Microscopy for the determination of the composition of feedingstuffs and the detection of undesirable substances

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Apart from the detection of animal constituents and some occasional analysis of the composition which started long ago (1960), the laboratory for feed analysis by microscopy at ALP started in 2004 to analyze feedingstuffs samples regularly (10-15/month) to verify the producers' declaration and detect undesirable substances.

Sampling

Grinding

Sedimentation

Sieving

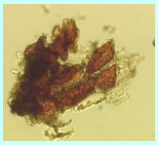
Stereomicroscope
for the coarse fractions

Selecting

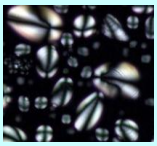
Weighing

Compound microscope for the fine fractions

Coloring



Polarized light



Calculating: A) Estimation of the percentages for each component B) Corresponding values for nutrients

MICROSCOPY - RESULTS FOR COMPOSITION

N° LIMS 339227-2 ■ Official Control 12091M2 □ Externe □
Feed: MILVI-30P
Blind an. ■ yes □ no Form: Meal Sample: Original Weight 10 (g)
sed. 15.3.12/1
Entry date: 1.3.12 Date of analysi 21.3.12 Visa: frg
Σ Fractior 8.5 g
Minerals 6.5 %
Bones 0 %

	Fraction I: > 3 mm			Fraction II: > 1.5 mm			Fraction III:: > 0.5 mm			Fraction IV: < 0.5 mm			Total
	11.25 % 1.02 g			25.58 % 2.32 g			39.25 % 3.56 g			17.42 % 1.58 g			
	Balance: F113			Balance: /			Balance: /			Balance: /			
Components	g/ parts	%	% total	parts estim.	%	% total	parts estim.	%	% total	parts estim.	%	% total	
Soya extraction mea	1	98.04	11.03	40	76.92	19.58	6	46.15	18.12	25	25.00	4.36	53.17
Barley	0.01	0.98	0.11	2	3.85	0.98	1	7.69	3.02	10	10.00	1.74	5.86
Wheat bran	0.01	0.98	0.11	8	15.38	3.94	4	30.77	12.08	10	10.00	1.74	17.87
Maize gluten	0	0.00	0.00	1	1.92	0.49	1	7.69	3.02	40	40.00	6.97	10.48
Rapeseed extr. meal	0	0.00	0.00	1	1.92	0.49	1	7.69	3.02	10	10.00	1.74	5.25
Sugar cristals	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	5	5.00	0.87	0.87
Total	1.02	100	11.25	52	100	25.58	13	100	39.25	100	100	17.42	100.00
Fish meal													0.00

Comparing with results of the chemical analyses

BA	110.3 g/kg
RAU	1.8 g/kg
RAU	1.4 g/kg
RETI	64600 IE/kg
RETI	46900 IE/kg
RETI	63700 IE/kg
RETI	31700 IE/kg
RF	41 g/kg
RF	39 g/kg
RLBT	20 g/kg
RPT	380 g/kg
RPT	386 g/kg
TOCO	57 mg/kg
TOCO	62 mg/kg
TOCO	56 mg/kg
TOCO	61 mg/kg
TSL	885.5 g/kg
ZEEL	350 µg/kg

Verifying the producers' declaration on the label

Ergänzungsfutter für Milchvieh

Zusammensetzung:
Sojaextraktionsschrot, Rapskuchen, Maiskleber, Weizenkleie, Mineralstoffe-Vitamin-Spurenelement-Vormischung, Melasse

Gehalte an Inhaltsstoffen:

Rohprotein	40.0%	NEL	6.8 MJ/kg	Calcium	15 g/kg
Rohasche	10.4%	APD	210 g/kg	Phosphor	9.0 g/kg
Rohfaser	4.4%	APDN	300 g/kg		
Rohfett	3.1%				

Gehalte an Zusatzstoffe:

