

Date: 19.02.2018		Report-Addition	
Task:	Authenticity of quail eggs	Internal lab-no.:	011K1049-0118
		Revision:	0
Delivered:	09.01.2018	Testing period:	09.01.2018 – 19.02.2018
Customer:	Wakker dier Postbus 92025 1090 AA Amsterdam	On behalf of:	
Attn.:	Mr. Collin Molenaar	Sampling by:	customer
Number of samples:	11	External lab-no.:	
Isotopes:	D/H, ¹⁸ O/ ¹⁶ O, ¹³ C/ ¹² C, ¹⁵ N/ ¹⁴ N, ³⁴ S/ ³² S	Methods Agroisolab:	AIL-1.1b+c (IRMS), AIL-3.1a (Laser)
Remark:	The results refer to provided samples. Number of measurements: (n=4-6)		

No.	Sample	Decl.	D/H* [‰] v.s. vsmow	¹⁸ O/ ¹⁶ O* [‰] v.s. vsmow	¹³ C/ ¹² C* [‰] v.s. PDB	¹⁵ N/ ¹⁴ N* [‰] v.s. Air	³⁴ S/ ³² S* [‰] v.s. CDT	Origin Evaluation
1	K3 – 1 Best before: 11/01 Eicom Barneveld	Netherlands/ Veluwe	-9,3 +/- 1,2	-0,1 +/- 0,2	-23,0 +/- 0,2	3,5 +/- 0,1	6,9 +/- 0,3	
2	K3 – 2 Best before: 11/01 Eicom Barneveld	Netherlands/ Veluwe	-13,7 +/- 1,5	-0,5 +/- 0,3	-23,2 +/- 0,7	3,6 +/- 0,2	7,5 +/- 0,7	
3	K3 – 3 Best before: 11/01 Eicom Barneveld	Netherlands/ Veluwe	-11,0 +/- 4,2	0,5 +/- 1,7	-23,5 +/- 0,4	3,8 +/- 0,1	7,4 +/- 0,7	
4	K3 – 4 Best before: 11/01 Eicom Barneveld	Netherlands/ Veluwe	-7,8 +/- 1,3	0,0 +/- 0,3	-23,2 +/- 0,1	3,6 +/- 0,1	7,3 +/- 0,7	
5	K3 – 5 Best before: 11/01 Eicom Barneveld	Netherlands/ Veluwe	-8,9 +/- 1,1	-0,6 +/- 0,4	-23,0 +/- 0,2	3,8 +/- 0,1	6,8 +/- 1,0	
6	K4 – 1 Best before: 18/01 Eicom Barneveld	Netherlands/ Veluwe	-11,1 +/- 2,8	-0,9 +/- 0,4	-23,2 +/- 0,4	3,7 +/- 0,1	6,3 +/- 0,4	
7	K4 – 2 Best before: 18/01 Eicom Barneveld	Netherlands/ Veluwe	-10,6 +/- 1,9	-1,1 +/- 0,2	-23,2 +/- 0,3	3,6 +/- 0,1	6,9 +/- 0,7	
8	K4 – 2 Best before: 18/01 Eicom Barneveld	Netherlands/ Veluwe	-13,7 +/- 1,4	-1,4 +/- 0,8	-23,2 +/- 0,3	3,6 +/- 0,1	7,0 +/- 0,7	
9	K4 – 3 Best before: 18/01 Eicom Barneveld	Netherlands/ Veluwe	-13,0 +/- 3,5	-1,6 +/- 0,6	-23,1 +/- 0,3	3,8 +/- 0,2	7,2 +/- 0,7	
10	K4 – 4 Best before: 18/01 Eicom Barneveld	Netherlands/ Veluwe	-13,4 +/- 2,5	-1,8 +/- 0,3	-23,1 +/- 0,2	3,6 +/- 0,1	6,8 +/- 0,9	
11	Reference Quail Eggs	Germany/ NRW	-36,9 +/- 1,2	-4,5 +/- 0,2	-24,6 +/- 0,3	4,4 +/- 0,1	6,4 +/- 0,8	-
Ref.	Henn Eggs (n=210) Agroisolab database	Germany / NRW	-36,9 +/- 5,4					
Ref.	Henn Eggs (n=2) Postcode: 73XX	Netherlands	-35,3 +/- 0,9					
Ref.	066K1049-0118 Quail eggs Postcode: 3611	Netherlands	-46,5 +/- 2,2	-4,1 +/- 0,6	-23,7 +/- 0,6	4,6 +/- 0,4	5,1 +/- 0,3	

