

Healthier Meat Products for the Future

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Introduction

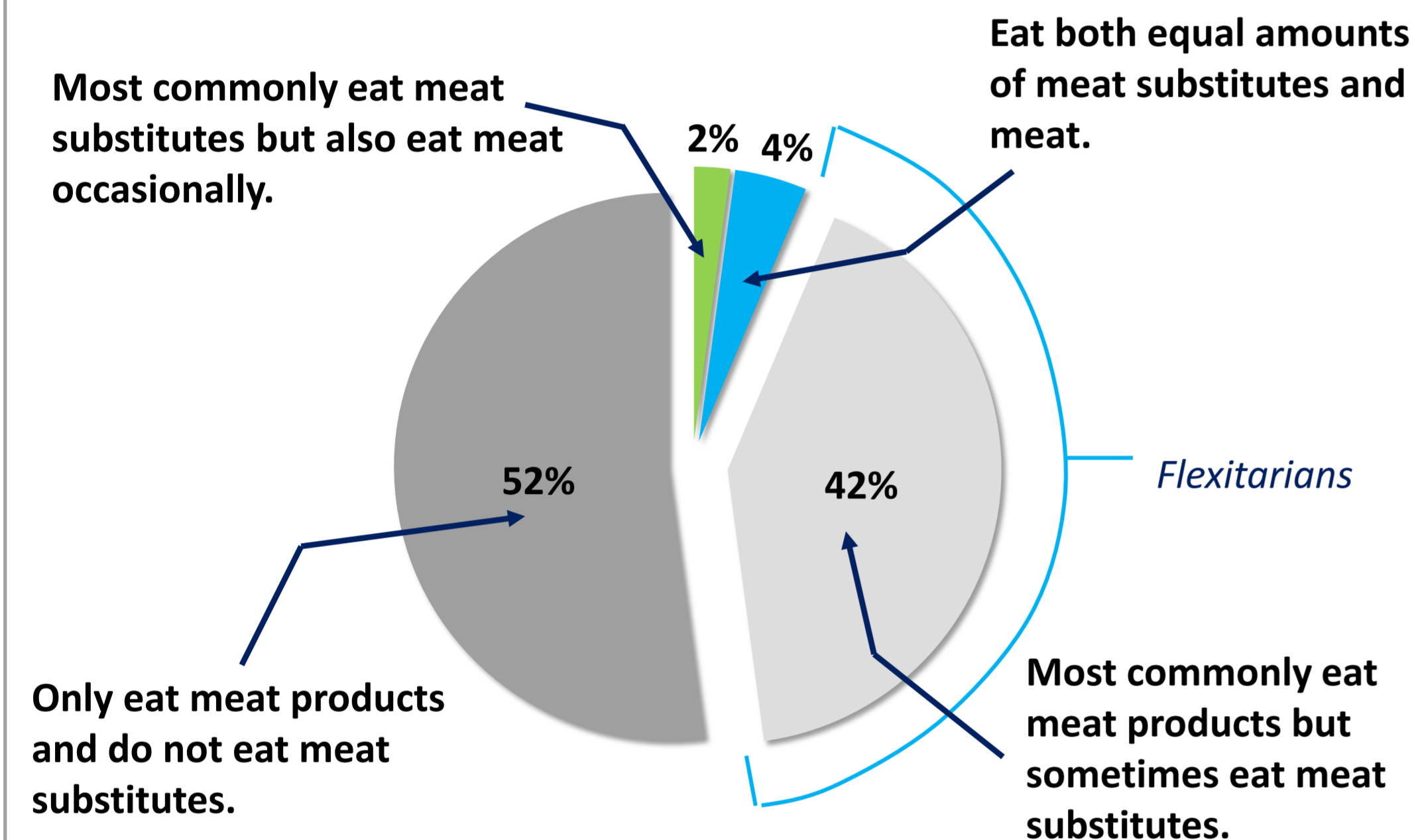
Animal proteins are an important contributor to human health providing amino acids, vitamins and minerals as well as having a special status within society and meal structure. Nonetheless, overconsumption of meat has increased in modern society raising health concerns. Animal proteins, in particular red meats, are high in saturated fats and over consumption of these has been scientifically proven to be a large contributor to heart disease, type 2 diabetes, obesity and some types of cancer. However, converting predominantly meat eaters to a meat reduced diet is a societal transition that will require careful strategic planning if we are to shift to more sustainable, healthier diets. Supermarkets offer a wealth of meat alternatives. Previous research has identified that non-vegetarian consumers generally judge the overall sensory quality of meat substitutes lower than that of meat, thus making it difficult to change consumer choices. Hybrid meat analogues where by a proportion of meat has been partially replaced by healthier and more sustainable protein sources have been proposed to provide a means for healthier diets. Such a strategy would bridge the gap between meat and meat free, provide convenience and allow consumers to continue using meat products as they conventionally would. In order to create suitable products a consumer orientated approach is needed to product development that takes into account consumer preferences. In the present study consumer testing was carried out on hybrid products to assess their acceptability among meat eating consumers as well as their sensory attributes. Consumers were also asked to describe their ideal meat product. The combined analysis of liking and sensory attributes allowed the identification of drivers for consumer acceptability. Penalty analysis enabled an indication of the penalty on liking when undesirable attributes are present. Assessed together with the ideal, directions to aid in product reformulation are outlined.

