



The Determination of the Spoilage Characteristics of *Chryseobacterium* Species Isolated from Fish

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Abstract

Introduction: Fresh fish spoils fast due to being an outstanding growth medium for a majority of microorganisms as it contains essential nutrients. Several bacterial isolates belonging to the genus *Chryseobacterium* were previously isolated from fish. However, their spoilage potential was unknown. This study therefore determined their spoilage characteristics by using the BIOLOG™ system, sensory and GC/MS analysis.

Methodology: Eleven *Chryseobacterium* fish isolates were used in this study. *Chryseobacterium balustinum*, *C. piscium* and *C. gleum* were the reference strains. Oxidation of carbon sources by the strains was profiled using the BIOLOG™ system. Headspace (HS) solid phase micro-extraction (SPME) gas chromatography/mass spectrometry (GC/MS) was used for volatile compound analysis (Marsili 1999). Sensory analysis was performed on the odour production by the strains using 10 semi-trained panellists.

Results and Discussion: Thirty-one carbon sources in the BIOLOG™ system made it possible to differentiate between the *Chryseobacterium* strains. Strains SH 23-4 and SH 11-4(b) utilised most carbon sources (25/31), indicating that these species have the potential to cause more pronounced types of spoilage compared to the other test species. No significant differences were observed in terms of odour production during sensory analysis, but odours such as smelly feet, cabbage-like, fruity, sour and putrid-sewage were noted for the 11 *Chryseobacterium* isolates from fish and their reference strains. A total of 87 volatile compounds were detected by GC/MS. The most detected volatile compounds were 2-ethyl-1-hexanol, indole, dimethyl disulphide, and 2-phenylethanol. The detected volatile compounds were most prevalent in *C. gleum*, *C. piscium* and strain SH 30-1.

Conclusion: Sensory analysis and GC/MS were useful in estimating the spoilage potential of the *Chryseobacterium* species. The BIOLOG™ system can be used as an effective screening method for identifying the carbon sources utilised by the *Chryseobacterium* species which could then be investigated further for their potential to produce food spoilage characteristics. *Chryseobacterium* species used in this study have the potential to spoil fish and fish products because of their ability to oxidize a wide range of carbohydrates and produce off-odours (volatile compounds).

Biography: Lydia Gavu

Lydia is a focused and dedicated Food Science graduate with an MSc degree, specializing in Food Microbiology. She possesses relevant microbiological lab experience gained during her studies with a few lab-assistant jobs. Currently studying towards a Food Science PhD degree, which will provide professional experience and opportunities for progression. Lydia has extensive coursework in Microbiology and Food Science, and this enabled her to develop a strong passion for microbiology and food science. Lydia majored in Food Science for her Honours degree in 2017 and during this time she developed a particular interest in the relationship between microorganisms and food. The aim of her project was to determine the effect of temperature growth kinetics of *Chryseobacterium* species isolated from food and to determine how different growth patterns can affect the spoilage potential of the organism.