**P-01-20**

## Monitoring of Thuringian meat products for nutrition-relevant criteria and derived recommendations for the consumers and meat processors (#347)

Friedrich Schöne[1], Antonia Ibel[2], Ralf-Peter Bähr[1], Christine Dawczynski[2], Marcus Ihling[3], Stefan Lorkowski[2]

[1] Thuringian State Institute for Agriculture and Rural Development, Division Laboratory and Surveillance, Jena, Germany; [2] Friedrich Schiller University Jena, Institute of Nutritional Sciences and Competence Cluster for Nutrition and Cardiovascular Health (nutriCARD), Halle-Jena-Leipzig, Germany; [3] Ernst-Benary-School, Erfurt, Germany

### Introduction

In Germany, meat consumption of ca. 60 kg per capita and year represents half of this amount as meat products, mainly sausage. Within the "landscape of German Wurst", Thuringia´s part is also recognized by EU legislation with the *Protected Geographical Indication* of several sausage varieties. Two third of meat products are purchased in packed form, with mandatory labelling also of nutrition facts. However, one third, mostly in the butcher´s shops, is offered unpacked with no nutrient labelling. In the present study, a defined and representative assortment of frequently consumed meat products from different processors should be investigated. A great diversity was expected for the different kinds of meat products in the gross energy (GE) and the content of protein, fat and salt. However, differences were also hypothesized for the same meat product originating from different processors. Combining the monitoring results with the per-capita consumption of meat products, should estimate their contribution to the intake mainly of fat and salt (https://de.statista.com/statistik/daten/studie/163791/umfrage/pro-kopf-konsum-von-wurstwaren-und-sonstigen-fleischerzeugnissen-in-deutschland/). In addition, the results of the present monitoring were compared with a similar former study (Schöne et al. 2004 a and b) and with the official German Food Tables (BLS 2016).

### Methods

A total of 235 samples represented 17 meat products from the four main groups: *rawsausage* (n=4, e.g. *salami*), *scalded sausage* (n=5, e.g. *bratwurst*), *cooked sausage* (n=4, e.g. *liver sausage*) and*cured hams and belly bacon* (n=4).The number of processors amounted to 15 enterprises which could be subdivided into 8 *bigger plants* (1000-4000 tons yearly production) and 7 *local handicraft businesses* (300 bis 800 tons yearly production). Sample preparation and analyses were performed according to EN ISO standards of the Official Collection of Methods according to § 64 of the German Foodstuffs and Feed Code. Results are provided as means for the main groups and as Boxplots for a typical product from each group. These parameters, the standard deviation (SD) and minimum maximum ranges are found in a comprehensive report (Schöne et al. 2018).

### Results

The group of cured hams and belly bacon (n=49), which show clearly the lean and fat parts, represented the highest mean content of protein and salt (21 and 3.3 g/100g) and the lowest content of fat (18 g/100g) associated with the lowest GE of 244 kcal/100g. Raw sausages (n=53) had the highest fat content (33 g/100 g), the highest GE level (369 kcal/100g) and a moderate protein and salt content (18 and 2.9 g/100 g). Scalded sausages (n=74) contained less fat, protein and salt (20, 15 and 2.1 g/100g) than raw sausages. Cooked sausages (n=59) showed an intermediate fat and protein content (26 and 17 g/100 g), finding them between the values of raw and scalded sausages. However, the group of cooked sausages had the lowest salt content (2.0 g/100g).

There was also high variability within a given individual meat product originating from the 15 different producers. For example, the fat content of *salamis* ranged from 18 to 44 g/100 g (mean ± SD 34 ± 8 g/100g) and the salt content from 1.4 to 4.7 g/100 g (mean ± SD 3.6 ± 0.9 g/100g). The high variation in nutrient content (Fig. 1 and 2) and GE level, particularly in combination with the unlabelled/unpacked offer, creates a high degree of uncertainty for health-conscious consumers. Thus, the consumption of meat products (Fig. 3) multiplied with the analyzed fat and salt contents would provide an average of 19 g fat and 2 g salt per capita and day corresponding to one third of the amounts recommended for these dietary compounds. A calculation for the *best* vs. *worst case* for the fat and salt intake via the meat products with lowest and highest fatness as well as saltiness resulted in 13 vs. 26 g fat and 1.3 vs. 2.5 g salt per day.

### Conclusion

In the Thuringian meat products analyzed, the mean fat content was somewhat higher, the salt content lower than in the respective standards of the German Food Tables (BLS 2016). As compared with the cited monitoring almost two decades ago, present results show a decrease in fat content by one tenth and an increase in the salt content by one seventh. The high variability within a given product, mainly of fat and salt contents, may help the processors to improve the established assortment by careful reduction strategy. However, it opens also possibilities for innovative recipes with fat and salt alternatives.

References

*Bundeslebensmittelschlüssel*3.02 (BLS 3.02) in *PRODI*® Version 6.6, 2016.

Schöne, F.; A. Ibel, M. Ihling et al.: Monitoring of Thuringian meat products and derived recommendations for nutrition advise and the meat processors.

Notes

Report Thuringian State Institute for Agriculture and Friedrich-Schiller-University, Jena, 2018, Project Method Quality
Schöne F., C. Kinast, H. Bergmann et al.: Zusammensetzung und Energiegehalt von Fleischwaren aus Thüringen. 1. Eiweiß, Fett und Brennwert. Fleischwirtschaft 84, Heft 7 (2004 a) 100-106
Schöne, F.; M. Leiterer, A. Greiling, et al.: Zusammensetzung und…dito. 2. Mineralische Substanz und Kochsalz. Fleischw. 84, Heft 8 (2004 b) 93 – 100.

