

Unprocessed soya beans low in trypsin inhibitors in organic pig fattening diets

Problem

Soya beans are rich in protein, but they contain antinutritional components such as trypsin inhibitors, which means that thermal processing is required before feeding to pigs and poultry. However, heat treatments are costly and cause damage to wanted nutrients, including protein. Special cultivars of soya bean containing lower levels of trypsin inhibitors have been developed, but there is little knowledge available about the potential of these varieties in organic pig fattening in Europe.

Solution

Results from recent pig feeding trials in Austria show that heat-treated soya can be replaced with unprocessed (full fat) soya, low in trypsin inhibitors, to up to 10 % of the diet.

Benefits

The successful use of unprocessed soya bean varieties with reduced content of trypsin inhibitors enables farmers to become more independent in their feed supply. Furthermore, costs for thermal treatment, e.g. toasting, could be saved.

About trypsin inhibitor activity in soya beans

Soya bean varieties differ in their nutrient content (e.g. protein and fat) as well as in their content of trypsin inhibitors, which is expressed as trypsin inhibitor activity (TIA). Current studies show that TIA content can differ significantly between batches. Reasons for this can include pest control, climate, fertilisers as well as protein content. One variety low in TIA is "Xonia", which has approx. half the TIA compared to other common soya bean varieties.

- Unprocessed soya beans of standard varieties contain about 20-40 g TIA/kg
- TIA content in soya bean varieties with low content is approx. 10 g/kg

Practical Recommendations

Pig feeding experiments in Austria and Germany during 2017 – 2020 provide following insights for practitioners:

- Since the TIA value can differ between batches, the batch-specific TIA must be known. TIA measurements are offered by specialised feed laboratories (see reference in 'Further Information').
- Unprocessed "Xonia" soya beans with a TIA value of less than 10 mg/g can be included in organic pig feed at 5%. The inclusion rate can be slowly increased up to a maximum of 10%. In doing so, the growth performance should be carefully monitored.
- Other protein-rich ingredients (e.g. peas or faba beans) need to be added into the pig feed to cover the protein requirements adequately. Unprocessed "Xonia" soya beans alone cannot provide enough protein.

Applicability box

Theme

Crop production - Animal husbandry - Feed and nutrition - Feed processing and handling - Arable crops - Forage - Nutritive values and needs - Ration planning

Geographical coverage

For all farms where soya can be grown

Application time

On demand

Period of impact

Time for sample collection, posting and interpretation of testing reports

Equipment

Sample bags and standard lab equipment

Best in

Farms with animal husbandry and arable production

Restrictions

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- Full fat soya bean is rich in polyunsaturated fatty acids. Consequently, full-fat soya beans should be included to a maximum of 10% during the finisher phase of feeding to avoid negative effects on the texture and stability of the bacon. This recommendation applies independently of the TIA



Ripe soya bean pod. Commonly, raw soybeans contain antinutritional components such as trypsin inhibitors.



The trypsin inhibitor activity (TIA) in the pig feed is directly linked to the growth performance. Pigs respond to high TIA values with poorer growth.

Further information

Reading

Contact information of research teams

In Central Europe, research teams in Austria and Germany are conducting feeding trials with pigs and poultry on the effects of soya bean feed with high and low TIA values:

- Agricultural Chamber of Lower Austria. Contact: Helmuth Raser, helmuth.raser@lk-noe.at
- University of Rostock. Department for Nutritional Physiology and Animal Nutrition. Contact: Dr Reinhard Puntigam, reinhard.puntigam@uni-rostock.de; Dr Julia Slama, julia.slama@uni-rostock.de

Analytical service

AGES - Austrian Agency for Health and Food Safety provides a service to evaluate the quality of feed products and is also capable of measuring TIA. Further information on the AGES website: www.ages.at/en

Additional information on organic farming

The web-based platform organic-farmknowledge.org provides access to additional information on local and organic protein sources for feeding pigs and poultry. Search for 'soya' to find further information on soybean.

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Project website: <https://ok-net-ecofeed.eu/>

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