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## 8) ISOLATION OF SALMONELLA IN ANIMAL FOODSTUFF FOR POULTRY

Laura Fiorentini<sup>1</sup>, Giovanni Tosi<sup>1</sup>, Paola Massi<sup>1</sup>

<sup>1</sup>Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna

Corresponding author: Dr. Laura Fiorentini. Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna, Sezione Diagnostica di Forlì. Via Marchini 1, 47100 Forlì, Italy- Tel. & Fax +39 0543 721533 Email: forli@bs.izs.it

**Abstract** Here we have reported data referring to the isolation of *Salmonella spp.* in foodstuffs and non-medicated composite feed destined for poultry. We found that the foodstuffs were frequently contaminated compared to the composite non-medicated feed. The most common species found was *S. seftenberg* that belongs to E group that was isolated from Soya protein flour and wheat germ. (We are presently putting a monitoring plan into force that deals with the qualitative study of salmonella in animal feed. It should be noted however that quicker and quantitative techniques should also be activated in the future.

**Key words:** *Salmonella spp.*, raw materials, non-medicated composite feed

### ISOLAMENTO DI SALMONELLA SPP. NEGLI ALIMENTI ZOOTECNICI

#### Riassunto

Questa comunicazione riporta alcuni dati relativi agli isolamenti di *Salmonella spp.* da materie prime e mangimi composti non medicati destinati al settore avicolo. Le materie prime sono risultate maggiormente contaminate dei mangimi composti non medicati con maggior prevalenza della specie *seftenberg* appartenente al gruppo E, isolata da farina di soia proteica e da crusca. Attualmente viene attuato un piano monitoraggio che prevede la ricerca qualitativa della *Salmonella* negli alimenti destinati all'alimentazione zootecnica, anche se è auspicabile che in futuro saranno previste tecniche di tipo quantitativo e più tempestive.

#### Introduction

There is presently a monitoring programme in force throughout the European Union that has been designed to evaluate the contamination levels of *Salmonella spp.* in raw materials used to produce vegetarian animal feed used either as they are or in composite food stuffs for poultry, pigs, cattle, birds, goats, fish and rabbits. It is clear that even vegetable based feed can contain pathogenic agents for animals and man that therefore create food and public health problems. At the moment there are no Community laws referring to zoonotic agents in animal feed specifically from vegetarian based origins. It is for this reason that this monitoring programme could be useful to integrate into the hygiene guidelines and quality control programs of production, transport, storing and handling of zoo-technical food products, that will enter into force on 1<sup>st</sup> of January 2006. Therefore, the microbiological controls have recently been intensified in order to measure the frequency and level of *Salmonella spp* contamination in vegetarian based animal feed. From 1<sup>st</sup> January 2003 to 10<sup>th</sup> July 2004, the IZSLER microbiology laboratories at Forlì analysed 304 samples; 125 of which were foodstuffs and 179 complete non-medicated animal feed all of which were destined for poultry. These were all samples supplied directly from the producers and by the breeders according to strict internal quality control.

#### Materials and Methods.

The feed samples were analysed according to a five consecutive step microbiological programme:

- Pre-enrichment of the non-selective liquid medium (tamponed peptonated water) inoculated with the examined sample and then once it was homogenised and incubated at 37°C for 24 hours.
- Enrichment in selective liquid medium (selenite cystine mixture and Rappaport Vassiliadis mixture) incubated at 37°C and 42°C respectively for 24 hours.
- Petri dishes prepared with selective and differentiated solid medium Hektoen enteric Agar were inoculated and then incubated at 37°C for 24 hours.
- Suspect colonies were transplanted to Kligler Iron Agar and incubated at 37°C for 24 hours.
- Biochemical and serological identification of the transplanted colonies (Zavanella M., 2001; Division of Microbiology. Center for Food safety and applied nutrition, 1984; Norme ISO 6579, 1993).

## Results

The detailed results are shown in the tables 1, 2 and 3. About 10% (28/304) of the samples were positive for *Salmonella spp.* with a higher frequency of *S. seftemberg* group E species, isolated from the protein Soya flour and wheat germ. Of the 28 strains isolated, 4 were not typed. Worth mentioning was the isolation of *Salmonella typhimurium* from protein Soya flour and of *Salmonella enteritidis* from complete non-medicated feed. Both of these strains are considered pathogenic species, as is *Salmonella kedougou*, which apart from being particularly rare was also responsible for an episode of food poisoning in 1994 in the Marche region in patients who had eaten cooked pork (Staffolani M et al., 2003). The foodstuffs were more frequently contaminated than the non-medicated composite feed.

