Stock Feed Manufacturers' Council of Australia
Stock Feed Manufacturers' Council of Australia Inc.
ABN 84 816 063 155
PO Box 151 Curtin ACT 2605
www.sfmca.com.au

8.1.2. Validation of Cross-Contamination Measures

Standard

Have cross-contamination measures been validated (e.g. flushing, sequencing) to ensure effective?
Manufacturers must meet the maximum carry-over of certain coccidiostats as per (EU) No 574/2011.
Carryover testing records to be sighted, especially for RAM or medicated.

Purpose

To ensure all measures to prevent cross-contamination, such as flushing, sequencing, and cleaning have been validated for effectiveness and records maintained.

Reason

Cross-contamination can occur over the entire production process, from raw material intake through to bulk out-loading or bagged feed packaging. The operator has a responsibility of recognising these risks and applying the appropriate controls to prevent cross-contamination.

A critical aspect of feed manufacture is to ensure feed is not contaminated with an unintended raw material. The two areas of greatest concern are:

1. Ruminant feeds contaminated with RAM, this is a breach of State regulation and feed suppliers are subject to prosecution. There is a national feed testing program operating, this targets multi-species feed mills with State Department inspectors completing site audits and sample collection.
2. Non target feeds are contaminated with medications that are either not compatible with this species or are not registered for use in the species. Incidents of ionophore toxicity in horses have occurred, as have medication residues in non-target species. Ractopamine (Paylean) carryover from pig feeds to cattle or sheep feeds may result in residues that adversely impact trade access. Additionally, residues in horse feeds are a breach of rules of professional competition.

What is Acceptable?

<u>Risk Assessment</u>

Operators shall conduct a risk assessment according to Fact Sheet 5.2.1 to 5.2.4, to understand the degree of potential cross-contamination across the entire process flow. The appropriate level of controls shall be put in place and validated to ensure they are achieving their intended purpose. A flow diagram demonstrating where controls can be incorporated into the operators production process can be found below.

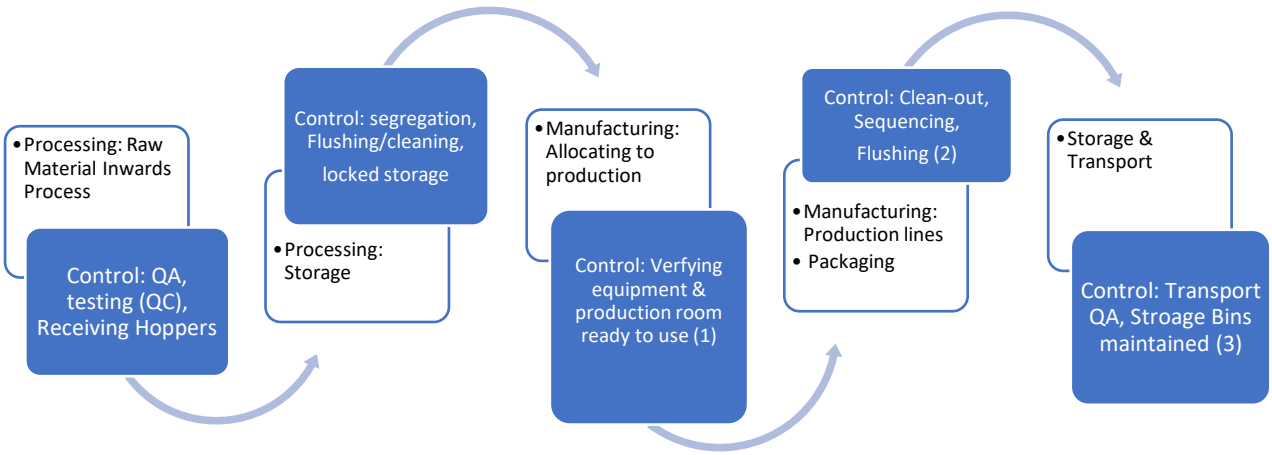

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Figure 1. Flow diagram from inwards good to delivery of finished goods. Control points identified in blue as potential cross-contamination. This diagram is a general overview and shall be used as a guideline only.

