POTENTIAL OF VIS-NIR SPECTROSCOPY TO PREDICT PERCEIVED 'MUDDY' TAINT IN AUSTRALIAN FARMED BARRAMUNDI

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Sensory analysis of food involves the measurement, interpretation and understanding of human responses to the properties of food perceived by the senses such as sight, smell, and taste (Cozzolino et al. 2005). It is important to have a quantitative means for assessing sensory properties in a reasonable way, to enable the food industry to rapidly respond to the changing demands of both consumers and the market. Aroma and flavour are among the most important properties for the consumer, and numerous studies have been performed in attempts to find correlations between sensory qualities and objective instrumental measurements. Rapid instrumental methods such as near infrared spectroscopy (NIR) might be advantageous to predict quality of different foods and agricultural products due to the speed of analysis, minimum sample preparation and low cost. The advantages of such technologies is not only to assess chemical structures but also to build an spectrum, characteristic of the sample, which behaves as a "finger print" of the sample.

Farmed barramundi (*Lates calcarifer*) can take on a 'muddy' or 'earthy' flavour, which is perceivable in the cooked fillet and is often considered undesirable by both producers and consumers. The 'muddy' taint is thought to arise due to a build up of naturally occurring geosmin and 2-methylisoborneol (MIB) in the water, which translates to higher levels in the fish flesh. The aim of this study was to explore the potential of visible (VIS) and near infrared (NIR) spectroscopy to predict the 'muddy' taint of Australian farmed barramundi fish. Fish samples were analysed by descriptive sensory techniques, where ten trained sensory panellists rated a number of defined sensory attributes for 74 cooked fish samples on an unstructured line scale (0 – 100) anchored from 'none' to 'high'. The fish had undergone a number of different treatments where a range of perceived 'muddy' flavour levels were observed. Raw fish fillets from each of the treatments were scanned by VIS-NIR in reflectance mode (400 - 2500 nm) (FossNIRSystems 6500) using a rectangular cell. Partial Least Squares regression models were developed between descriptive sensory and VIS-NIRS data using cross validation (The Unscrambler, version 7.8, CAMO ASA, Oslo, Norway). Satisfactory predictions were observed for a number of the sensory attributes rated including 'muddy/earthy aroma' (R_{cal} = 0.54, SECV = 3.2), 'fresh flavour' (R_{cal} = 0.73, SECV = 4.7), 'muddy/earthy flavour' (R_{cal} = 0.73, SECV = 5.0) and 'muddy aftertaste' (R_{cal} = 0.60, SECV = 3.7). This study demonstrates that VIS-NIR offers potential as a non-destructive, rapid technique for determination of undesirable 'muddy' taint in Australian farmed barramundi.

REFERENCES

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