

Poster beim 46th International Congress of Meat Science & Technology, 27.08.-01.09.2000, Buenos Aires, Argentinien *Salmonella* findings in a slaughtering and cutting plant

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Background

286 samples of ground meat produced in an authorized EU slaughtering and cutting plant were examined for the presence of *Salmonella* according to the EU-Directive for Ground Meat (95/65/EG). Results showed that 44 (15.4%) of all tested samples were *Salmonella* positive.

Objective

The objective of this study was to collect data concerning the *Salmonella* contamination of ground meat from one slaughtering and cutting plant and to differentiate the predominant serotype by PFGE. Results are intended to create a basis for a contamination study to elucidate origin and contamination pathways

Material and Methods

***Salmonella* findings.** Between June 1996 and December 1997 286 pool samples of prepacked deep frozen ground meat (beef and pork) were examined for the presence of *Salmonella* according to ISO 6579: 1993. All pool samples consisted of 5 subunits in order to be representative of a day's production. When a pool sample was determined *Salmonella*-positive, additional examinations were carried out separately for each subunit. Thus, 112 *Salmonella* isolates were collected, serotyped and examined by PFGE.

PFGE. DNA extraction was performed as described by Maslow et al. (1993) with the modifications of Björkroth et al. (1996). DNA was restricted with *Xba*I (Weide-Botjes et al., 1997). Additionally, *Bln*I was used. The DNA fragments were separated in a 1% agarose gel over 22 h at 200 V via contour-clamped homogenous field electrophoresis (Gene Navigator™ System, Pharmacia Biotech) with linear ramping (initial and final switching times of 0.25 and 50 sec). After electrophoresis the gels were stained with ethidium bromide and analysed using a Gel Doc 1000 imaging system (Bio-Rad).

Results

Regularly, more than one subunit of a pool sample was *Salmonella* positive. In six cases, all 5 units of a day's production were contaminated. Most *Salmonella* findings occurred at intervals of several weeks or even months. The seasonal distribution of the number of *Salmonella* positive isolates is given in **Tab. 1**. Further data are published by Stock (1999). During summer, no increase of *Salmonella* findings could be observed.

Serotyping results are shown in **Tab. 2**. *S. Typhimurium* was the predominant serotype with 78 (69.6 %) of 112 isolates, 7 of which were *S. Typhimurium* var. Copenhagen. Among the 78 *S. Typhimurium* isolates, 10 different PFGE patterns were detected. One third of all *S. Typhimurium* isolates showed an identical and unique PFGE fragment pattern given in **Fig. 1**. This is remarkable, as isolates with this pattern originated from ground meat samples which were produced over a period of nearly 20 months.

Discussion

According to literature *Salmonella* are regularly found in ground meat and *S. Typhimurium* is the predominating serovar (Blaha, 1996; Louwers et al., 1997). The results of the present study underline that a total day's production of ground meat can be contaminated by clonally related *Salmonella* isolates. In four cases all five subunits of a day's production were contaminated with *S. Typhimurium* with an identical PFGE pattern. This implies severe economic damage and it is therefore strongly recommended to search for the plant specific contamination sources and routes of these bacteria. Moreover, apparently clonally related *Salmonella* isolates showing the same PFGE pattern were repeatedly detected over a long time period. These findings could indicate either a recurring contamination of meat from a common source within the plant or the entry of salmonella of clonal origin e.g. via slaughtering animals. Further elucidation requires a profound sampling of animals and the total slaughtering line (machines, utensils, surroundings etc.).

Acknowledgement

We thank Dr. H. Beck and his group from the Department for Health Service, South Bavaria, Oberschleissheim for serotyping the *Salmonella* isolates.

Literature

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Tab. 1 Seasonal distribution of *Salmonella* findings isolated over a period of one year (Jan-Dec 1997)

Month	No. of <i>Salmonella</i> isolates
January	6
February	4
March	3
April	1
May	1
June	2
July	1
August	0
September	1
October	0
November	3
December	1

Tab. 2 Serotyping results of 112 *Salmonella* isolates from ground meat

Serotype	Number of isolates	%
<i>S. Typhimurium</i>	71	63.4
<i>S. Typhimurium</i> var. Copenhagen	7	6.2
<i>S. Derby</i>	17	15.2
<i>S. Blockley</i>	5	4.4
<i>S. Virchow</i>	3	2.7
<i>S. Heidelberg</i>	2	1.8
<i>S. Stanley</i>	2	1.8
<i>S. Grampian C1</i>	1	0.9
<i>S. Give E1</i>	1	0.9
<i>S. Montevideo</i>	1	0.9
Others	2	1.8

Fig 1 PFGE patterns of 16 *S. Typhimurium* (lane 1-16) serovars isolated over a period of 20 months, M = PFGE-Marker (New England Biolabs), fragment length in kb

