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Linoleic (LA) and α-linolenic (ALA) acids are essential fatty acids (EFA) involved in major body functions (e.g. reproduction, fluidity of cell membranes) and regulations (e.g. inflammatory response, platelet aggregation). As no EFA requirement values are available in dairy ruminants, we quantified LA requirements for productive (i.e. lactation) and non-productive (i.e. all other functions) expenditures in dairy cows by meta-analysis of a database including 73 *in vivo* experiments (273 treatments) providing LA intake and LA milk yield (MY) and body weight (BW). In accordance with the approach used in INRA (2018), between-experiment regressions of LA intake (g/d) in function of LA MY (g/d) and BW (kg) were studied. We quantified a non-productive requirement of 0.17 g/d of LA intake/kg BW and a requirement for milk LA secretion of 7.32 g/d of LA intake/g of LA MY (LA intake (g/d) = 0.17×BW (kg) + 7.32×LA MY (g/d); RMSE=111.2 g/d; R^2=88.3%). The residuals of that relation were not linked to the days in milk, the main diet characteristics, the milk yield and composition, but were positively correlated (r=0.7; P<0.001) with the diet total FA content (% DM) and negatively correlated (r=-0.5; P<0.001) with the milk fat content (MFC). Thus, we tested the effect of Milk Fat Depression (MFD) vs control (CTL) rations on LA requirements, with MFD rations characterized by a drop in MFC and milk fat yield greater than 15% compared to CTL and a pronounced increase in *t*10,*c*12 18:2 and/or *t*10 18:1 in milk fat. We observed a higher requirement for milk LA secretion with MFD (17 treatments) compared to CTL (256 treatments) rations, whereas the non-productive requirement was not affected (MFD: LA intake (g/d) = 0.13×BW (kg) + 13.80×LA MY (g/d); CTL: LA intake (g/d) = 0.13×BW (kg) + 7.42×LA MY (g/d); RMSE=95.8 g/d; R^2=91.3%). Our approach gives a first estimate of LA requirement for non-productive functions according to BW as well as for milk LA secretion. A similar approach is currently applied to ALA.

***In vitro* digestion and Ussing chamber to investigate nutrient effects on intestinal physiology**

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The use of chestnut extracts (CHE) as feed ingredients affects gut ecosystem of livestock. Little is known about the effects of CHE on the digestibility of nutrients containing different levels of proteins and lipids and how CHE metabolites can affect the pig intestinal integrity. Thus, we investigated the effect of CHE on simulated monogastric *in vitro* digestibility (IVD) of soy protein isolate (SPI) and two different soybean meals extracts obtained by screw pressing (SM1) and solvent extraction (SM2). The CHE-derived metabolites were tested for their effects on jejunum integrity in pigs. Samples of SPI, SM1 and SM2 were digested *in vitro* with or without the addition of 3% CHE. The polyphenol content before and after IVD was quantified by HPLC. Trans-epithelial resistance (TER), was studied in porcine jejunum segments obtained from 100 kg Swiss Large White pigs and mounted in Ussing chambers in the presence of three different dilutions of CHE-derived metabolites (1:4, 1:8 and 1:16 v/v) or absence. The tissues were then lysed to determine claudin-1, occludin, zonula occludens-1 protein expression. The CHE (3% w/w) decreased (P<0.05) both the IVD and polyphenols content of both SPI (-3.2 and -60.3%), SM1 (-8.1 and -67.5%) and SM2 (-7.2 and -68.2%). No detrimental effects of CHE on TER were observed. The 1:8 dilution increased (P<0.05) both zonula occludens-1 and occludin protein expression (+60%) compared to the control, while the dilution 1:16 only increased zonula occludens-1 expression (+100%). In conclusion, CHE exert anti-nutritional effects on the IVD of soy-based products when included at the 3% w/w. The observed effects depend on the chemical composition of the soy meal. In addition, low concentrations of CHE derived metabolites exert protective effects on the intestinal epithelial cell integrity.