“Graviera Naxou and Graviera Kritis Greek PDO cheeses: Discrimination based on microbiological and physicochemical criteria and volatile organic compounds profile”

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\textbf{ABSTRACT}

The purpose of the present investigation was to study the microbiological and physicochemical characteristics of Graviera cheese from raw milk. Graviera Naxou and Graviera Kritis, made in each of the respective islands, in order to discriminate those two types of cheeses. Totally, 103 Non Starter Lactic Acid Bacteria (NSLAB) isolates were obtained from fresh cheeses and after grouping by SDS-PAGE, selected strains were identified by 16S rRNA gene sequencing analysis. In Graviera Naxou leuconostocs and \textit{Lactobacillus brevis} predominated. In Graviera Kritis lactococci predominated while enterococci and leuconostocs constituted a significant part. Mature Graviera Kritis cheeses had lower ($P<0.05$) moisture, salt-in-moisture, aminoacid content and caseins (CN) degradation. NSLAB from Graviera Naxou had stronger mean acidifying ability at 24 h than Kritis’s, exhibited higher proteolysis, but lower antagonistic activity against undesirable bacteria. The profile of total microbiota by Denaturing Gradient Gel Electrophoresis (DGGE-PCR) suggested differences in the cheeses of the two islands, while profiles of NSLAB were more similar PCR suggested positioning and evolution. Each island had its own volatile organic compounds (VOCs) profile. Acids, esters and alcohols were the most abundant groups of VOCs. There were compounds common for both cheese types and others discriminant for each area. There were also common terpenes between pasture samples and the cheeses. The overall findings indicate that Graviera Naxou and Kritis cheeses differ considerably in respect of microbiological and physicochemical criteria, as well as VOCs content.

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