

Suitability of porcine and poultry identification assays for use in processed animal proteins and animal feed



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At present, most processed animal proteins including meat and bone meal are not allowed in feed for all farmed animals. The Animal By-Products Regulation (EC) No. 1774/2002 allows the use of products from category 3 materials for inclusion in feed, but this is subjected to strict rules, including an intra-species recycling ban. The availability of an analytical technique for species identification, would contribute to acceptance of PAP's in feed for farmed animals.

The suitability of several porcine and poultry identification assays, is tested with different reference materials.

Reference materials

Some of the reference materials are processed by CCL (Veghel, NL) in a dedicated steriliser of 140 litre under strict conditions (133°C and 159°C during 20 minutes; both pre-pressure and post-pressure cooked):

- Porcine soft material (100% large intestines)
- Porcine 'bone' material (5% tails + 95% hind-legs)
- Porcine bone material (100% bone)
- Chicken soft material (100% digestive system)
- Chicken 'bone' material (40% heads + 60% shanks)

PDM Ltd (Doncaster, UK) processed bovine, ovine, porcine and avian carcase and muscle reference material, heated at 133°C, 137°C, 141°C and 145°C.

Furthermore, some 'pure' commercial available products are used as reference samples.

With these reference materials several mixtures are prepared (in PAP and feed).

Methods

Several PCR assays, which claim to be able to identify porcine or poultry species, are tested with the reference materials.

1. Real-time PCR CRA-W (Gembloux, B)
2. Real-time PCR TNO (Zeist, NL)
3. PCR of an anonymous institute
4. Real-time PCR UCM (Madrid, ES)

Assay number 1 is carried out by CCL. The other three assays are carried out by the institute, which developed them.

Results of these tests are shown in the presented table.

Conclusions

The tested assays seem quite suitable for identification of porcine and poultry species, even after heating for twenty minutes at the highest temperatures. However, it is still desirable to reduce the number of false positive and negative results. Furthermore, assay 3 and 4 need to be examined with more reference samples.

In general, the results show that these assays are quite promising. This will help acceptance of porcine and poultry PAP's in aquafeed and to make it possible again to feed porcine PAP's to poultry and poultry PAP's to pigs.

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Results

		Assay 1		Assay 2		Assay 3		Assay 4	
		Pig	Chicken	Pork	Poultry	Porcine	Avian	Porcine	Chicken
Reference samples									
Pork soft, pre-pres cook	133°C	+	-	+	-	-	-	-	+
Pork soft, post-pres cook	159°C	+	-	±	-	-	-	-	+
Pork bones, post-pres cook	159°C	+	-	+	-	-	-	-	+
Chicken soft, pre-pres cook	133°C	-	+	-	+	-	+	-	-
Chicken soft, pre-pres cook	159°C	-	+	-	+	-	+	-	-
Chicken soft, post-pres cook	159°C	-	+	-	+	-	+	-	-
Chicken bones, pre-pres cook	133°C	-	+	-	+	-	+	-	-
Chicken bones, pre-pres cook	159°C	-	+	-	+	-	+	-	-
Porcine carcase 133°C		+	-	+	-	-	-	-	+
Avian carcase 133°C		-	+	-	+	-	-	-	-
Avian muscle 133°C		-	+	-	+	-	-	-	-
Commercial available products									
Feather meal 1		-	+	-	+	-	-	-	-
Feather meal 2		-	+	-	+	-	-	-	-
Mixed samples (soft/bones pre 133°C):									
Chicken 95% + Pork 5%		+	+	+	+	-	-	-	+
Chicken 98% + Pork 2%		+	+	+	+	-	-	-	+
Chicken 99.5% + Pork 0.5%		+	+	+	+	-	-	-	+
Pig feed % Bovine % Chicken %									
0	0	100	-	+	-	+	-	-	+
0	0.2	99.8	-	+	-	+	-	-	+
0	0.1	99.9	±	+	-	+	-	-	+
95	0	5	-	+	-	+	-	-	+
99	0	1	-	+	-	+	-	-	+
100	0	0	-	+	-	+	-	-	+
95	5	0	-	-	-	-	-	-	-
99	1	0	-	-	-	-	-	-	-
99.5	0.5	0	-	-	-	-	-	-	-
99.7	0.3	0	-	-	-	-	-	-	-
99.8	0.2	0	-	-	-	-	-	-	-
99.9	0.1	0	-	-	-	-	-	-	-
Pig feed % Ovine % Chicken %									
0	0.2	99.8	-	+	-	+	-	-	+
0	0.1	99.9	-	+	-	+	-	-	+
Chicken feed % Ovine % Pork %									
90	5	5	+	+	+	+	-	-	+
94	1	5	+	±	+	+	-	-	+
94.5	0.5	5	+	±	+	+	-	-	+
94.7	0.3	5	+	±	+	+	-	-	+
94.8	0.2	5	+	±	+	+	-	-	+
94.9	0.1	5	+	±	+	+	-	-	+
Feathermeal % Ovine carcase %									
99.5	0.5		-	+	-	+	-	-	-
99.9	0.1		-	+	-	+	-	-	-

Green: Correct result
 Red: Wrong result
 Yellow: Inconclusive result



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