

Studies of HAA accumulation in meat products, depending on the raw materials type and the heat treatment duration

Steaks weighing 150.0 ± 1.0 g and 2.5 cm thick were formed from chicken, pork and beef. After steaks formation they were fried using electric grill in temperature 230°C . First set of steaks were fried during 5 mins on each side, second one – during 7,5 mins, and the third set were fried during 10 mins on each side.

Method

For the development of the method of HAAs determination in meat products as standards we used:

- 2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline (MeIQx) – manufactured by Toronto Research Chemicals (Canada) with purity of above 99.0%;

- 2-Amino-1-methyl-6-phenylimidazo(4,5-b)pyridine (PhIP) – manufactured by ChemCruz (USA) with purity of above 95.0%.

Determination of HAAs in meat products was made using HPLC system (Agilent 1200) with QQQ MC/MC detector (Agilent 6410B). Column C18 4.6x50 mm, 1.8 μm (Agilent, USA) were used for analytes separation. Acetonitrile (Panreac, France), formic acid (Merc, USA), deionized water obtained on the MilliQDirect 8 system (France) were used as reagents.

Sample preparation

After frying the samples were cooled at room temperature then the samples were ground. Ground samples were hydrolase in 1M NaOH solution in ethanol. After that the hydrolysis analytes were extracted by the diethyl ester. Then the diethyl ester was evaporated to dry residue, which was dissolved in 1 ml of acetonitrile transferred into chromatographic vial for analysis.

Results

Steaks made of	Heat treatment duration on each side, min	Amount of determined HAAs, ng/g	
		MeIQx	PhIP
Poultry	5,0	$3,84 \pm 1,34$	$18,61 \pm 6,51$
Pork		$12,02 \pm 4,21$	$35,07 \pm 12,27$
Beef		$6,20 \pm 2,17$	$36,36 \pm 12,72$
Poultry	7,5	$5,99 \pm 2,10$	$29,77 \pm 10,42$
Pork		$18,63 \pm 6,52$	$55,05 \pm 19,27$
Beef		$9,92 \pm 3,47$	$51,99 \pm 18,20$
Poultry	10,0	$9,11 \pm 3,19$	$45,25 \pm 15,84$
Pork		$29,26 \pm 10,24$	$83,13 \pm 29,10$
Beef		$15,27 \pm 5,35$	$76,94 \pm 26,93$

The studies did not shown a large difference in the total concentration of HAA formed during frying of pork and beef, but they showed that the amount of HAA in frying chicken is 1.5-2 times less than that in pork or beef. At the same time, an increase in the duration of heat treatment by 2.5 minutes on each side increases the amount of HAA formed in the product almost 1.5 times



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