

Suitability of spray-dried soy sauce for the production of cooked sausages

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Abstract

Within the scope of a project with industrial contribution, the Institute of Technology at the BAFF in Kulmbach studied the effects of the addition of spray dried soy sauce in cooked sausages. New ways of versatility of such products and the potential of substituting the number one flavour enhancer glutamate had been analyzed in numerous trials. Beside extensive physical and chemical analyses according to §35 LMBG special attention was directed to examine the products colour composition and taste. The interpretation of these trials showed, that the best results concerning sensory evaluation and long-time storage were achieved with cooked sausages manufactured with 0.2 to 0.4% spray dried soy sauce.

Introduction

Many sausages are produced using flavour enhancer (glutamate, relish) to give the products a more finished taste. Also soy sauce is used as flavour enhancer. It is made by a fermentation process from soy beans and wheat and acquires a strong pleasant flavour and a dark red-brown colour. Because of the complex situation concerning foodstuffs and its artificial or chemical additives many consumers get more critical of those products containing preservatives and/or flavour enhancer. In contrast to the label "including flavour enhancer glutamate" the note "including soy sauce" would probably have a more positive effect on peoples attitude. In this connection only the soy sauce and not its components must be mentioned on the label, even if the same active substance (glutamic acid) is included. With the employment of spray-dried soy sauce new foodstuffs could be developed that stand out of the uniformity of the glutamate taste.

Materials and methods

Two different types of spray-dried soy sauce were tested in this trial. Product A made from soy beans and wheat, fixed to salt and maltodextrin as a carrier, is an extremely hygroscopic light brownish powder with a mild carneous flavour (NaCl: $36,5 \pm 1,5\%$ w/w; H₂O: $<2,0\%$ w/w; N₂: $>3,1\%$ w/w; pH_{2,5%}: $5,15 \pm 0,25$). Product B is hydrolyzed only from wheat protein and is almost flavourless (NaCl: $32,0 \pm 2,0\%$ w/w; H₂O: $<3,0\%$ w/w; N₂: $>4,75\%$ w/w; pH_{2,5%}: $5,2 \pm 0,25$). Concerning the microbiological status of the products, both powders are unobjectionable. With a total count of less than 10,000 germs per gram no coliform organism or salmonella could be found.

To consider as many different products as possible being found on the world market in this study, differing types of bologna-type sausages with variable adding of spray-dried soy sauce from 0.0% (control) to 0.6% sauce powder were produced and analyzed. Also sausages with commercial amounts of glutamate had been manufactured as a standard of comparison. Cured („Lyoner“: 25% beef; 25% porc; 25% fat; 25% ice) and non cured meat products („Gelbwurst“: 50% beef; 25% fat; 25% ice) were produced using conventional technologies and usual additions of phosphate. For the spicing only natural condiments were used.

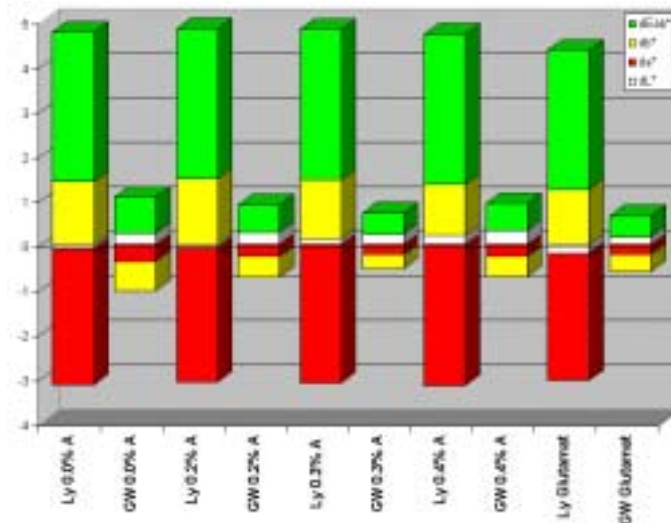


Figure 1: Measurement of the colour stability of Bologna-type sausages with product A (dL*=degree of brightness; da*=red portion; db*=yellow portion; dEab*=colour distance; Ly="Lyoner"; GW="Gelbwurst").

Results

None of the spray-dried soy sauces showed significant affects on the course of temperature during the cutting process, the pH-value of the stuffing and the finished product, the separation of fat or jelly, the chemical composition or the firmness of the sausages. Also the colour and its stability was not influenced by either of the products (see figure 1).

The sensory evaluation of the cooked sausages with product A showed that most of the test persons accepted an addition of 0.2 to 0.4% spray-dried soy sauce type A (figure 2).

