Abstract

Determination of shell fraction in krill meat

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Introduction

Krill is a shrimp-like marine animal living in the oceans world-wide that has gained interest as a fish meal replacer in feed for fish, as well as healthy food additive for humans. A limitation for use of krill in European fish feeds has been EU's restriction on fluoride (F) level in feed. The F is mainly located in the exoskeleton of the krill. Moreover, the exoskeleton contains high concentration of chitin which is associated with reduced growth as well as reduced digestibility of amino acids and fat in salmonids. The aim of the present study was therefore to investigate if NIR can be used to determine the shell fraction in de-shelled krill meat.

Materials and Methods

A mixture design was used to mix 37 samples (in duplicate) containing a constant portion of de-shelled krill meat added shell, water and oil in the range from 0 to 10 weight-%. The krill meat (de-shelled krill extruded into pellets) was produced on a fishing ship, and the krill shell fraction was produced at the Norwegian University of Life Sciences by technologies proprietary to Krillsea Group AS. The meat pellets and shells were ground to 1 mm prior to mixing. The samples were analysed on an NIR spectrophotometer (DA 7200 Perten Instruments AB, Segeltorp, Sweden). The NIR spectra was analysed using the statistical software Unscrambler (Camo, Oslo, Norway).

Results and Discussion

Test set validation gave partial least square (PLS) regression prediction errors, expressed as root mean square errors (RMSEP) of 0.83, 0.64 and 0.69 weight-% for shell, oil and moisture, respectively. Due to some bias the bias adjusted standard error of performance (SEP) was somewhat lower, 0.71, 0.64 and 0.69 weight-% for shell, oil and moisture, respectively. The test set validation resulted in correlation coefficients (r) of 0.98 for all three constituents.

Conclusion

NIR prediction of added shell, oil and water to de-shelled krill meat gave good and satisfactory results for the studied model system.

Reference paper as:
M. Sørensen, I. Obucina, T. Storebakken, E. Rukke, O. Kraugerud and T. Isaksson (2012) Determination of shell fraction in krill meat (abstract), in: Proceedings of the 15th International Conference on Near Infrared Spectroscopy, Edited by M. Manley, C.M. McGoverin, D.B. Thomas and G. Downey, Cape Town, South Africa, p. 483.