Influence of Sow Dietary Polyunsaturated Fatty Acid source on the Tissue and Blood Fatty Acid Profile of Piglets

J.A.M. Missotten\textsuperscript{1}, E. Claeys\textsuperscript{1}, K. Raes\textsuperscript{2} and S. De Smet\textsuperscript{1}

\textsuperscript{1}Laboratory for Animal Nutrition and Animal Product Quality, Ghent University, Melle, Belgium; \textsuperscript{2}Research Group EnBiChem, University College West-Flanders, Kortrijk, Belgium

To examine the effect of different \textit{n}\textsuperscript{3} polyunsaturated fatty acid (PUFA) sources in sow diets on piglets’ tissue and blood PUFA composition, two groups of six sows each were fed different diets from day 45 of pregnancy and during lactation on two commercial farms. On farm I a control diet (palm oil; 25 g/kg) and a linseed oil containing diet (20 g/kg; LO) was fed. On farm II the same control diet and a fish oil containing diet (20 g/kg; FO) was fed. All diets contained equal amounts of C18:2\textit{n}-6. Blood was taken from the sows to separate plasma and erythrocytes (RBC) on day 93 of pregnancy. One and three weeks after birth a randomly chosen piglet from each sow was sacrificed to take samples of the \textit{Longissimus dorsi} (LD), liver, subcutaneous fat (SF) and blood. FA were analysed by gas chromatography following chloroform/methanol extraction and methylation.

Compared to the control diet, the LO diet increased the proportion of C18:3\textit{n}-3 and C20:5\textit{n}-3 in sow plasma and RBC by at least 2-fold, but did not affect the C22:6\textit{n}-3 proportion. The FO diet resulted in 5- to 10-fold increases in the proportions of C20:5\textit{n}-3 and C22:6\textit{n}-3 in sow plasma and RBC. The proportion of \textit{n}-6 PUFA was either decreased or not affected.

In 1 week old piglets of the LO group compared to the control group, there was a 4-, 4-, 3- and 2-fold increase in the C20:5\textit{n}-3 proportion in SF, liver, LD and plasma respectively. For C22:6\textit{n}-3 a 1.5-fold increase in SF and LD was found on this diet in spite of no difference in sow plasma, but no change in piglets’ liver and plasma was observed. In 1 week old piglets of the FO group compared to the control group, the increase in C20:5\textit{n}-3 proportion was 5.5-, 15-, 6- and 14-fold in SF, liver, LD and plasma respectively. Corresponding increases for the proportion of C22:6\textit{n}-3 were 5.5-, 2-, 4- and 3-fold. Similar differences were seen in 3 week old piglets. LO or FO in the maternal compared to the control diet did hardly affect the \textit{n}-6 PUFA proportions in piglets’ tissues.