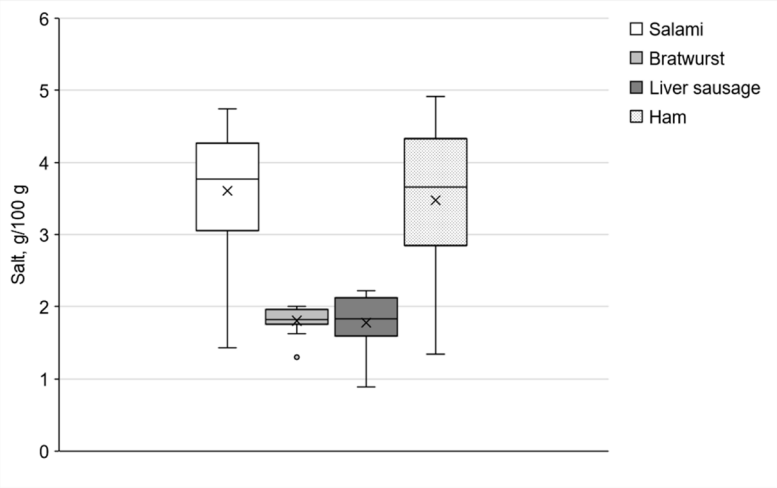



Fig. 2: Salt content of selected meat products from 15 processors in each case. The two squares separated by the median represent the upper and lower quartile or a total of one half of the data. The cross shows the arithmetic mean. The whiskers characterize the minimum-maximum range. The dot stands for an outlier.

The salt content varies also within a meat product depending on the processors

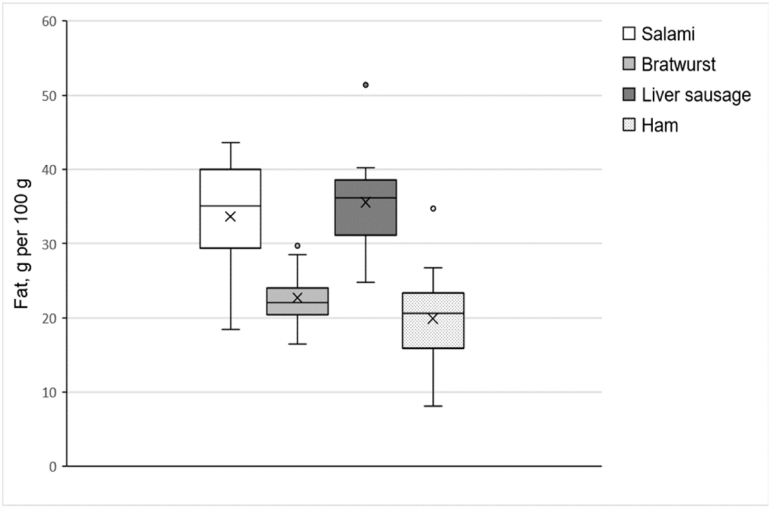
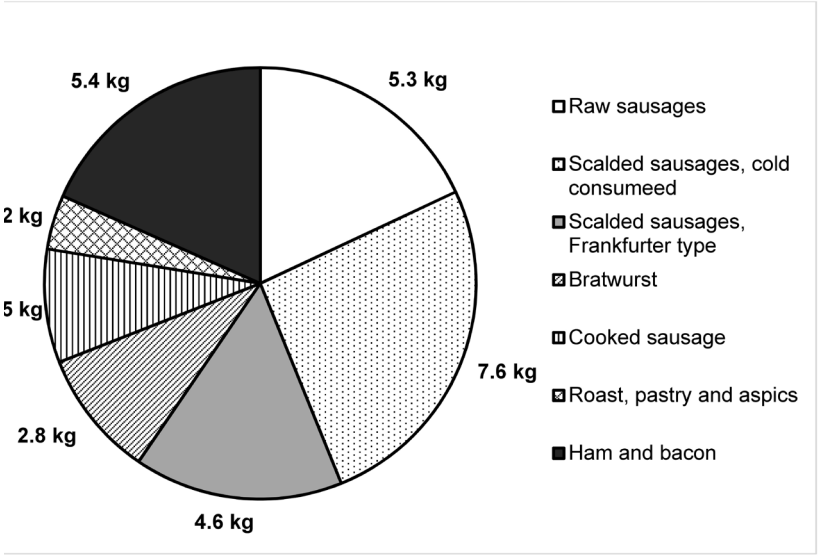



Fig. 1: Fat content of selected meat products from 15 processors in each case. The two squares separated by the median represent the upper and lower quartile or a total of one half of the data. The cross shows the arithmetic mean. The whiskers characterize the minimum-maximum range. The dots stand for outliers.

The fat content varies also within a meat product depending on the processors.

**Notes**




gure 3: Yearly consumption of the meat products from different group
rves for the calculation per day multiplied with the fat and salt conten
alyzed in the present study. The resulting daily intake of fat and salt
m meat products is given in the abstract text (see
ps://de.statista.com/statistik/daten/studie/163791/umfrage/pro-kopf-
nsum-von-wurstwaren-und-sonstigen-fleischerzeugnissen-in-
utschland/ for the meat product statistics).

**Consumption of meat products in Germany 2017 - Positions from a total of 29.4 kg per capita and yr.**

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