Vitamin A	36000 IE/kg	Vitamin E	48 mg/kg
Vitamin D	6000 IE/kg		

and the recipe

Gewicht	Rohstoff
610 kg	Soyaschrot 49%
120 kg	Rapskuchen
100 kg	Maiskleber 60-62%
80 kg	Krüsch
25 kg	Dextrose
30 kg	Melasse
60 kg	Konz.
Total	1'025 kg

IAG - International Association for Feedingstuff Analysis, Section Feedingstuff Microscopy:

Because products and contaminants may vary in time and places, an international network of feed microscopists is very useful for increasing the general knowledge. In Europe, the IAG is such a network. Its aim is to exchange information and skills. The group organizes annual meetings since 1959.

IAG Activities:

-organization and critical discussion of ring tests (identification and estimation of constituents of animal origin is not presented here)
-training of specialists
-development of microscopic methods
-elaboration of statements for national and EC purposes

In Table 1 are presented all IAG ring tests since 2004 on:

-identification and estimation of constituents = **composition** (in animal feed and in fertilizers)
-detection and quantification of ergot in cereals and mixed feed = **ergot**
-detection and quantification of ragweed in bird feed and raw materials = **ambrosia**
-detection and quantification of toxic weeds in roughage = **weeds**

In IAG composition ring tests, correct results are results falling inside an interval set in correlation with the given percentage for each component:

0-5 %	→	± 100% relative	20-50%	→	± 10% absolute
5-10%	→	± 5% absolute	50-100%	→	± 20% relative
10-20%	→	± 50% relative			

Table 1: Ring tests organized by the IAG (not including tests on MBM)

Year	Samples	Test	Analysts	Correct results
2004	pig feed	composition	28	**86 %** (145 / 168)
	pig feed	composition	25	**73 %** (109 / 150)
	dairy feed	composition	26	**70 %** (88 / 125)
	fertilizer	composition	11	
	fertilizer	composition	11	
	pig feed	ergot	25	
	pig feed	ergot	25	
	pig feed	ergot	25	
	wheat	ergot	25	
2005	pig feed	composition	24	**94 %** (248 / 264)
	pig feed	composition	24	**88 %** (190 / 216)
	dairy feed	composition	22	**81 %** (125 / 154)
	fertilizer	composition	14	
	fertilizer	composition	14	
	pig feed	ergot	26	
	pig feed	ergot	26	
	pig feed	ergot	26	
2006	laying hen	composition	24	**92 %** (155 / 168)
	dairy feed	composition	21	**89 %** (131 / 147)
	fertilizer	composition	15	
2007	laying hen	composition	28	**73 %** (122 / 168)
	pig feed	composition	28	**77 %** (150 / 196)
	dairy feed	composition	24	**72 %** (139 / 192)
	dairy feed	composition	22	**94 %** (124 / 132)
	fertilizer	composition	13	
2008	pig feed	composition	26	**93 %** (193 / 208)
	dairy feed	composition	25	**78 %** (195 / 250)
	fertilizer	composition	15	
	bird feed	ambrosia	6	
	bird feed	ambrosia	7	
2009	horse feed	composition	24	
	pig feed	composition	24	
	dairy feed	composition	22	**88 %** (174 / 198)
2010	dairy feed	composition	24	**77 %** (129 / 168)
	bird feed	ambrosia	30	**66 %** (20 / 30)
	hay	weeds	13	**100 %** (13 / 13)
2011	pig feed	composition	23	**78 %** (197 / 253)
	dairy feed	composition	22	**80 %** (177 / 220)
	bird feed	ambrosia	27	**100 %** (27 / 27)
	bird feed	ambrosia	27	**74 %** (20 / 27)
	bird feed	ambrosia	27	**74 %** (20 / 27)
	hay	weeds	17	**85 %** (29 / 34)
2012	dairy feed	composition	22	**89 %** (118 / 132)
	poultry feed	composition	24	**87 %** (104 / 120)
	lin seed	ambrosia	12	**67 %** (8 / 12)

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www.iag-micro.org

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