

Combining meat protein with plant protein in classic Danish meat products

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Introduction: Both consumers, politicians and a large number of companies have increased their focus on sustainability, and there is an increasing demand for climate neutral products and products that can be part of a circular life cycle. Food is also under great scrutiny, as changed purchasing habits from consumers have helped to influence the companies' shopping habits and supply. A way for traditional Danish meat products to meet these new habits and demands is to combine plant protein and meat protein. When using plant proteins, it is important to address the challenges both to the eating, nutritional and technological quality of the final meat product.

AIM: The overall aim was to develop a classic Danish meat product in which a significant part of the meat protein was replaced by plant protein, without compromising the nutritional or sensory quality of the product.

Material and methods: Texturized vegetable protein products from pea protein were obtained during extrusion cooking and used to replace 10%, 30%, or 50% of meat proteins in wieners with 10% fat and 2% NaCl. 50% of the sausages were exposed to smoke (10 min, 60°C) after cooking. The sausages were investigated for changes in the sensory attributes texture and taste. The nutritional value was evaluated based on amino acid score. Sustainability was evaluated based on available CO₂ footprints from available LCAs and industrial data.

Results: Pork-plant sausages with the highest concentration of texturized vegetable proteins had significantly lower ($P < 0.05$) firmness, cohesiveness, gumminess, chewing time, and chewing residual, but significantly higher ($P < 0.05$) grittiness than the other pork sausages.

The taste and flavour of the sausages were affected by the substitution of meat proteins with pea protein, with a decrease in meat flavour and an increase in bitterness and pea flavour. Smoke partly masked the pea flavour while bitterness was not reduced by the smoke.

Conclusion: DTI-DMRI has shown that it is possible to substitute at least 30% of the meat protein with plant protein and still have products of good eating, nutritional and technological quality. Texture is the most challenging attribute. Taste (bitterness and pea) can be masked or partly masked using smoke. Substituting 30% meat protein with texturized pea protein reduces the CO₂ footprint with approximately 15%.

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