OCCURRENCE OF OCHRATOXIN A - PRODUCING MOULDS AND OCHRATOXIN A IN SOME MEAT PRODUCTS

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Background:

Ochratoxin A (OA), a toxic metabolite of several Aspergillus and Penicillium species, is very often contaminant of various types of foods and raw materials for their production in Balkanian countries. It is a nephrotoxic and hepatotoxic compound and many mycotoxicologists consider that OA is associated with Balkan endemic nephropathy (Krogh et al., 1977; Petkova-Bočarova & Castegnaro, 1985).

Objectives:

The objective of this study was to examine the occurrence of ochratoxin A - producing moulds on some meat product surfaces, their share in isolated mycopopulations and the presence of OA.

Material and Methods:

Samples. The presence of ochratoxigenic moulds and OA in various meat products (80 samples: tea sausage-11, Budim's sausage-6, Novi Sad's sausage-7, summer sausage-5, barbecue sausage-11, Serbian sausage-8, beef sausage-4, pork sausage-7, mortadella-2, bacon fat-7, smoked ham-7, dried neck-5) was investigated. Samples were taken from meat processing plant and from market.

Mycological investigation. Total viable counts of moulds per cm² was performed by cutting out a visible moulded piece of surface of meat product and transferring into Petri dishes. After that 15 ml of Sabouraud dextrose agar (SDA) with 1 % of streptomycin was added. Incubation was done at 25°C for 7 days. Isolation and identification of Aspergillus and Penicillium species were carried out according to Samson & van Reenen-Hoekstra (1988) and Samson et al. (1976).

Mycotoxicological investigation. Qualitative and quantitative determination of OA was performed by using a TLC method given by O.A.O.C. Methods (1990).

Results and Discussion:

Mycological investigation. Between 6.6 and 27.8 moulds per cm² were isolated from visible moulded surface of meat products. About 3 % of meat samples were contaminated with Aspergillus spp. Only one of them (A. ochraceus Wilhelm) belongs to the producers of OA (Samson & van Reenen-Hoekstra, 1988). It was isolated from smoked ham only (Table 1).

Table 1. Ochratoxigenic mould species isolated from meat products

Meat product	Mould species						
	A. ochraceus	P.aurantiogriseum	P. chrysogenum	P. commune	P. verrucosum var. verrucosum	P. verrucos var. ochrace	
Tea sausage		+	+	conditestals both t	mest slutries and		
Budim's sausage	Annual Street, and Street,	+	+	with R-killer to the constant	are adjusted to 24°3	and some life	
Novi Sad's sausage		+	+	no an five extringial	Portate tribe	+	
Summer sausage		+	rea weeks dimate	dember programe	+ + + + + + + + + + + + + + + + + + + +	mer cultur	
Barbecue sausage	ead as control to	+	+	ensor to nH in the	austres, weight to	of and	
Serbian sausage	в жилифидров п	rentline+ of Lines	4 1 1 1 1 1	13. md + 979 2 to x	of Listeria in salami mi	his made +	
Beef sausage		+ 003	+			3.5	
Pork sausage	ni-os Palconi wis	7 516 est volle em	+	added, +orbital	nicroserophilic for	raya daya di	
Mortadella	m were routuine	i semi austribulieri	efter en + hannu	nodefeat emiliarle	les McClain & Le	1986 9198	
Bacon fat	LAB were dete	fed by pota Mating	(enumeration) as a	rell as up+an plan	g (visual recognital	at and	
Smoked ham	nation) +n MIS	Qxold), an apylogge	in lacult+ed for th	ree days at 30°C.	1	1 00	
Dried neck	D. Description of the second	+			+//		

A dominant share in mycopopulations isolated from meat products had *Penicillium* species. They found to be contaminants of all samples tested. Five species, from totally 16 *Penicillium* species (*P. aurantiogriseum* Dierckx, *P. chrysogenum* Thom, *P. commune* Thom, *P. verrucosum* Dierckx var. *verrucosum* Dierckx var. *verrucosum* Dierckx var. *ochraceum* (Thom) Samson, Stolk & Hadlok), are known

as UA - producing moulds.

P. aurantiogriseum was the most frequent fungus. All meat products, except smoked ham, was contaminated with it. Incidence of high contamination caused by P. chrysogenum was also observed on all products, except summer sausage, bacon fat and dried neck.

P. commune was isolated from Serbian sausage, pork sausage and bacon fat, P. verrucosum var. verrucosum from summer sausage and dried neck and P. verrucosum var. ochraceum from Novi Sad's sausage and Serbian sausage.

It was found that P. chrysogenum had the highest share in mycopopulations. Even 93 % of fungal strains isolated from tea sausage, 65 % of strains isolated from Budim's sausage as well 63 % of them originated from pork sausage belonged to this mould species. Further, between 36 and 48 % of strains isolated from barbecue sausage and beef sausage were determined as P. chrysogenum.

Mycotoxicological investigation showed that OA was found in tea sausage (2 samples), pork sausage (1 sample), barbecue sausage (1 sample) and beef sausage (1 sample) (Table 2). Concentrations of OA varied from hardly detectable (trace) to 12.0 µg/kg. The presence of OA probably resulted by fungal growth on the surface of meat products. Namely, OA - producing moulds were isolated from toxin-positive meat samples, too.

Table 2. Meat products contaminated with OA

Meat product	No. of samples tested	OA - positive samples	Concentration of OA (μg • kg ⁻¹)
Tea sausage	c can dusa bout 11 no but ductor of	2	12.0
Budim's sausage	6	a	12.0
Novi Sad's sausage	7	ished of &. con Otavity Ironal	CHVES To enhance the Lo
Summer sausage	5	a to repair any disaage, and the	ave broth allowing the bacter
Sarbecue sausage	Management (W 11) rass program	nation being directed. Buttared	sees the curducture of the oran
Serbian sausage	8	TO INTER DITE OF C IN COMMUNIC	trace
seef sausage	4	ado, sile alimbra a acidente sec	U III TITUTA III TATA III TO I
ork sausage	7	or ser w. indufor impedience	trace
Mortadella	2	and the section of the section of	trace
Bacon fat	7	elegy on I to be the 111 130 d	-
Smoked ham	7	supplied to the supplied of the State	
Dried neck	5	They (51) Walter District THE	THO HOU IS VESTIONAL OF

JA was not detected

Conclusions:

- 80 samples of various meat products (tea sausage, Budim's sausage, Novi Sad's sausage, barbecue sausage, Serbian sausage, beef sausage, pork sausage, mortadella, bacon fat, smoked ham, dried neck) were analyzed on the presence of ochratoxigenic moulds and ochratoxin A (OA).
- From 6.6 to 27.8 moulds per cm² of visible moulded meat products surfaces were established.
- Ochratoxigenic moulds were isolated from all of meat product tested. They were classified into 6 species: A. ochraceus, P. aurantiogriseum, P. chrysogenum, P. commune, P. verrucosum var. verrucosum and P. verrucosum var. ochraceum.
- All types of meat products, except smoked ham, were contaminated with P. aurantiogriseum and only one type (smoked ham) with
- The highest share in isolated mycopopulations had P. chrysogenum.
- Five samples (tea sausage 2, barbecue sausage 1, beef sausage 1, pork sausage 1) contained OA at concentrations from hardly detectable (trace) to 12.0 μg/kg.

Pertinent literature:

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