

# **Salmonella Problem Solving Guide**

## **for Renderers – Meat Meal**

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# ABOUT OUR COMPANY

We are a major provider of analytical testing, consulting & training services for agri-food industry

- ✓ Microbiological testing
- ✓ Chemical residue testing
- ✓ Wet chemistry
- ✓ Food, Air, Contact Surfaces
- ✓ Animal Feed, Grains, Animal fats
- ✓ Water, Soils
- ✓ Inorganic chemistry
- ✓ Nutritional analysis
- ✓ Consulting to industry and government
- ✓ Meat & food science
- ✓ Agricultural science and animal health
- ✓ Processing technology
- ✓ HACCP & food safety
- ✓ Market research
- ✓ Training programs



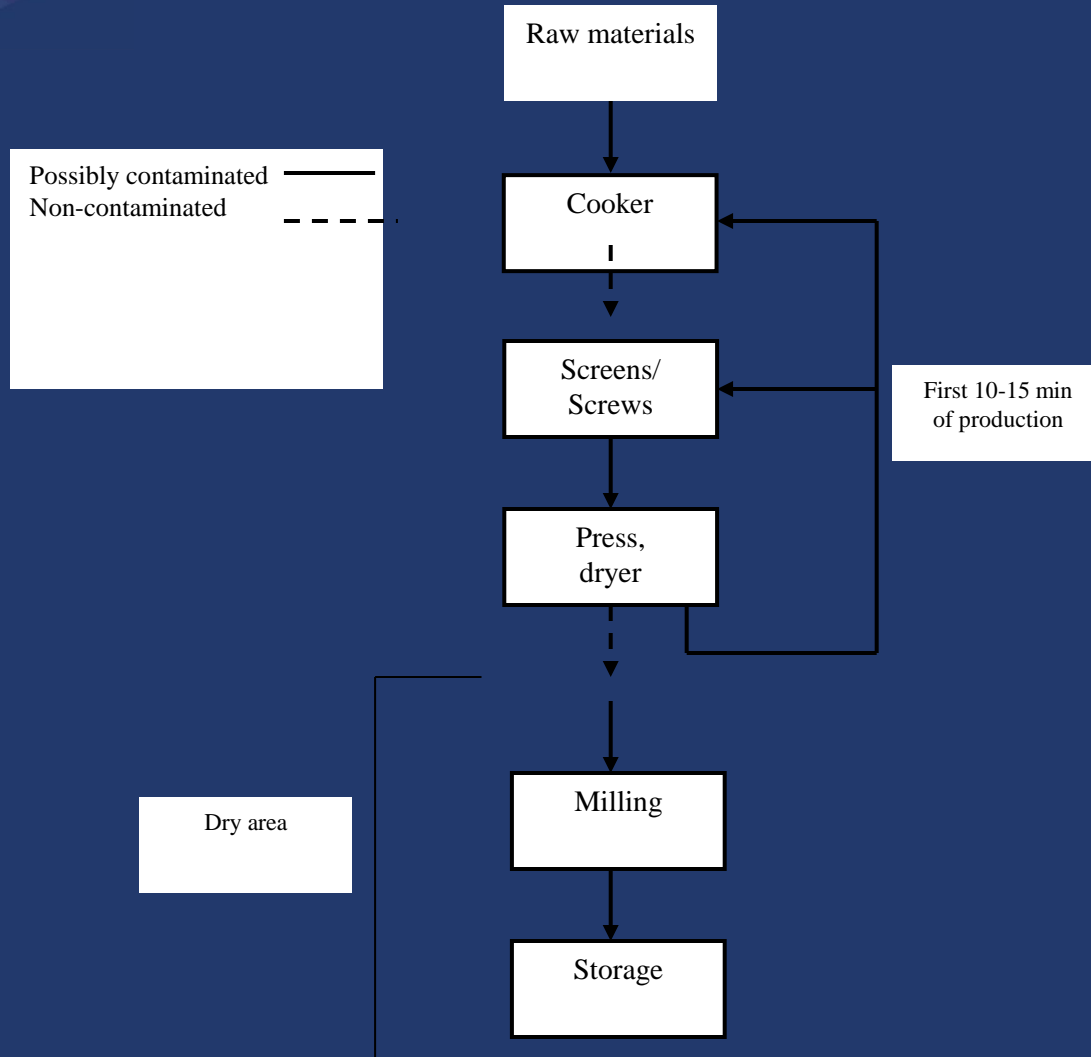
## Issues

- Meat meal is a valuable product for the red meat industry
- Salmonella can occur in meat meal
- There is a perception that some cases of human salmonellosis could be traced back to meat meal.
- Domestic/international specifications for meal to be Salmonella-free

## Aim of the SPS Guide

- Identify known sources of Salmonella
- Assess the extent of Salmonella in meat meal.
- Develop strategies to reduce the incidence of Salmonella in meat meal.

