

Impact of Salt Reduction in Salami on Liking

H. Stoffers-Kneubühler*, P. Eberhard, Y.-A. Brügger, E. Beutler, K. Breme, P. Piccinali
 Agroscope Liebefeld-Posieux Research Station ALP-Haras, Bern, Switzerland
helena.stoffers@alp.admin.ch

Introduction

Salt plays an essential role in food safety, but also influences technological issues and sensory profiles in various meat products. As a high salt intake may increase blood pressure, and hence the risk of cardiovascular diseases such as heart attacks and strokes, the WHO recommends an intake below 5 g/day (average intake 2011 in Switzerland: around 9g/person/day). Besides the reduction of sodium chloride, its substitution with other salts is one of the key strategies to preserve salty taste impression.

Objectives

The goals of this study were to test

- consumer liking of salt reduced salami
- appropriateness of different levels of salt in salami
- ability of potassium lactate to boost salty impression
- influence of salt level and K-lactate on the aroma profile

Results

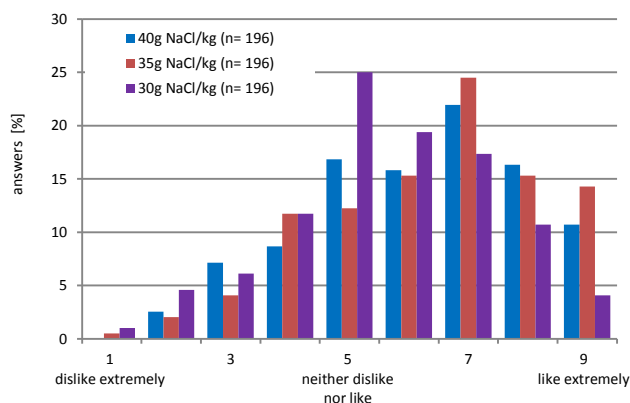


Figure 1: Salami of the 2nd reduction level (30g NaCl/kg) was significantly less appreciated than salami with 35g NaCl/kg and 40g NaCl/kg (reference salami).

Overall, liking of salami with 35g NaCl/kg (Fig. 1) was comparable to the reference with 40g NaCl/kg, while salami with 30g NaCl/kg was significantly less appreciated than both other samples. JAR test showed similar distributions for the reference and the 1st reduction level, whereas salami with only 30g NaCl/kg was evaluated as not salty enough (mode= 4). Since for all samples neither food safety nor technological issues emerged, a reduction to 35g NaCl/kg is recommended.

The addition of K-lactate seemed to boost salty impression (Fig. 2), but overall liking did not improve compared to the sample without K-lactate (results not shown). Nevertheless, results have to be handled carefully as the salami with 30g NaCl/kg and the sample with the equal salt concentration plus addition of K-lactate were not tested in the same session.

Comparison of volatile chemical profiles obtained by HS-SPME-C-MS of the salt reduced and K-lactate enriched sample (28g NaCl/kg + 16g K-lactate) and the reference were quite similar, but showed higher signals of phenylacetaldehyde and acetoin for the salt-reduced/K-lactate salami (Fig. 3; values calculated over duplicate analyses of both samples). The odour attributes of phenylacetaldehyde and acetoin are "honey/bloomy" and "buttery", respectively. In general, the within-sample variation over all analyses was higher than expected which may be due to a non-uniform distribution of spices and herbs (e.g. pepper).

Conclusions

Both consumer tests with all in all 500 people showed that a salt reduction in salami from 40g NaCl/kg (reference) to 35g NaCl/kg had no significant impact on overall liking and appropriateness of salt level. On the contrary, the samples with 30g NaCl/kg were significantly less appreciated and estimated as not salty enough. For all samples neither food safety nor technological issues appeared. Therefore, a stepwise reduction to 35g NaCl/kg is recommended. Addition of K-lactate to the salami with 30g NaCl/kg seemed to boost salty perception, but did not improve overall liking. Profile of volatile compounds showed higher peak areas of phenylacetaldehyde and acetoin for salt-reduced and K-lactate enriched sample than for the reference.

