

Focus on the amino acid content of energy feedstuff components

Problem

Switching poultry rations from 95 % to 100 % organic feed can lead to a reduction in the use of home-grown and regional feed. Currently, conventional maize gluten and conventional potato protein are replaced by organic oilcake (soya, sunflower, rapeseed, sesame). Oilcake has a comparatively low content of important amino acids such as methionine and so higher proportions of oilcake must be used. This can lead to further reductions in the use of regionally produced and home-grown feed components such as cereals.

Solution

Energy feedstuff components contain different amounts of amino acids such as methionine. Some grain species have a high methionine content and can grow well in most regions by the farmers themselves. The best examples are proso millet (*Panicum milleceum*) and naked oats (*Avena nuda*) followed by spelt, naked barley (*Hordeum vulgare* L. var. *nudum* Hook. f.) and buckwheat with all containing higher levels of methionine than wheat or maize.

Figures 1 and 2 show the harvest and a field visit as part of the project “Proso millet in poultry feed”



Figure 1: Millet harvesting. Picture: Julia Roesch



Figure 2: Millet field visit. Picture: Elisabeth Assmann

Benefits

In the present ration example, the use of oil cake can be reduced from 34.8 % (see Table 1) to 26.1 % (see Table 2). This means that the share of home-grown and regional components can be increased by more than 8 % since the oil content could also be reduced.

Practical recommendation

In proso millet, the methionine content is high, but the lysine content is low. Lysine can be added easily to the ration with grain legumes such as peas, field beans, lupins or soya. The low crude protein of millet is positive, as it is well complemented by the higher crude protein content of other feedstuffs, e.g. grain legumes. Overfeeding crude protein is undesirable as it puts a strain on the animal's metabolism and leads to excessive nitrogen excretion. Naked oats have a high content of amino acids plus a high fat content so that the use of oil can be reduced.

Proso millet and naked oats are crops that are easy to grow in many regions in Central and Southern Europe.

Table 1: Ration for 100 % organic feeding of laying hens with energy feed based on corn and wheat

Components	Share	Ingredients											Batch
	%	ME	Protein	Fat	Fibre	Lys	Met	Met+Cys	Trp	Ca	P	Na	3.000
		MJ	%	%	%	%	%	%	%	%	%	%	kg
Corn	20.00	2.88	1.72	0.72	0.64	0.05	0.03	0.09	0.00	0.01	0.06	0.00	600
Wheat	19.50	2.24	2.11	0.51	0.60	0.06	0.04	0.09	0.03	0.01	0.06	0.00	585
Milled grass	6.00	0.32	0.97	0.22	1.50	0.04	0.02	0.02	0.02	0.05	0.02	0.01	180
Peas	8.10	1.02	1.70	0.22	0.55	0.13	0.02	0.04	0.02	0.01	0.04	0.00	243
Feed lime	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	240
Sunflower oil	1.40	0.52	0.00	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42
Premix	2.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.24	0.17	66
Sunflower cake	14.00	1.19	4.66	1.53	3.63	0.15	0.08	0.13	0.09	0.05	0.05	0.00	420
Sesame cake	4.50	0.36	2.21	1.70	0.27	0.05	0.04	0.08	0.02	0.04	0.02	0.00	135
Soya cake	16.30	1.78	7.24	1.30	1.17	0.47	0.09	0.23	0.09	0.05	0.13	0.00	489
	100.00	10.31	20.61	7.52	8.36	0.94	0.31	0.68	0.27	3.81	0.63	0.18	3.000

Table 2: Ration for 100 % organic feeding of laying hens with energy feed based on proso millet and naked oats

Wheat	12.00	1.38	1.30	0.31	0.37	0.04	0.02	0.06	0.02	0.01	0.04	0.00	360
Proso millet	20.00	2.50	2.04	0.54	1.48	0.04	0.05	0.08	0.03	0.01	0.06	0.01	600
Naked oats	15.00	2.10	1.52	1.05	0.23	0.09	0.04	0.10	0.03	0.02	0.05	0.00	450
Milled grass	6.00	0.32	0.97	0.22	1.50	0.04	0.02	0.02	0.02	0.05	0.02	0.01	180
Peas	10.00	1.26	2.10	0.27	0.68	0.16	0.02	0.05	0.02	0.01	0.05	0.00	300
Feed lime	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	240
Sunflower oil	0.70	0.26	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21
Premix	2.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.24	0.17	66
Sunflower cake	6.00	0.51	2.00	0.65	1.55	0.06	0.03	0.05	0.04	0.02	0.02	0.00	180
Sesame cake	4.90	0.39	2.40	1.85	0.29	0.05	0.05	0.09	0.03	0.04	0.02	0.00	147
Soya cake	15.20	1.66	6.75	1.22	1.09	0.44	0.08	0.21	0.08	0.05	0.12	0.00	456
	100.00	10.38	19.07	6.78	7.20	0.92	0.31	0.68	0.26	3.79	0.62	0.19	3.000

Target values	10.60	17.50	6.00	5.00	0.80	0.32	0.73	0.17	3.70	0.54	0.18
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Abbreviations: ME = Metabolizable Energy; MJ = Megajoule; Lys = Lysine; Met = Methionine; Cys = Cysteine; Trp = Tryptophan; Ca = Calcium; P = Phosphorus; Na = Natrium (Sodium)

Values for Protein, Fat and Fibre = crude

Literature: Vogt-Kaute, W. et al. (2018) Proso millet as a protein source for organic poultry. In: Santra D et al.: Proceedings of 3rd International Millet Symposium, Fort Collins: 27

Further information

Weblinks

- Check the [Organic Farm Knowledge](#) platform for more practical recommendations.
- Grashorn M et al. (2014) [Estimation of ideal nutrient digestibility in native energy and protein feeding stuffs for organic chicken meat production](#), Abschlussbericht BÖLN Projekt 2811OE070.
- Vogt-Kaute W et al. (2018) [Evaluation of millet \(panicum millaceum\) lines and varieties for use of their seeds for poultry](#).

About this practice abstract and OK-Net EcoFeed

Publishers:

Öko-Beratungsgesellschaft mbH
Eichethof 1, 85411 Hohenkammer, Germany
Phone +49 8137 6372-900, www.naturland.de

Bioland Beratung GmbH
Kaiserstr. 18, 55116 Mainz, Germany
Phone +49 6131 23979-28, www.bioland.de

Research Institute of Organic Agriculture (FiBL)
Ackerstrasse 113, Postfach 219, CH-5070 Frick
Phone +41 62 865 72 72, info.suisse@fibl.org, www.fibl.org

IFOAM EU, Rue du Commerce 124, BE-1000 Brussels
Phone +32 2 280 12 23, info@ifoam-eu.org, www.ifoam-eu.org

Authors: Werner Vogt-Kaute, Öko-Beratungsgesellschaft;
Elias Schmelzer, Bioland Beratung GmbH

Review: Lindsay Whistance, Organic Research Centre, UK

Contact: w.vogt-kaute@naturland-beratung.de

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