observed including *Oenococcus oeni*, a well-known species involved in malolactic fermentations in fermented alcoholic beverages. Numerous yeast species were also identified in samples with most dominant species being *Brettanomyces bruxellensis*, *B. anomala* and *Zygosaccharomyces bailli*. Noteworthy, culture dependent and independent method results were highly correlated. Interestingly, some species such as *B. bruxellensis/anomala* have been regularly associated in the literature with fermented beverage spoilage (i.e., excess volatile phenol production in wine, cider) while in Kombucha, they can be considered as key species involved in fermentation and final product quality. The main yeast and AAB species are involved in alcoholic fermentation (ethanol and CO_2 production) and organic acid (mainly acetic and lactic acids are produced from ethanol or sucrose) production respectively while the roles of some minor species (i.e., *Wickerrhamomyces anomalus*, *Candida boidinii*, *Pichia membranefaciens*) on the final fermented product is less clear. Tea (green or black) type did influence microbial community equilibrium and biodiversity although microbial counts were quite similar. The final fermented products were both acceptable from a sensorial point of view (odour, color, taste) and microbial load.

Biography

Monika Coton has obtained her PhD from the University of Caen Basse-Normandiein, France, where she was trained as a Molecular Microbiologist. Since 2011, she works as an Assistant Professor at the Université de Bretagne Occidentale and teaches Food Processing Technologies, Food Microbiology and Biotechnology at the "Ecole Supérieured' Ingénieurs Agro-alimentaires de Bretagneatlantique" (ESIAB). Her research mainly focuses on the structural and functional diversity of filamentous fungi in fermented food products (dairy, beverages etc) in the "Laboratoire Universitaire de Biodiversitéetd' Ecologie Microbienne" (Brittany, France). She has published more than 40 papers in reputed journals.

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