Material and Methods

Salami with three levels of sodium chloride (40 as reference, 35 and 30 g/kg) were tested by 196 consumers regarding overall liking and perceived saltiness. Overall liking was measured on a 9-point hedonic scale. The perceived saltiness was evaluated on a just about right (JAR) scale (1= much too little salt, 5= just about right, 9= much too much salt). To test the ability of K-lactate to boost salty perception, the same experimental design was used, but with an addition of 15g K-lactate (Purasal High Pure Plus 78%, Purac, D) to the salami with the lowest salt content (30g NaCl/kg). The salami of the second trial were evaluated in an additional test by 393 consumers as described above for liking and perceived saltiness.

The influence of salt reduction (28 instead of 40g NaCl/kg) and addition of potassium lactate (+ 16g Purasal High Pure P/kg) on the volatile compound profile was measured by headspace solid-phase microextraction-gas-chromatography-mass spectrometry (HS-SPME-GC-MS).

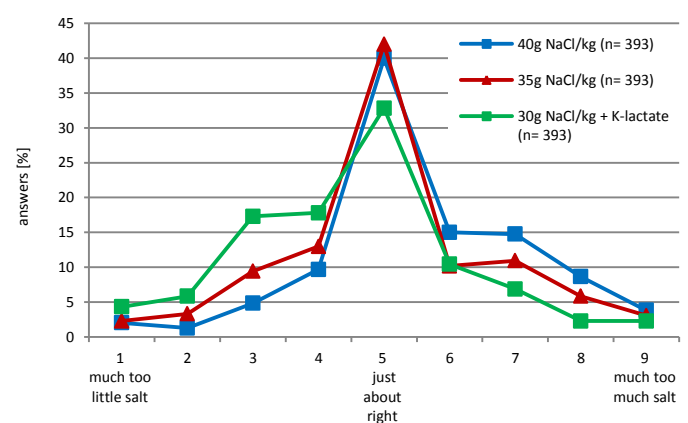


Figure 2: JAR scale shows that a salt reduction from 40 to 35g NaCl/kg had nearly no impact on estimation of saltiness. But salami with only 30g NaCl/kg was evaluated as not enough salty (data not shown, mode= 4), whereas the addition of K-Lactate seemed to boost salty perception.

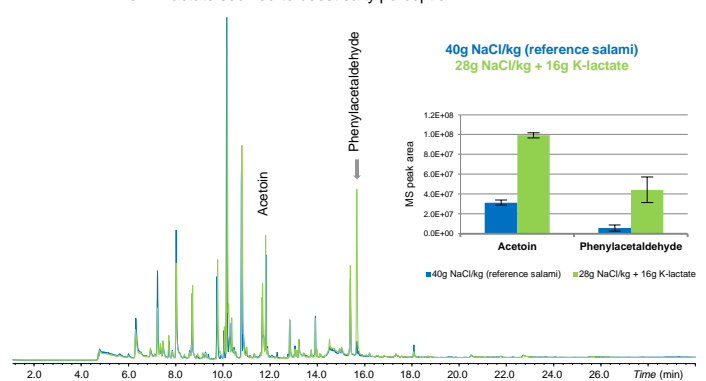


Figure 3: HS-SPME-GC-MS volatile chemical profile measured of a reference salami with 40g NaCl/kg (blue) and a salt-reduced salami (28g NaCl/kg) with addition of K-lactate (16g Purasal HiPure Plus Purac). Samples were prepared, extracted (DVC/CAR/PDMS 50/30µm 2cm fibre) and measured in duplicate (data not shown; VF-WAXms 60m x 0.32mm x 1µm GC stationary phase) and MS peak area mean values and mean relative measurement deviations were calculated. Main differences over duplicate analyses were found for acetoin (buttery flavour note) and phenylacetaldehyde (honey-flowery flavour note).