Despite a still perceptible flavour of the soy sauce, the examiners often particularly preferred the non cured meat products when soy sauce was added.

Sausages manufactured with product B as a flavour enhancer were compared to commercial glutamate bologna in three point pairing tests. As shown in figure 3, most test persons could not find a distinction between the use of soy sauce and glutamate. Those who found out the difference ranked both products equally. After 6 weeks of storage all products were tested again. As a result it was found that those sausages made with soy sauce still carried a typical finished taste, while glutamate products showed a marked lack of flavour.

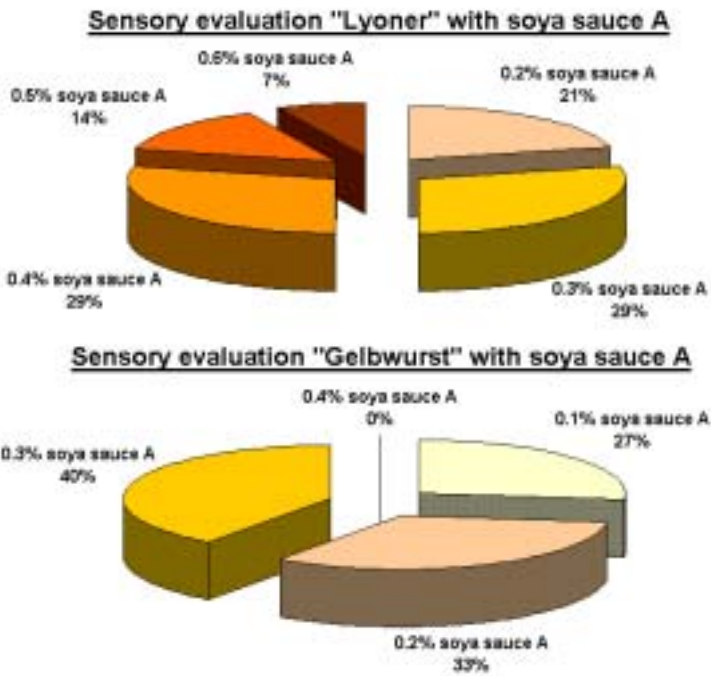


Figure 2: Sensory evaluation of bologna-type sausages („Lyoner“ and „Gelbwurst“) with Product A

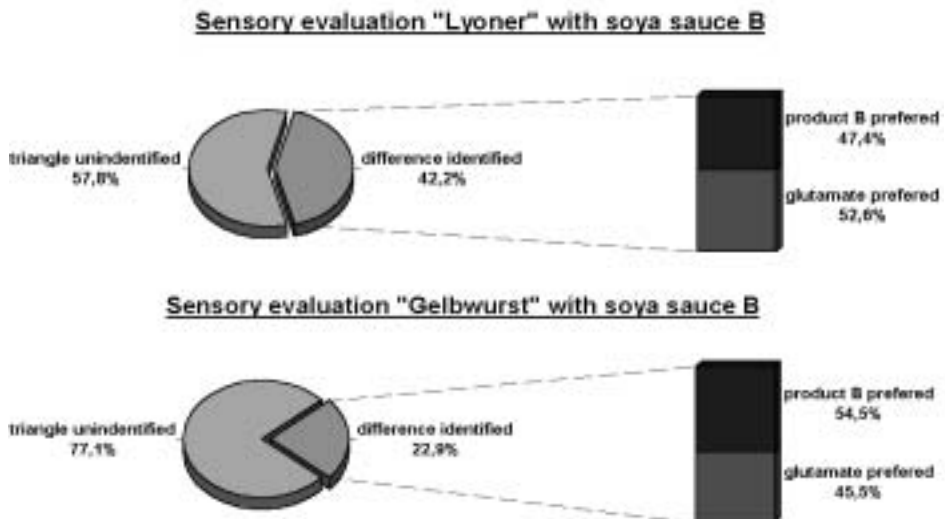


Figure 3: Sensory evaluation of bologna-type sausages („Lyoner“ and „Gelbwurst“) with Product B

Conclusion

- None of the soy sauces used in this research showed any negative chemical or physical effects on the finished products.
- Even having a typical finished flavour, cooked sausages made with soy sauce A (soy beans and wheat) could easily be distinguished from glutamate sausages.
- Most test persons could not make a distinction between soy sauce and glutamate rank when sauce B was used (only wheat protein).
- The adding of spray dried soy sauce helps cooked sausages to hold their finished flavour over a longer period of time.

Because of the soy product's comparatively high pH-value it is assumed that an increase of soy sauce added to meat products far above the limit used in the documented trials will cause negative chemical and physical alterations in the finished cooked sausages.