* +/- single standard deviation

Quick evaluation: = likely to be from declared origin or organic farming methods (fertilisation)
 = doubts, has to be verified with further information
 = unlikely, based on current evidence the sample is evaluated as mislabelled with respect to its provenance

Interpretation:

All tested quail egg samples 1-10 show very similar D/H and $^{18}\text{O}/^{16}\text{O}$ isotope ratios, therefore a similar regional geographic origin can be concluded. Furthermore the feeding parameters (CNS) show similar ratios as well. So the maize content in the feed was low as the carbon ratios are relatively depleted. The depleted $^{15}\text{N}/^{14}\text{N}$ ratios are typical for conventional breeding as well. In summary it can be concluded, that the 10 test samples are originating from the same barn.

Unfortunately no direct quail egg reference sample from the Netherlands is available. Nevertheless, taking into account the reference sample from Germany/ NRW (sample no. 11) the D/H signature of the quail egg reference is well comparable to the Agroisolab database for the NRW region, which is based on henn's eggs.

Therefore for the following evaluation henn's eggs reference samples from the Dutch postcode region: 73XX were taken into account.

Based on these reference samples the test samples 1-10 show significantly enriched D/H and $^{18}\text{O}/^{16}\text{O}$ isotope ratios. Therefore, within the current state of knowledge, due to this enrichment an origin from that region: 73XX of Netherlands can be excluded with probability bordering on certainty. Furthermore the increased ratio is unlikely for an origin from the total country Netherlands as well. That enrichment has not been verified in more than 750 analyzed egg samples from Netherlands.

Therefore the average of Netherland egg samples (750 reference samples) is $-34 \pm 6 \text{ ‰}$.

Additionally a further quail egg reference sample (order no 066K1049-0118) was analyzed for further verification. It has to be mentioned that the sample is not a direct farm reference from the farm of the tested quail eggs from order no. 011K1049-0118. Nevertheless the reference sample is from a nearby postcode region (3611). As the D/H and $^{18}\text{O}/^{16}\text{O}$ ratios in the tissue water represent a regional differentiation parameter, that location is sufficient to confirm the evaluation of the fraud sample anyway.

Finally it could be mentioned that the feed was different in the reference sample (order no 066K1049-0118) as well. In comparison to the test samples 1-10 the amount of maize in the feed is less and the depleted $^{34}\text{S}/^{32}\text{S}$ and enriched $^{15}\text{N}/^{14}\text{N}$ ratios are significant different.

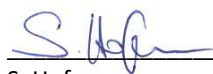
Regarding the Agroisolab egg database the reference sample from order no 066K1049 shows quite depleted D/H isotope ratios. In the region 3xxx an average of $-37 \pm 4.2 \text{ ‰}$ could be expected in eggs. So the sample represents a minimum. On the other hand that reference samples is confirming the fraud samples 1-10 from order no. 011K1049-0118 very well.

Regarding the new reference sample and the Agroisolab database it can be excluded with a probability bordering on certainty that the ten test samples 1-10 are from the declared region Netherlands/ Veluwe.

Regularly such enriched values have to be expected for a southern Europe origin.

Conclusion: Samples 1-10: Within the current state of knowledge an origin from the Netherlands can still be excluded.

Best Regards,



S. Hofem
(Food Chemist)
- Scientific Manager -