(1) Equipment sanitised and ready to use, equipment qualification, dust collector residue (emptied and cleaned).
(2) Operators using sequencing and flushing shall consider batching, mixing, pellet press and feed transfer to finished product bins.
(3) Cross-transference controls after mixing process in storage bins and transport. Sequencing or clean out of delivery trucks.

In the case of multi-species feed mills, manufacturing ruminant feeds and using RAM on site, the SFMCA has defined that the controls identified through risk assessment, must be validated at least every 6 months.

In the case of multi-species mills, manufacturing pig feeds containing ractopamine and manufacturing cattle, sheep or horse feeds, the SFMCA has defined that these controls must be validated through sample testing at least every 6 months.

Completing the Control Validation Test

1. Multi-species Mill Where Sequencing and Flushing are used as Controls

Sampling

The entire feed production line needs to be considered when undertaking the six monthly validation test:

Raw Material Intake: where a common intake system is used for RAM and other ingredients, samples need to be taken immediately after the flush has been completed.

Batching/Mixing: samples should be taken as feed exits the mixer from the first batch of feed following the final flush.

Pelleting: samples should be taken as feed exits the pellet press, as the first feed following flush is manufactured.

Cooling and crumbling: samples should be taken as feed leaves the crumble rolls in the feed batch immediately following the flush.

Finished feed: samples from both out-loading bins and bagged feed packing lines are to be taken from the batch that followed the last flush of the production line.

For some mills there will be additional production spots that could provide cross contamination, these including holding bins and equipment for fat/oil, enzyme or molasses application.

The verification test needs to be able to confirm that no positive test results are found through the production process. If positive results are obtained, corrective actions need to be implemented to address the problem area.

2. Split Production Lines

Where RAM is held on site and production lines are split between ruminant and non-ruminant, the site should still undertake a 6 monthly validation that the system is operating correctly. If there is any common use of equipment such as intake systems, bulk out-loading bins or feed packing, then feed sampling and analysis must be completed.

Similarly, if incompatible medications are in use, such as ractopamine, then 6 monthly validations of the control systems are still required.

3. Single Species Mills

Assuming there is no RAM used on site, the mill will have a significantly lower risk level of ruminant feed contamination from RAM. The risk is however not eliminated as raw materials may be received that are already contaminated.

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These mills need to ensure they have controls in place relating to declarations from ingredient suppliers and transport operators. Rapid assay test strips to routinely check raw materials being received may be used (see Appendix One). Focus should be given to carriers that may be transporting bulk RAM products in prior deliveries.

Single species monogastric mills manufacturing pig and poultry feeds are seen to present no RAM cross transference risk. These mills are still required to have controls in place for medication use and controlling cross transference.

Flushing

Table 1. SFMCA Flush Volume Guideline

Flush Volume (%) *	Cleaning System
5	Fully self-cleaning system
25	Non-self cleaning system

*The actual volume used needs to account for potential feed residue within the mixer and feed carryover. Data suggests by using the appropriate level of flush material and split over two or three flush sequences, residual feed and contaminants are diluted with each passing flush (Kansas State University).

Where the existing flushing control procedures are found to be inadequate, larger volumes of flush material and either double or triple flushing should be implemented.

In deciding upon flush volume, smaller volumes of flush may not adequately flush mixers as the volume may not cover the mixer axle and does not sufficiently fill the mixer. The mill needs to take account of this issue and work in validating the adequacy of flush volume.

Flush material – density of the flush material affects the success of flushing. If lighter density materials such as millrun are in use, there may be lower capacity to flush out heavier ingredients. Some mills are using a combination of limestone and millrun to act as the flush, with the limestone being more effective as a heavier ingredient. Similarly, bentonite may be used as part of the flush mix. Where existing flushing controls are inadequate, use of alternate flush materials should be considered.

Flush material disposal - the flushing material used must be segregated and labelled following flushing. This flush material can only be re-used in feeds that present no residue risk.