## Overview of potential salmonella contamination



## Methods

1. Sample the environment and product for salmonella
2. Spot temperatures also can be taken.
3. Analyse data to identify where problem areas exist.
4. Identify possible preventive/control measures that can be practically implemented (detailed risk assessment undertaken)
5. Re-sampling and data analysis to confirm if the preventive measures are successful\*
6. Modification of preventive/control measures if necessary.

## General observations

- Salmonella can survive and grow at any point from the press dryer to the silos.
- No point or section was detected as having a high load of salmonella.
- The potential for pre press salmonella contamination carrying over to the final product is negligible
  - mechanical action of the press causes the product to be heated to >90oC and moist atmosphere
- Unless there is heavy contamination of meal prior to the press then preventive measures are best actioned post press.

# Salmonella serovars (project)

Serovar	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Sum	4	13	11	1	20	13	5	5	11	17	2	1	10	2	1

Four most common serovars found.  
Not common in poultry or humans

Fairly common in poultry but not in humans



# Salmonella Problem Solving Guide (SPSG)

The guide is intended to assist renderers to:

1. Identify known sources of Salmonella
2. Identify problem areas
3. Provide preventive measures for implementation

Guide based on:

- Detailed risk assessment – from literature
- Input from participating processors
- Project results

## Inherent problems

Problem	Possible Solution	Outcome
•Poor hygienic design of construction and equipment	•Redesign the plant using hygienic design principles	•Not practical.
•End product contamination	•Decontaminate final product before loadout with heat or chemicals	•Not practical. No single product is effective at final decontamination. Certain technologies which may be effective are costly and/or not available.
•Prevent recontamination	•Decontaminate equipment on a regular basis.	•Not practical. Dismantling and cleaning equipment is difficult.

## The solution

- Corrective actions (eg total clean down) may provide temporary relief from Salmonella contamination of product, BUT
- Real and lasting improvement will come from managing suitable preventive/control measures
- Unless there is heavy contamination of meal prior to the press then preventive/control measures are best focussed post press

## Preventive/control measures

These preventive/control measures focus on the following:

### Hurdle technology

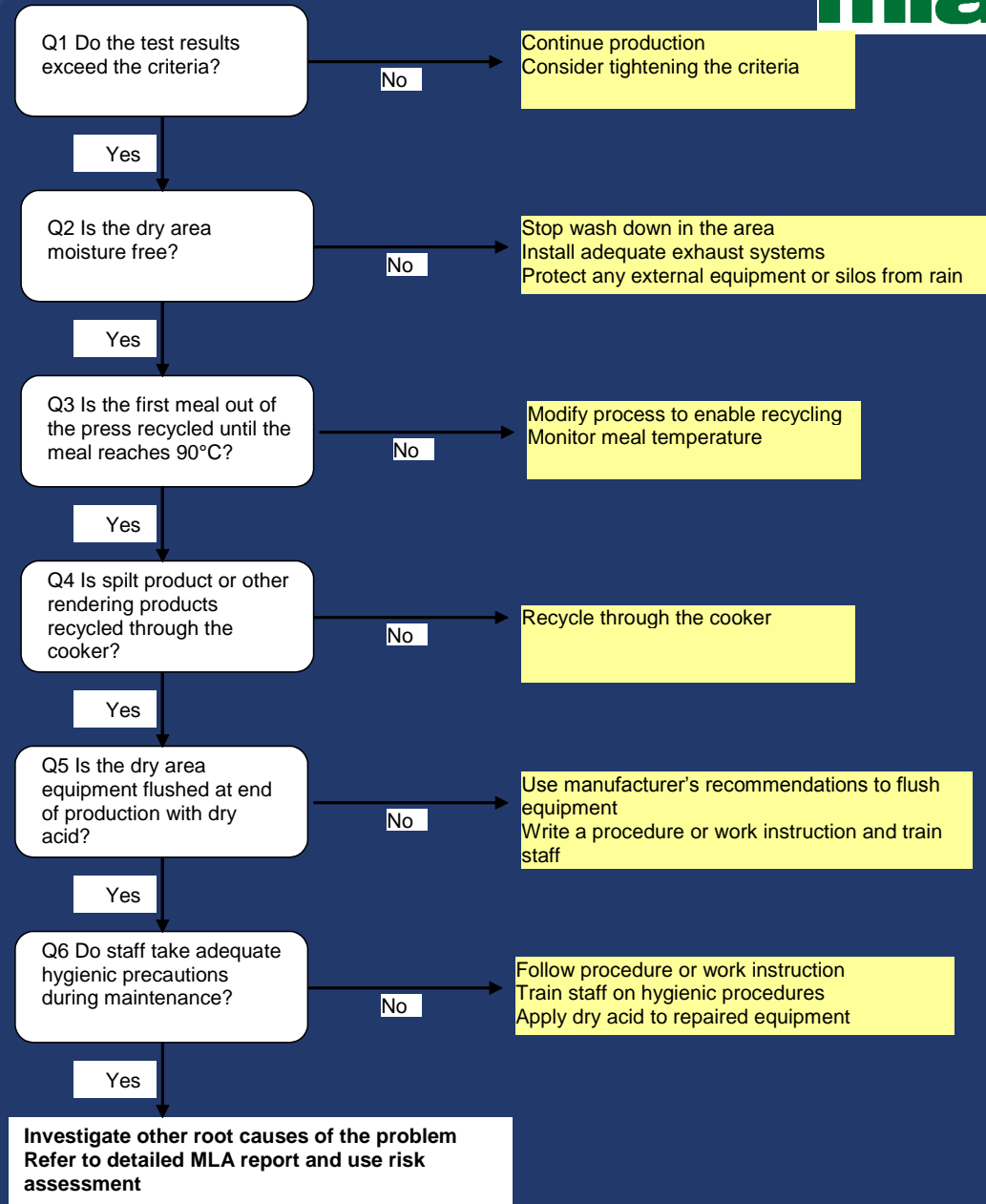
- heat (heat of press or dryer)
- low water activity (moisture removal)
- low pH (addition of acid)

