



WHITE LUPINS IN PIG FATTENING

Do the existing alkaloid rules for lupins in pig feed also apply to the new varieties of white lupin? This was investigated by the Saxony-Anhalt State Research Centre and the North Rhine-Westphalia Chamber of Agriculture. Below, the results are being presented by the authors.

The renaissance of white lupins in arable farming is based on the newly bred anthracnose-tolerant varieties. In times of rising commodity prices and thus high input costs, anthracnose-tolerant white lupins are once again an alternative leaf crop that can also be used to extend crop rotation. It is also yield-stable in heat and drought and therefore has a wide range of location adaptability. With regard to utilisation for animal nutrition, the question arises as to whether the current recommendations on utilisation rates are still valid or whether the quantities used should be adjusted due to the existing composition of ingredients, such as the proportion of antinutritive ingredients. Until now, there have only been a few trials on the use of white lupin in pig fattening. Godfrey et al. 1985 postulated that 0.2 g alkaloids per kilogramme (equivalent to 0.02 %) should not be exceeded in the total ration. With an alkaloid content of up to 0.5 g alkaloids per kilogramme (equivalent to 0.05 %) in lupin grain, this does not usually occur in practical feed rations. This currently results in the requirement that lupin grains used for feeding pigs should not exceed a content of up to 0.5 g alkaloids per kilogramme.

Joint attempt at improvement in Iden & Haus Düsse

The question of whether this can also be transferred to the new varieties of white lupin was investigated in two trials by the North Rhine-Westphalia Chamber of Agriculture and the Saxony-Anhalt

State Research Centre for Agriculture. For this purpose, 192 pigs were fattened in group housing at the Iden experimental station of the State Institute for Agriculture and Horticulture (Saxony-Anhalt) and 100 animals were fattened in row housing at the Haus Düsse Agricultural Research and Training Centre (Bad Sassendorf). At both locations, the carcasses of the animals were assessed according to FOM and AutoFOM.

In order to demonstrate the effects of lupin feeding, these animals were divided into four feeding groups with different proportions of white lupin and fed in three phases (Table 1).

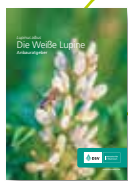
Feeding with the same batch of lupins

The same lupin batch was used both in Iden and at Haus Düsse. The conventionally grown white lupin CELINA was used. The ingredients of the white lupin, whose crude protein content of 251 g/kg FM was below the table values, can be found in the full report of the LLG Saxony-Anhalt (see QR code). The lupin crop was stressed by the drought at sowing in combination with heat events in summer, which can explain the low crude protein content and alkaloid values. At 580 mg/kg DM (0.06 %), the values of the total alkaloids to be tolerated were slightly above the value found in the literature for use in pig feed (0.05 %). The feed rations used in Iden and at Haus Düsse differed slightly in the choice of cereals used, but were comparable in the concentrations of ingredients. The analyses showed good compliance with the declared values. The rations can be obtained from the authors or can be found in the experimental report of the LLG Saxony-Anhalt.



**TAB. 1: THE FEEDING VARIANTS WERE AS FOLLOWS
BY PERCENTAGE OF WHITE LUPIN):**

Experimental group	Control (A)	0/10 (B)	5/15 (C)	10/20 (D)
Pre fattening (30-60 kg)	0	0	5	10
Centre fattening (60-90 kg)	0	5	10	15
Final fattening (90-120 kg)	0	10	15	20



The cultivation guide for the white lupin can be ordered on our website: www.dsv-saaten.de



