COMBINATION OF PLANT- AND ANIMAL PROTEINS TO CREATE HYBRID VEGETARIAN /MEAT PRODUCTS

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I. INTRODUCTION

The consumer attitude towards meat consumption is changing. For health, welfare and sustainability reasons, consumers have developed an increased interest to include more plant protein choices in their eating pattern. Despite the fact that the number of vegetarians is not increasing rapidly according to the figures, the number of flexitarians who consciously choose to eat less meat has exceeded 50% [1]. Over the last five years, the amount of hybrid products emerged on the market has grown significantly [2]. Most of the hybrid products are combinations of animal protein with added vegetables. Another option is to create hybrid products based on both plant and animal proteins with protein content comparable to meat. Consumer survey shows willingness to buy hybrid products based on attributes like healthy, ethical, and environmentally friendly [3]. However, the main challenge is the sensory appreciation of the product once it has been prepared. If this is disappointing, there is no repeat purchase. The main goal of the project was to create hybrid product with appealing texture that fits into a healthy diet, has protein content comparable to meat and contributes to a higher sustainability compared with meat. The joint project was carried out with the Dutch Butchers Organization and SVO Food Education.

II. MATERIALS AND METHODS

A practical approach was taken to transfer the current knowledge and experience in meat and plant proteins to butchers to make the hybrid products in their own shops. An inventory of equipment available in butcher shops was made to meet the requirement that every butcher should be able to make the product with his/her already available equipment. A series of 50 multiple combinations of each 3-5 kg were tested with suitable plant proteins commercially available on the European market. Each combination was sensory tested for structure. No statistical analysis was performed. As part of the project, the Dutch Butchers' Association conducted a survey among butchers' customers about their opinions on hybrid products containing both meat and plant proteins. To meet the sustainability demand of butchers and consumers, attribution modelling by economic allocation was used to calculate the greenhouse gas emissions of the hybrid products developed.

III. RESULTS AND DISCUSSION

The product concept is based on a separate preparation of a vegetable gel that can be mixed with meat. Vegetable proteins were tested for their functionality in combination with vegetable oils. A blend of pea and egg protein proved the most acceptable. Several gel recipes were developed with some variation in texture that could be used in different end products. The gels are virtually flavourless and easy to mix with beef, pork or chicken. Based on the current knowledge and expertise of the producer (butcher), a mixture of flavour components such as herbs/species is used to create a unique tasty product. Thus, the hybrid product consisting partly of meat and partly of the vegetable base can be made according to one's own preference and understanding. The meat and plant base can also be combined in different ratios, for example 30/70, 50/50, 70/30 or otherwise. The application possibilities are broad: the plant base can be used to make ready-to-eat products like burgers as well as be used in sausage preparations. The consumer survey revealed that 80% respondents have never eaten hybrid product, but that 41% would like to try it. This offers opportunities for this product group, which is definitely gaining ground among butchers. Calculating the carbon footprint of plant protein sources grown and harvested in Europe shows that such a hybrid product is close to the GHG footprint of vegetarian products already available on the market. This has also developed a basis for hybrid

butchery products to drive reductions in the amount of animal meat consumed, and thus GHG emissions. By Figure 1 illustrates the GHG emissions for various vegetarian (non-vegan) products in addition to the hybrid products developed in this project compared to processed meat and meat products. It shows that greenhouse gas emissions can be reduced by 75% when a hybrid product is prepared using only 30% pork.

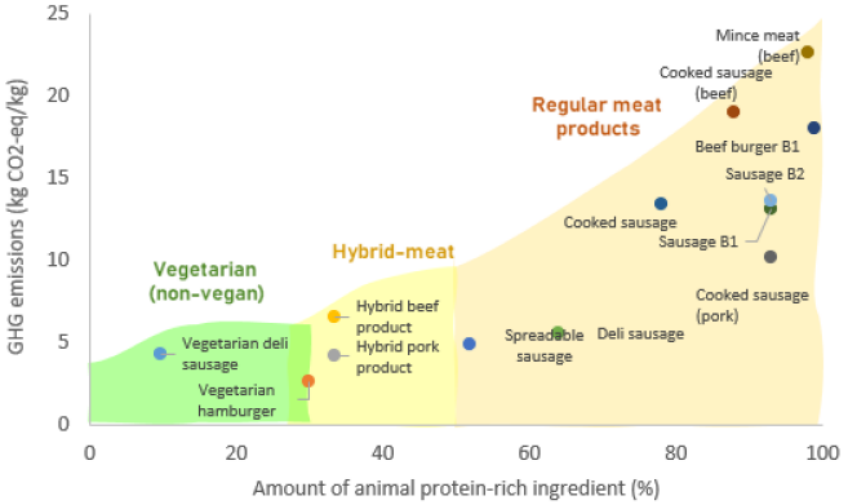

Figure 1. Greenhouse gas emissions of meat, vegetarian and hybrid products

IV. CONCLUSION

The knowledge of plant and animal proteins has been transferred to the Dutch butchers so that they are able to continue with hybrid product development according to their own insights and wishes of their consumers. As a result, consumers have more choice at traditional butchers, can consume less animal protein and more plant protein, thereby also reducing their carbon footprint.

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