Replacing hexane by 2-methyloxolane for defatting soybean meal does not impair dairy cow performance

V. Menoury, Anne Ferlay, L. Jacques, Vincent Rapinel, Pierre Noziere

The effect of replacing grains with bakery by-products on performance and pigs' diet preference

F. Veldkamp[1,2], H.M. Vermeer[2], J. Kater[2], A. Ten Berge[2], J.M.J. Rebel[1] and I.C. De Jong[2]
[1]Wageningen University, Adaptation Physiology Group, De Elst 1, 6708 WD, Wageningen, the Netherlands, [2]Wageningen Livestock Research, Animal Health & Welfare, De Elst 1, 6708 WD, Wageningen, the Netherlands; fleur1.veldkamp@wur.nl

Around one-third of all food produced in the world is lost or wasted. Part of this can be re-used in animal diets to reduce the usage of grains, making it a good diet ingredient for improved livestock sustainability. The aim of this study was to test the effect of replacing feed grains in weaned pig feed with bakery by-products on growth performance, health, welfare and behaviour (data latter three not yet analysed) and pigs' diet preference. The first part of the study was carried out in eight pens with ten weaned piglets per pen (initial starting weight = 7.95±0.9 kg) until a body weight of 25.7±2.5 kg during four batches. Pigs received either standard (PS, based on grains) or circular (PC, based on bakery by-products) feed and were offspring from sows that were fed standard feed (SS, based on grains) during the first two batches or circular (SC, based on bakery by-products) feed during the last two batches. Body weight at pen level was measured at the start and end of each batch. Feed provision was determined daily. Average daily gain (ADG, in grams), average daily feed intake (ADFI, in grams) and feed conversion ratio (FCR) were calculated. The ADG was higher for PC than for PS (451±42 vs 423±57, P=0.03) and the ADFI showed a tendency to be higher for PC than PS (PC=624±63.1 vs PS=583±60.7, P=0.05) whereas FCR (PC=1.50±0.09 vs PS=1.49±0.07, P=0.97) did not differ significantly. No interaction between pig feed and sow feed was found. The second part of the study was carried out in two pens with 40 pigs per pen during four batches. Pigs had the choice between PS or PC feed (two feeding throughs per feed per pen). The results revealed that pigs consumed overall more PC than PS (PC=52.3%±0.03 vs PS=47.7%±0.03, P=0.002). In summary, using bakery by-products as replacements for feed grains in weaned pig feed did not negatively impact growth performance and pigs even preferred feed based on bakery by-products over feed based on grains.

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V. Menoury[1], A. Ferlay[1], L. Jacques[2], V. Rapinel[2] and P. Nozière[1]
[1]UCA, INRAE, VetAgroSup, UMR Herbivores, Theix, 63122 Saint Genès Champannelle, France, [2]Pennakem Europa (EcoXtract®), 224 av. de la Dordogne, 59944 Dunkerque, France; valentin.menoury@inrae.fr

Soybean meals (SMB) fed to dairy cows are obtained through mechanical and/or chemical extraction of oil from the seed. Chemical extraction consists of solvent extraction, extraction-grade hexane being the most used solvent in the industry. Concerns regarding the health effects of n-hexane residues in food and feed are driving the industry to find alternatives to extraction-grade hexane. 2-methyloxolane (2-meOx) could be one of these. However, process differences between hexane and 2-meOx defatted SBM may lead to differing nutritive values and may affect the performance of dairy cows. A 4×4 Latin-square experiment with 16 primiparous lactating Holstein cows was conducted to study the effects of 2-meOx on milk yield and composition, nitrogen use efficiency for milk production, and solvent residues in milk. Cows were fed a diet containing 14% SBM and 165 g/kg DM crude protein. The 4 treatments differed according to the inclusion level of hexane and 2-meOx defatted SBM (i.e. 100% hexane, 66% hexane – 33% 2-meOx, 33% hexane and 66% 2-meOx, and 100% 2-meOx). Results show that dry matter intake, milk yield, milk protein concentration and excretion, milk protein fractions, and milk fat excretion did not differ among treatments. Milk fat concentration tended to increase with 33% hexane – 66% 2-meOx compared to 100% hexane SBM (P=0.07). Nitrogen intake, milk nitrogen excretion and nitrogen use efficiency for milk production did not differ according to the treatment. N-hexane residues tended to be more often detected in the milk from 100% hexane-fed cows compared to 100% 2-meOX-fed ones (P=0.08). 2-meOx residues were only detected in milk from 2-meOx-fed cows, but the difference with 100% hexane-fed cows was not significant. When detected in the milk, n-hexane and 2-meOx concentrations were below the quantification threshold of 10 ng/g. These preliminary results indicate that 2-meOx-defatted SBM can replace hexane-defatted SBM without affecting milk production performance and nitrogen use efficiency. Further analyses are required to confirm results regarding the detection of solvent residues in milk.