E329

Identification of microorganisms of irrigation water samples with MALDI-TOF MS

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Consumption of raw vegetables and fruits were responsible for several food-borne illnesses worldwide in the past decades. The sources of the microbial hazards could be traced back to the irrigation water. To prevent the illnesses and minimise the economic losses we have to ensure safe foods to consumers. To do this we need to gain as much knowledge as possible on the microbial ecosystem in the irrigation water. The aim of our study was to identify microbes isolated from irrigation water with MALDI-TOF MS. MALDI-TOF MS technique is widely used to identify microorganisms from different matrices. This technology generates characteristic mass spectral fingerprints, unique signatures for each microorganism, to support microbial identification. In this study several irrigation water samples from different regions in Hungary were collected and examined. The identified microbes contain mostly Gram-positive (25) and -negative (18) different bacterial species and Fungi (1). The mostly recognized Gram-negative bacteria include different Pseudomonas strains, Gram-positive bacteria contain different Bacillus strains. Some potential pathogens were also detected: Staphylococcus epidermidis, Bacillus cereus, Chryseobacterium gleum. During the detection we recognised some limitations of MALDI-TOF MS, which requires more development. Among them essential would be to expand the database with environmental bacteria, yeast and fungi isolates.

E330

Impact of heat treatment and flavourings on tea antioxidant capacity

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The benefits of tea and its high antioxidant capacity are well known, but the effect of flavouring materials has been less studied. Some like it neat, others like honey add sweeteners or lemon or both. These add extra antioxidants to the drink which can interact with each other, the global result being also affected by the temperature of the water. The research presented focuses on the combined effect of heat and flavourings (acacia and honeydew honeys, lemon juice) on the total polyphenol, total flavonoid content and antioxidant capacity of black and green teas. In vitro assays (Folin-Ciocalteu, CUPRAC, total flavonoid assay, enzymatic ascorbic acid determination) were used to track the changes. For statistical analysis descriptive statistics and analysis of variance were used. In many cases higher antioxidant capacity was obtained at 80°C, which can be explained by the Maillard reaction products. Tea prepared with honeydew has significantly higher antioxidant capacity than the tea with acacia honey. Surprisingly, addition of lemon decreased the antioxidant capacity of tea with honey. No synergies were confirmed in any of the compositions investigated. Vitamin C content of lemon in the tea was reduced by approximately half; its level wasn't affected by the presence of honey.