## Discussion

*Salmonella* is more frequently present in foodstuffs and Soya can be considered a good substrate. Composite feed are less frequently contaminated probably due to the production process, the use of additives and their lower humidity. We should not forget that animals become infected with salmonella and possibly develop salmonellosis also from contaminated feed, that justify a a monitoring programme. However presently this monitoring program is only qualitative even given the ever greater need to find also the quantitative data as well as prevent salmonella and any other zoonotic agents as early as possible in the food chain.

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**Table 1:** Raw materials

<b>N. samples</b>	<b>raw materials</b>
108	protein Soya flour
7	Mais
5	Crusca
2	FARINA DI GRANO TENERO
1	FARINA D'OSTRICHE
1	FARINA DI PESCE
1	FARINA DI GIRASOLE
125	Total raw materials

**Table 2:** Salmonella in raw materials

raw materials (28 strains <i>Salmonella</i> /125 samples)		
raw materials	Group	Salmonella (species)
SOJA	E	SENFTENBERG
SOJA	C	ARDWICK/RISSEN
SOJA	C	ARDWICK/RISSEN
SOJA	E	SENFTENBERG
SOJA	E	SENFTENBERG
SOJA	C	ARDWICK/RISSEN
SOJA	E	SENFTENBERG
SOJA	E	GRUPPO E (non tipizzata)
SOJA	E	GRUPPO E (non tipizzata)
CRUSCA	E	SENFTENBERG / IDIKAN
SOJA	C/ not categorised	KEDOUGOU/MBANDAKA
SOJA	C/E	S. MONTEVIDEO/RISSEN
SOJA	E	MUENSTER
SOJA	E	HAVANA
SOJA	E	ENTERICA Subsp. ENTERICA
SOJA	B	TYPHIMURIUM
SOJA	E	MUENSTER
SOJA	E	SENFTENBERG
SOJA	not categorised	DERBY
SOJA	C	MONTEVIDEO
SOJA	E	ENTERICA Subsp. ENTERICA
SOJA	not categorised	MBANDAKA

**Table.3:** Salmonella in non-medicated composite feed

non-medicated composite feed 4positive /179 samples	
group	<i>Salmonella</i> (species)
C	KENTUCKY
not categorised	BRAENDERUP
D	ENTERITIDIS
not categorised	ENTERICA Subsp. ENTERICA

## 9) EVALUATION OF AN ADDITIVE EFFICACY IN BROILER LITTER MICROBIAL LEVEL CONTROL IN FIELD: PRELIMINARY RESULTS

**G. Tacconi<sup>1</sup>, P. Casagrande Proietti<sup>1</sup>, R. Ventura<sup>2</sup>, R. Arcaro<sup>2</sup>, M. Pennacchi<sup>2</sup>**

<sup>1</sup>Dipartimento di Scienze Biopatologiche Veterinarie, Università di Perugia, Italy <sup>2</sup>Laurea in SPA

Corresponding author: Prof. Giuseppina Tacconi. Dipartimento di Scienze Biopatologiche Veterinarie, Sezione di Patologia e Igiene Veterinaria, Università degli Studi di Perugia - Facoltà di Medicina Veterinaria, Via S. Costanzo,4 - 06126, Perugia, Italy. Tel: +39755857736. Fax: +39755857738 - E-mail: [gtacconi@unipg.it](mailto:gtacconi@unipg.it)

**ABSTRACT** The present study was conducted to evaluate in field the efficacy of an additive (SOP® C Poultry), as an agent for the control of micro-organisms in broiler litter. The Total aerobic Microbial Count, Staphylococcus spp., Coliforms, and Salmonella spp. in broiler litter samples of both the Houses, 2 and 3, were determined, and also at the end of each cycle the mortality rate was recorded. The results showed significant differences of all the microbial counts between treated litter samples and the control. Significant resulted also the difference in mortality rate recorded between H2 and H3.

**Key words:** litter additive, environment, broiler, TMC, Coliforms, Stapylococcus spp., Salmonella spp., mortality.