PROBLEMS OF MICROBIOLOGICAL STANDARDIZATION OF MEAT AND MEAT PRODUCTS IN SLOVENIA

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Four years ago our still valid microbiological standards incl. sampling, bacteriological methods and criteria for meat and meat products were analyzed and compared with regulations used in some foreign countries or suggested by WHO/FAO.

During the years 1989-1991 103 samples of raw meat, 39 samples of minced meat (mechanically deboned and fresh minced), 85 samples of heart, liver and stomach tissue and 198 samples of meat products were examined on the base of our law regulations and some foreign regulations. The proposal was to rectify some our standards for meat and meat products to assure higher standard of food safety regarding standardization of methods for *Salmonella spp.* detection, narrowing *Staphylococci spp.* and *Clostridium spp.* group to *Staphylococcus aureus* and *Clostridium perfringens* and adding TPC criteria to some meat products.

Results showed our "plus" on the field of limits of bacterial contamination because they were lower than other permitted in foreign criteria. Our "minus" were standardized methods which were not so sensitive as other prescribed.

Table 1: Results of comparison of 5 different methods for salmonella detection.

METHOD	No. of samples examined	positive	negative
A	107	1 (0,93%)	106 (99,07%)
B	153	5 (3,27%)	148 (96,73%)
C	153	8 (5,23%)	145 (94,77%)
D	21	6 (28,57%)	15 (71,43%)
E	107	16 (14,95%)	91 (85,05%)

Table 2: Results of *Clostridium spp.* testing

SAMPLE	No. of samples tested	*Clostridium spp.*	*Clostridium perfringens*
raw meat	55 (21%)	4 (1.51%)	0 (0%)
minced meat	29 (11%)	0 (0%)	0 (0%)
meat prod.(past)	180 (68%)	1 (0.38%)	0 (0%)
TOTAL	264 (100%)	5 (1.89%)	0 (0%)

Table 3: Suitability of meat products

Meat products	Our standard + TPC (norm = 10^4)	
	excl. TPC	incl. TPC
suitable	179 (99.4%)	159 (88.3%)
unsuitable	1 (0.6%)	21 (11.7%)

Four years later we want to rebuilt our standards for meat and meat products adding new criteria for systematic and routine control for *Listeria monocytogenes*, *Campylobacter spp.*, *Yersinia enterocolitica* and rectify some procedures for *Salmonella spp.* Partially we already analyzed risks for the human health, we analyzed epidemiology and also a monitoring of food producing plants was carried out. We also checked some methods regarding *Listeria spp.* and *Salmonella spp.* which seemed worthy of the confidence placed on them in case of public health protection and complete systematic microbiological control.

Table 4: Results of *Salmonella spp.* positive samples (ISO 3565) in meat and meat products

	No. of samples	*Salmonella spp.*
raw meat	611 (14%)	0
viscera	440 (10%)	7
minced meat	148 (3.4%)	1
meat prod.(past)	3182(72.6%)	0
TOTAL	4381(100%)	8 (0.183%)

Table 5: Results of *Listeria spp.* (USDA-FSIS method) in meat and meat products

	No. of samples	*Listeria spp.*
raw meat	4 (1.1%)	0
cooked poultry	314 (84.9%)	15
minced meat	15 (4.0%)	5
meat prod.(past)	3 (0.8%)	0
ready to eat prod.	34 (9.2%)	0
TOTAL	370 (100%)	20 (5.4%)

It is obvious that *Salmonella spp.* and *Listeria spp.* are not so big problem as we expected. Nevertheless we will suggest to our ministry to incorporate criteria for *Listeria spp.* in new regulations and to leave standard for *Salmonella spp.* the same as it is with the change of the isolation method to ISO 6579.

At the moment in our regulations the valid standards are: for salmonella absence in 25g using the ISO 3565 isolation method, for *Staphylococci spp.* absence of Coagulase positive *Staphylococci spp.* in 1g (raw meat), 0.1g (minced meat) and 0.01g (raw meat in pieces and cooked meat products) and for *Clostridium spp.* absence of Sulphitreductive *Clostridium spp.* in 1g, 0.1g and 0.01g.

LITERATURE

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