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# NIRS discrimination of broiler rabbits fed with increasing levels of false flax (*Camelina sativa* L.) seeds in relationship to the fatty acid profiles

G. Masoero[1], G. Sala[1], G. Meineri[2], P. G. Peiretti[3]

[1] Istituto Sperimentale per la Zootecnia, Consiglio per la Ricerca e la Sperimentazione in Agricoltura. Torino, Italy

[2] Dipartimento di Produzioni Animali. Università di Torino, Italy

[3] Istituto di Scienze delle Produzioni Alimentari. Consiglio Nazionale delle Ricerche. Torino, Italy

*Corresponding author:* Giorgio Masoero. Istituto Sperimentale per la Zootecnia. Consiglio per la Ricerca e la Sperimentazione in Agricoltura. Via Pianezza 115, 10151 Torino, Italy - Tel\Fax: +39 011 731689 - Email: giorgio.masoero@entecra.it

**ABSTRACT**

Three groups of ten young rabbits each received an enriched diet with false flax (*Camelina sativa* L.) seeds at 0% (C), 10% (M), and 15% (H), respectively. At the end of the experimental period, which lasted 50 days, all the rabbits were slaughtered. The *longissimus dorsi* (LD) muscle and perirenal fat samples were collected at 24h *post mortem* from each carcass and analysed with a GC method for the fatty acid (FA) profiles and their indexes. Spectroscopy was conducted using a Model LSP LabSpec-Pro portable UV-Vis.NIR spectrophotometer (350-2500nm). The perirenal fat was directly examined. The samples derived from thawed LD muscles (2cm ø x 2cm long.) were previously fixed in 95% ethanol, stored for 3 days and finally scanned after 2 and 24 hours air exposition of the tissues. Discrimination of individuals between couple of groups, fitted 1 or 2 dummy values, was performed by a Modified Partial Least Square Discriminant Analysis by the WinISI II software (Infrasoft International, Port Matilda, PA, USA) allowing one passage for the removal of the outliers. The cross-validated 1-VR (Variance Ratio) coefficient was retained for comparative purposes. The pre-treatment of the spectra involved 2nd derivation of Standard Normal Deviate and Detrended log(1/R), while the FA and their indexes (25 and 28 variables for the perirenal and muscle fat, respectively) were only pre-treated as SNV and processed by chemometrics as above.

The false flax supplementation greatly affected the FA profile as far as the perirenal and the muscle fat were concerned. The distinction of the M and H treated groups from the control group C was absolute when considering the GC analyses in both perirenal ($R^2$=0.99) and muscle fats ($R^2$=0.98) as the two treated groups very clearly distinguished (0.82 and 0.77, respectively).

The UV-Vis-NIRS scan of the perirenal fat gave similar results (0.86, 0.90 and only 0.29 for M *vs* H). The spectra were significantly related with $R^2$ 0.60÷0.80 to 11 FAs, and this explains the causalities of the concordances. In the ethanol specimens, the UV-Vis-NIRS scan was ineffective at 2 hours, except when a ternary fitting (C=1 *vs* M=2 *vs* H=3) gave $R^2$ 0.51, but after delayed evaporation, some differences in LD emerged at an average level of $R^2$ 0.50. These differences in spectra were only slightly related to FA, with $R^2$ 0.45÷0.52, for 6 FAs out of 28. As the prediction of fat diversity between groups by the spectra was aligned to the level of GC analyses, some evidence concerning intrinsic muscle properties, linked to UV-Vis-NIRS radiation, can lead to the hypothesis that dietary fat addition could also modify the fat-free part of the muscle tissue.