International Association for Food Protection

GIDA TURKISH FOOD GÜVENLİĞİ SAFETY DERNEĞİ ASSOCIATION

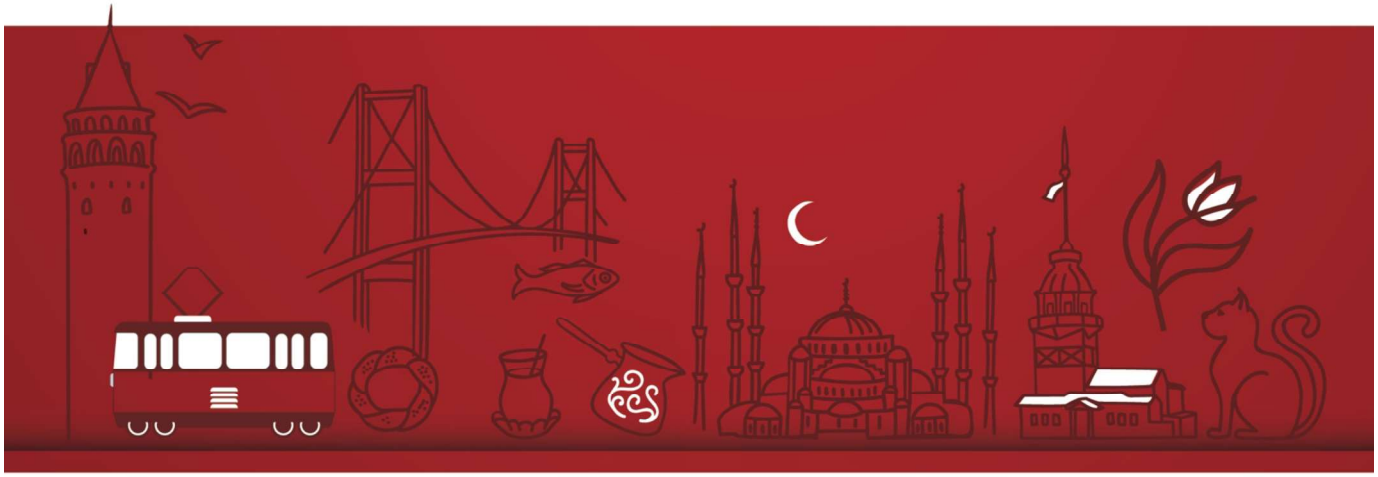
7th International Food Safety Congress

3-4 November 2022 Istanbul-TÜRKİYE

Grand Cevahir Hotel & Convention Center

"Safe food for now and future"

ABSTRACT BOOK



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Changes in Biogenic Amines Content During Processing of Traditional Sausage *Sjenički sudžuk*

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Sjenički sudžuk is traditional dry-fermented beef sausage from south-western region of Serbia. During fermentation and ripening, high amount of free amino acids is generated and precondition for biogenic amines (BAs) formation is settled. Accumulation of BAs is a consequence of microflora activity. Hence it could be seen as good hygienic practice indicator.

Sample sausages were produced in small processing facility within town of Sjenica. It was done according to traditional procedure, using fresh boneless beef and spices (sea salt, raw garlic paste, black pepper and red sweet paprika powder). Further, raw sausages stuffed into natural casings, underwent process of smoking/drying/ripening during 23 days. For BAs analysis raw sausage mixture and three sausage samples were taken after 3, 7, 15 and 23 days of processing.
Putrescine, cadaverine, histamine and tyramine were determined as dansyl derivatives, using liquid chromatography (Agilent 1200 series), equipped with a diode array detector on an Agilent, Eclipse XDB-C18, 1.8 µm, 4.6 x 50 mm column. As solvents, acetonitrile (solvent A) and water (solvent B) were used. Gradient elution program was established: initial 50% B; linear gradient to 10% B in 7.6 min, 10% B to 10 min; linear gradient to 50% B in 2 min. Flow rate was 1.5 mL/min, column temperature was 40°C and injection volume was 5 mL.

In the raw sausage mixture, BAs were not detected, indicating good hygienic quality of raw materials. After three days of processing, only tyramine was quantified (48.5 ± 2.91 mg/kg), confirming previous data of its highest abundance and prevalence in dry-fermented sausages, with usual content ranging from 50 to 300 mg/kg. Following logarithmic growth pattern, on the 23rd day of production tyramine content reached 147 ± 8.30 mg/kg. After 7 days of production putrescine and cadaverine were found in low concentration. Subsequently, cadaverine showed slow linear increase ($p<0.05$) from 20.4 ± 2.12 to 30.8 ± 3.76 on 23rd day. On the other hand, putrescine concentration significantly increased ($p<0.05$) during ripening period, becoming the most abundant amine in *Sjenički sudžuk* (212 ± 10.1). Histamine was only detected on 23rd day of production. It is the most important BA because of its toxic effects and the single one with stipulated maximal amount, by European Council: 100 mg/kg in some fish species and 200 mg/kg in fishery products. Its content in *Sjenički sudžuk* was only 9.69 ± 0.70 mg/kg. Moreover, sum of tyramine and histamine was 156.69 mg/kg at the end of production, what was lower than limit of 200 mg/kg suggested as criteria for good hygienic conditions. Furthermore, according to European Food Safety Authority (EFSA) prescribed thresholds for these two amines consumption (healthy person) are: for tyramine – 600 mg/meal and for histamine - 25 mg/meal. Hence, these tolerable limits would hardly be reached by consuming *Sjenički sudžuk*. Considering good manufacture practice, content of cadaverine and histamine are proposed as indicators, since their accumulation is closely connected with bacterial spoilage, and in this research their contents remained at low values.

In conclusion, four analysed biogenic amines were detected at the end of processing, on 23rd day. However, the obtained concentrations remained lower then recommended and stipulated thresholds, proving that production of *Sjenički sudžuk* was in accordance with good hygienic and manufacturing practice.