TAB. 2: FATTENING PERFORMANCE DATA

Location	Iden test station					Haus Düsse Agricultural Research and Training Centre				
	A	B	C	D	p	A	B	C	D	p
Number of animals	41	48	43	47		23	23	23	24	
Increases in initial fattening (g/d)	814	823	812	780	0.32	946	938	931	896	0.14
Increases in centre fattening (g/d)	1,056 ^a	980 ^b	954 ^b	989 ^{ab}	<0.01	1,163 ^a	1,092 ^{ab}	1,042 ^b	1,075 ^{ab}	0.01
Increases in final fattening (g/d)	1,013 ^a	963 ^{ab}	903 ^b	900 ^b	<0.01	1,068 ^a	987 ^{ab}	983 ^{ab}	927 ^b	0,02
Increases in total fattening weight (g/d)	937^a	908^{ab}	880^{bc}	870^c	<0.01	1040^a	992^{ab}	972^b	955^b	0.01
Feed consumption AM (kg/day)	2.01 ^a	1.97 ^a	1.91 ^a	1.80 ^b	<0.01	1.95 ^a	1.93 ^a	1.88 ^{ab}	1.81 ^b	0.02
Feed consumption MM (kg/day)	2.79 ^a	2.62 ^{ab}	2.53 ^b	2.53 ^b	0.01	2.72 ^a	2.62 ^{ab}	2.49 ^{bc}	2.44 ^c	<0.01
Feed consumption EM (kg/day)	3.14 ^a	2.86 ^b	2.71 ^b	2.70 ^b	<0.01	3.17 ^a	2.80 ^b	2.79 ^b	2.67 ^b	<0.01
Total feed consumption (kg/day)	2.52^a	2.39^b	2.32^{bc}	2.26^c	<0.01	2.56^a	2.42^{ab}	2.37^b	2.30^b	<0.01
Feed expenditure AM (kg/kg)	2.49 ^a	2.40 ^a	2.36 ^{bc}	2.32 ^c	0.03	2.06	2.06	2.06	2.02	0.46
Feed expenditure MM (kg/kg)	2.64	2.68	2.66	2.56	0.09	2.35	2.42	2.40	2.28	0.11
Feed expenditure EM (kg/kg)	3.15	3.03	3.05	3.03	0.52	3.00	2.87	2.92	2.90	0.50
Total feed expenditure (kg/kg)	2.68	2.64	2.64	2.60	0.11	2.47	2.45	2.45	2.41	0.53

^{ab} Values with different superscripts within a test centre differ significantly; significance level p < 0.05

Similar results in Iden and at Haus Düsse

The results in Table 2 show that from a proportion of 10 % of white lupin, the feed intake in the fattening sections decreased. The daily weight gain of the pigs decreased significantly in the increase trial with quantities of 15 % in the total ration both in Iden and at Haus Düsse. While the trial groups did not differ significantly in terms of feed expenditure, this was the case for feed consumption. Feed consumption per day decreased as the proportion of white lupin used increased.

Carcass valuation figures

Table 3 shows the slaughter performance data. The carcass weights correspond to the finishing weights: they were close to each other in Iden and thus show no influence of feeding. The lean meat percentage was also comparable in the four groups. For the animals fattened at Haus Düsse, the carcass weight decreased from test group A to D, whereby the index points tended to improve.

The meat quality recorded in Iden showed no meat quality defects. None of the meat quality parameters analysed showed a significant influence of the experimental group.

TAB. 3: DATA OF THE CARCASS EVALUATION

	Slaughter weight (kg)	Slaughter (%)	MFA FOM (%)	Index points (pts.)
Iden test station				
A	98.2	80.1 ^a	60.5	
B	96.7	79.6 ^{ab}	60.6	
C	96.7	79.6 ^{ab}	60.6	
D	96.3	79.5 ^{ab}	60.5	
p	0.06	0.03	0.48	
Haus Düsse Agricultural Research and Training Centre				
A	95.6 ^a	77.5		1.019
B	94.4 ^{ab}	77.6		1.019
C	93.4 ^b	77.4		1.020
D	93.3 ^b	76.5		1.026
p	0.03	0.05		0.34

^{ab} Significance level p<0.05

Summary

Based on the results presented, the use of up to 10 % white lupin in the ration is feasible and, depending on the price of the lupin, also economically viable. Further studies on the influence of the total ingredients, including the alkaloid content, on feeding should be sought.

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