

## Authentication of fish oil by NMR and FT-IR spectroscopy

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Due to their high contents of the health-promoting omega-3 fatty acids, fish oils are becoming increasingly popular as a dietary supplement and as animal feed. For economic reasons, fish oil may be adulterated with omega-3 fatty acids containing vegetable oils of lower quality and value. Consequently, there is a need for reliable authentication methods that can be used by authorities trying to detect food fraud as well as food/feed suppliers interested in protecting high quality products. In this work, <sup>1</sup>H NMR, <sup>13</sup>C NMR, and FT-IR spectroscopy were used in combination with multivariate statistics including *Artificial Neural Networks* and *Support Vector Regression* in order to detect adulteration of cod (*Gadidae*) liver oil with vegetable oils (rapeseed and sunflower oils). Moreover, fatty acid profiles were determined by GC-MS in order to compare the accuracy to detect adulteration levels with the spectroscopic techniques. High-field NMR spectroscopy has been used in the authentication of plant oils before [1,2], but no study has reported on its application in the context of fish oil adulteration and using *Artificial Neural Networks* or *Support Vector Regression*.

### Literature:

[1] T. Shi, M.T. Zhu, Y. Chen, X.L. Yan, Q. Chen, X.L. Wu, J. Lin, M. Xie, *Food Chem.* 2018, 242, 308–315. [2] A. Agiomyrgianaki, P.V. Petrakis, P. Dais, *Talanta* 2010, 80, 2165–2171.