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Traditional date vinegar: Microbiota, chemical characterization, and an insight into starter culture production: An original Study

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Statement of the problem: The indigenous microbiota, quality, and safety of traditional date vinegar is not well presented in the literature and its production takes a long time following the traditional methods. Understanding date vinegar microbiota is important for the industrial development of this product.

Methodology & amp; theoretical orientation: Microbiological and chemical analyses were done for forty home-made samples (HMS) and laboratory-made samples (LMS) of date vinegar. To evaluate the hygienic quality, E. coli, coliforms, and Enterobacteriaceae were enumerated. Acetic acid, ethanol, and methanol contents were analysed by headspace gas chromatography. Moreover, a starter culture was formulated from the isolated acetic acid bacteria (AAB) and yeast and tested for their efficiency to produce date vinegar in a shorter time.

Findings/Results: Coliforms and Enterobacteriaceae occurred in 75 and 67% of HMS, respectively, and in 3.6% (both groups) of LMS while E. coli was not detected in any sample. The LMS had better hygienic quality and supported better growth of yeasts and AAB than the HMS. Thirty-five yeasts belonged to six genera and 55 acetic acid bacteria (AAB) to five Gluconobacter species (identified by a polymerase chain reaction). The percentage of acetic acid was less than the international recommended standard levels and ranged from 0.09 to 3.38%, and 0.03 to 3.46% in HMS, and LMS, respectively. The content of ethanol ranged from 0.14 to 2.17%, and 0.07 to 7.81% in HMS, and LMS, respectively. Methanol was less in LMS (≤ 0.06%) than in HMS (≤ 0.17%) and its level in some samples exceeded the standard levels. The highest concentrations of acetic acid were 4.67% attained with the starter culture (DC3, DC4, BC1 and Y9) and 3.62% achieved with starter culture (A5, A7, A32, BC1, DC3, DC4, and Y9) in the fourth day of the fermentation time.

Conclusion: Utilizing the traditional method for producing date vinegar does not assure the production of true and safe vinegar that contains the specified levels of acetic acid and ethanol. It may also contain unacceptable levels of the toxic chemical methanol. The highest amount of acetic acid (4.67%) produced after 4 days' fermentation is acceptable and can provide the basis for producing a commercial product (starter culture) ready for use by both industry and local producers that ensures production of a good-quality date vinegar in an easier, faster, safer, and efficient way. It also may provide a beneficial usage for the low quality and the surplus dates.

Biography

Zahra S. Al-Kharousi is an Assistant Professor in the Department of Food Science and Nutrition in the College of Agricultural and Marine Sciences, Sultan Qaboos University, Oman. Her research fields of interest include food safety and quality, antibiotic resistance, antimicrobial activity of medicinal plants, and antimicrobial peptides. She published 12 scientific papers in peer-reviewed international scientific journals and contributed too many conferences.