### Good manufacturing practices (GMPs)

- pest control
- prevent water contamination during cleaning
- personal hygiene
- equipment/environment hygiene
- repairs and maintenance procedures

# Decision tree

## Problem solving questionnaire



# Example of decision tree questions

**Q 2 *Is the dry area moisture free?***

**Rationale:**

- Salmonella require moisture to grow. The prevention or removal of excess moisture is one of numerous hurdles aimed at minimising or preventing the growth of salmonella. The moisture content of meat meal is about 5% which is low enough to prevent salmonella growth. If the moisture content of remaining meal on the surface of equipment is high enough then salmonella can grow overnight. Moisture may condense on equipment and storage facilities along the chain due to differing surface temperatures and humidity.

**If YES then go the Q 3.**

**If NO then:**

- cease washing down in the area
- provide adequate exhaust fans for the rooms
- provide suitable exhaust ducts for enclosed screws, conveyers and bins
- provide a system to prevent moisture from exhaust ducts dropping back into the meal or equipment
- provide weather proof cover for any equipment, silos and loadout stations
- consider construction to separate the moist and dry areas more effectively.





## **Activity 1:**

**The trainer will divide you into 6-7 groups.**

- 1. Working in your group, review the Salmonella problem solving Decision Tree, question, notes, "rationale" & Appendix A Best Practice**
- 2. Discuss then share with the rest of the group**
  - a) What is this preventive/control measure for the issue covered?
  - b) What is suggested in the answer is "NO"?



## **Activity 2:**

**Go to Appendix A**

**For the same Questions as you had in the previous activity, identify for your plant/operation...**

- **Current practice for controlling this issue**
- **Potential improvements & practical Y/N?**
- **Actions to make the improvement happen**

**Note: Ask for an example if you are stuck**

# Sampling methodology

## Aim

- Overall plan is to get objective evidence via sampling of the environment and product to assist in problem solving
- emphasis should be on the process - product contact surfaces and non-product contact surfaces where contamination of the product may occur
- Each plant should be appraised first up to identify sampling sites by discussion with management, QA personnel and maintenance workers then by a visual inspection of potential problem areas
- Suitability of the areas to sample should be assessed - flexible depending on the operation, potential risk of contamination, suitability of collection points and safety.
- Each sample should be tested for Salmonella.

## Sites for sampling

1. Product
2. Product Surfaces
3. Non-product contact surfaces

### **Activity 3:**



**Scenario: Ongoing problem with Salmonella, assuming all other options have been considered using the SPS Decision Tree**

**Question: What further investigation could be done – where does the Salmonella risk lie and how could we identify it?**

- 1. Make a list of sampling sites for your operation**
  - a) Product
  - b) Product contact surfaces
  - c) Non-product contact surfaces