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Genetic parameters along the near infra red spectra to predict melting rate of the duck fatty liver

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In the framework of a duck genetic design, we carried out a genetic analysis along the near infrared (NIR) spectra of fatty livers in relation to their melting rate (lipid exudation during cooking). We used 1,418 livers with weight ranging from 300g to 830g. NIR spectra were collected with 2 spectrometers (FOSS NIRSystems6500 on grinded livers or ASD LabSpecPro on liver surfaces) in order to predict the liver melting rate. NIR spectra were represented by absorbance values at 400 wavelengths (one datapoint every 4 nm). As mule duck is a hybrid duck, progeny of Muscovy drake with common duck female, genetic parameters were estimated on both parental lines by Gibbs sampling using the software gibbsf90, for each of the 400 absorbances and for the liver melting rate.

Heritabilities of the absorbances along the NIR spectra varied between 0.05 and 0.19 with values significantly higher on common ducks versus Muscovy ducks. FOSS and ASD spectra have very different heritability patterns. Genetic correlations between melting rate and absorbances are similar between FOSS and ASD spectrometers. Moreover, there is a great similarity of the genetic correlations in the two parental populations, except for a 2 discrepancy areas specific to spectrometers.