Elevator buckets, augers and conveyors – it is recognised that some equipment will hold feed residues that may result in later batch cross transference. Where positive test results are found, attention needs to be given to these points in the production line. Either physical cleaning prior to at risk feed manufacture or re-engineering may be required to eliminate the production limitation.

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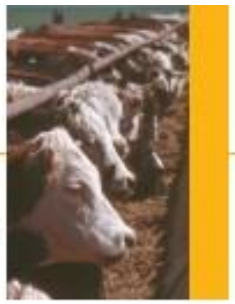
Appendix 1

Example of a Rapid Assay Test Kit for animal material.

FeedChek™



FeedChek™ is a simple, highly sensitive lateral flow test for the detection of meat and bone meal in feed and feed ingredients.

Feed Test for Meat and Bone Meal (MBM) is designed to detect the presence of meat and bone meal (MBM) in animal feed. Currently, the use of mammalian-derived MBM in cattle feed is prohibited or highly regulated in most countries due to its potential to spread Bovine Spongiform Encephalopathy (BSE). As a precautionary measure, some regions have restricted the use of MBM from any animal species in ruminant feeds. In order to accommodate user-specific requirements, the FeedChek Test for MBM incorporates 2 tests into one test strip. One test line indicates the presence of any MBM (avian and mammal) in the sample and the second test line indicates the presence of mammalian MBM in the sample. FeedChek has a 15-second extraction process and provides results in ten minutes. No laboratory equipment is needed to perform the test.

How FeedChek works

The feed sample is added to buffer solution in a sample cup. The cup is capped and shaken for 15 seconds to extract the target protein from the sample. The lateral flow strip is then placed into the sample cup and results are read in ten minutes. The FeedChek lateral flow test is an immunoassay, which employs a unique combination of anti-MBM antibodies conjugated to red-colored particles and coated on the surface of a membrane. The lateral flow membrane contains one control line and two test lines. One test line is specific for mammalian MBM, and the other test line is specific for mammalian and avian MBM. The presence of only one line (control line) on the membrane indicates a negative sample. The presence of 2 lines indicates that the sample is positive for MBM. The presence of 3 lines indicates that the sample is positive for mammalian MBM.

Test Sensitivity

The test was validated using a variety of finished feeds (mixed grain, pelletted, or milled) representative of calf, dairy, and beef cattle feeding programs. These feeds varied in crude protein content, crude fiber content, mineral content, and were either medicated or unmedicated depending on their specific application. The test detects 0.1% (w/w) MBM and 1% (w/w) mammalian-MBM in animal feeds.

Applications

FeedChek works with both raw materials and finished feed.

Packaging

Feedchek is available in kits of 20 tests. All materials to perform the assay are included in the kit.

Feed™

FeedChek™ gives you a simple, affordable test for both raw material and finished feed.

SDI
Strategic Diagnostics Inc.

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Appendix 2

Micro-Tracer Testing
Micro-tracers are coloured uniformly small sized iron particles that are easily identifiable in feed samples. The dye colour provides visual recognition when recovered using a test kit.

For more information on micro-tracers and their use refer to www.microtracers.com

Micro tracers are available from:
Feedworks
Phone: 03 5429 6458
Website: www.feedworks.com.au

Appendix 3

Ractopamine Testing Laboratories

1. Symbio Alliance Conduct a routine (ppm) and a more sensitive (ppb) ractopamine analysis on feed. The more sensitive analysis must be requested. Detection limit in feed for the more sensitive assay is claimed to be down to 5ppb.

   Laboratory Contact:
   Symbio Alliance
   PO Box 4312, Eight Mile Plains, Qld 4113
   Phone: 07 3340 5702
   Email: admin@symbioalliance.com.au

2. National Measurement Institute
   Feed analysis detection limit is claimed to be sensitive down to 1ppb.

   Laboratory Contact:
   NMI PO Box 264, Lindfield, NSW 2070
   Telephone: 02 8467 3600
   Email: info@measurement.gov.au

Appendix 4

For limits on carry-over of common feed "medications" refer to:
Commission Regulation (EU) No 574/2011 16/06/2011
Section VII: Authorised Feed Additives in Non-target Feed following Unavoidable Carry-over.
https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32011R0574