Microbiome of Artisanal Cheeses from South Africa

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Abstract

Artisanal cheeses are produced by hand and using mainly traditional techniques. As such, the microbiome of artisanal cheeses is especially diverse with the metagenomics dependent on several biotic and abiotic factors including microbiota population, pH, water activity, moisture content and salt content of the cheese matrix. Artisanal cheese metagenomics is also influenced by environmental conditions and including location of aging. Overall, the artisanal cheese microbiome has significant effects on flavour and textural properties. This study assessed the metagenomic profile of select artisanal cheeses of cow and goat milk origin using next generation sequencing techniques.

Metagenomic analysis was undertaken using the Illumina platform initially by 16S amplicon sequencing and subsequently by Shotgun metagenomics. Prior, DNA extraction was undertaken by ZymoBIOMICSTM DNA Miniprep kit, with 16S rRNA amplicon sequencing utilising primers targeting the V4 variable region. PCR was undertaken using the HotStarTaq Plus Master Mix kit under specified conditions.

The pH and water activity of the select artisanal cheeses ranged from 4.56 – 5.85 and 0.87 – 0.95 respectively. Taxonomic diversity and relative abundance of 16S rRNA amplicon sequencing associated with the artisanal cheeses indicated Lactococcus and Leuconostoc as the most abundant bacterial genera, together accounting for ~98.5%. Lactococcus and Leuconostoc genera play an important role in casein breakdown, texture and flavour formation during cheese making. Genera belonging to Acinetobacter, readily found in soil, and related to aromatic compounds was identified in one sample. The 16S rRNA amplicon sequencing did not provide reliable data at the specie level and as such the ePoster will concentrate on Shotgun metagenomics data which gives evidence of species diversity and abundance.

The microbiome of artisanal cheeses provides the typical microbiota associated with individual cheese types and could play a significant role in producing artisanal cheeses with specific textural and flavour properties with subsequent implications to safety and quality.

Keywords: Microbiome, Artisanal cheese, cheese safety and quality, metagenomics

Biography: Anja Steyn

Anja Steyn is currently a BScHons student in the field of Food Science at the University of Pretoria. I am doing my research in the field of food microbiology under supervision of Dr. Rodney Owuso-Darko. Anja is interested in doing product development post-graduation. Her hobbies include cooking, baking, jogging, dancing and singing which she thoroughly enjoys. Anja's vision is to change the misperception which many consumers have about healthy and nutritious foods. She looks forward to furthering her studies in the field and would also like to broaden her knowledge on nutrition. Anja is currently a member of SAAFoST and very excited for the opportunity to present her first research poster in this years' Congress.