Methods

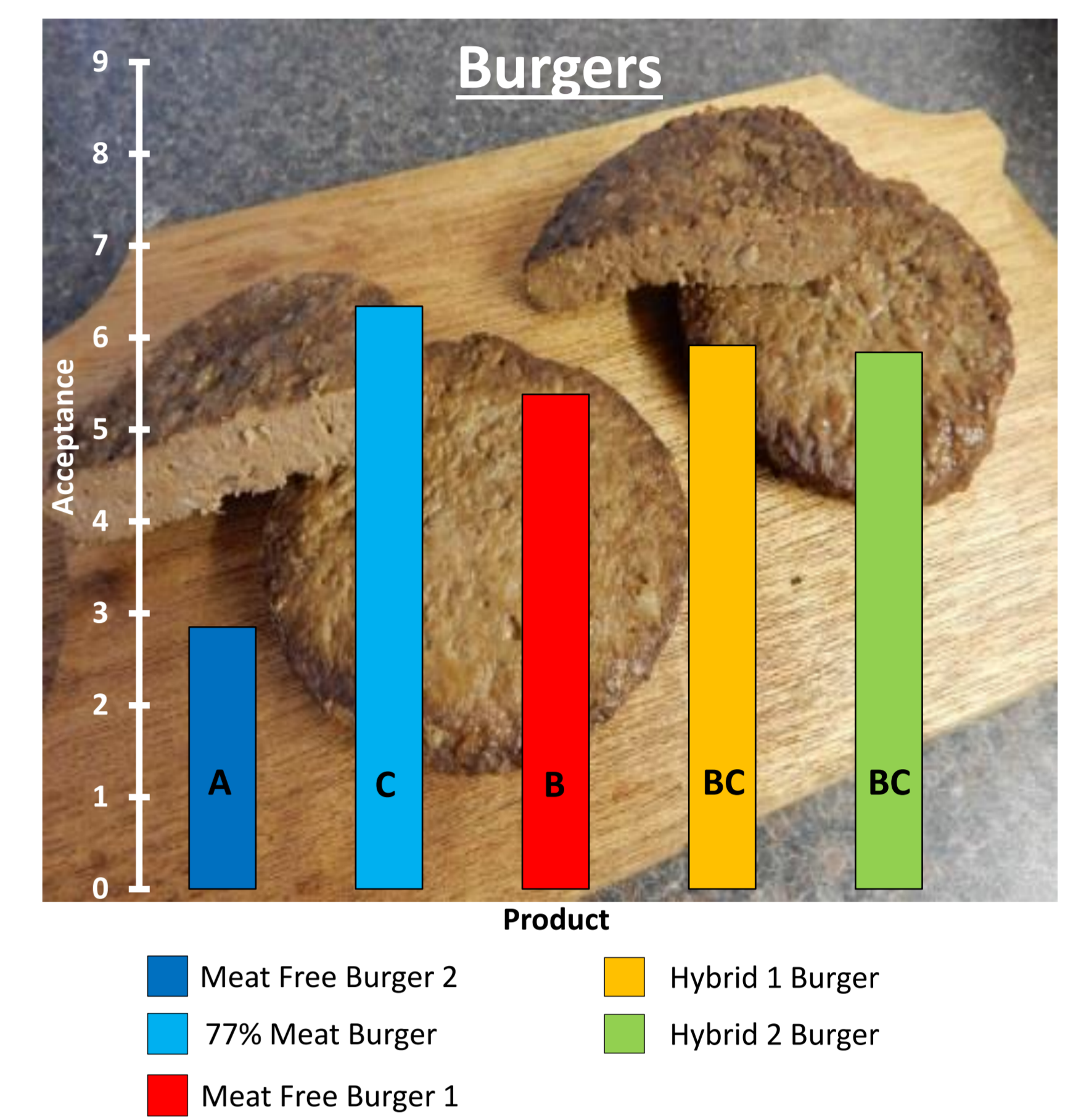
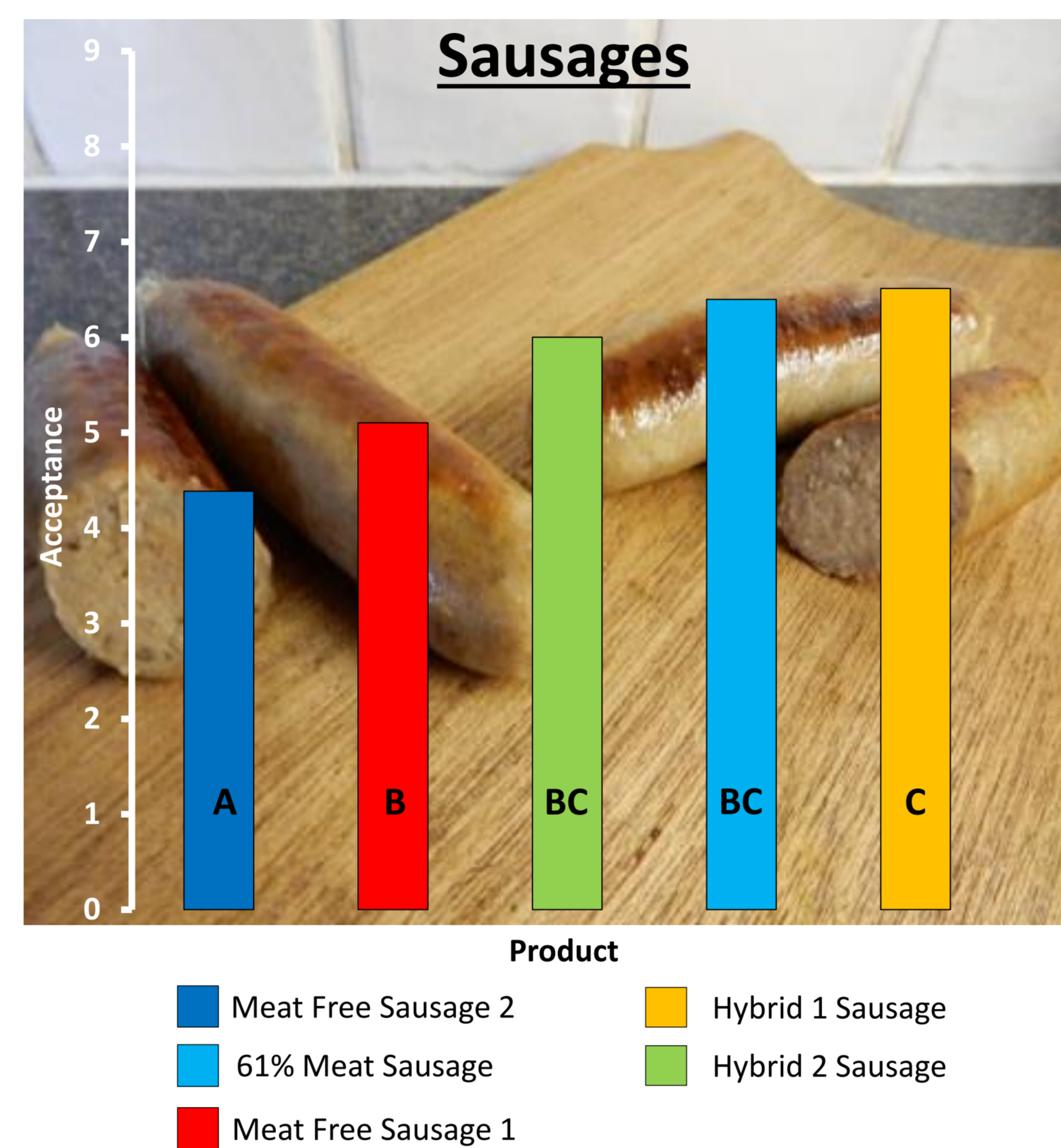
Hybrid sausages (30% pork) and hybrid burgers (37% beef) were developed using a combination of starches, hydrocolloids and a protein alternative in an aim to replicate meat. A variety of protein replacers were assessed and two were selected for consumer studies.

Hybrid products were assessed in comparison to commercial meat and meat free products. After sensory attribute generation, consumer testing (n=94) was conducted on hybrid and commercial samples. Consumers were presented each sample and asked to indicate their liking (horizontal 9-point scale). Check-all-that-apply (CATA) questioning was used to identify the sensory attributes of each sample. Consumers then checked all the attributes they felt their ideal product would have.

Consumers were selected based on their meat consumption behaviour:

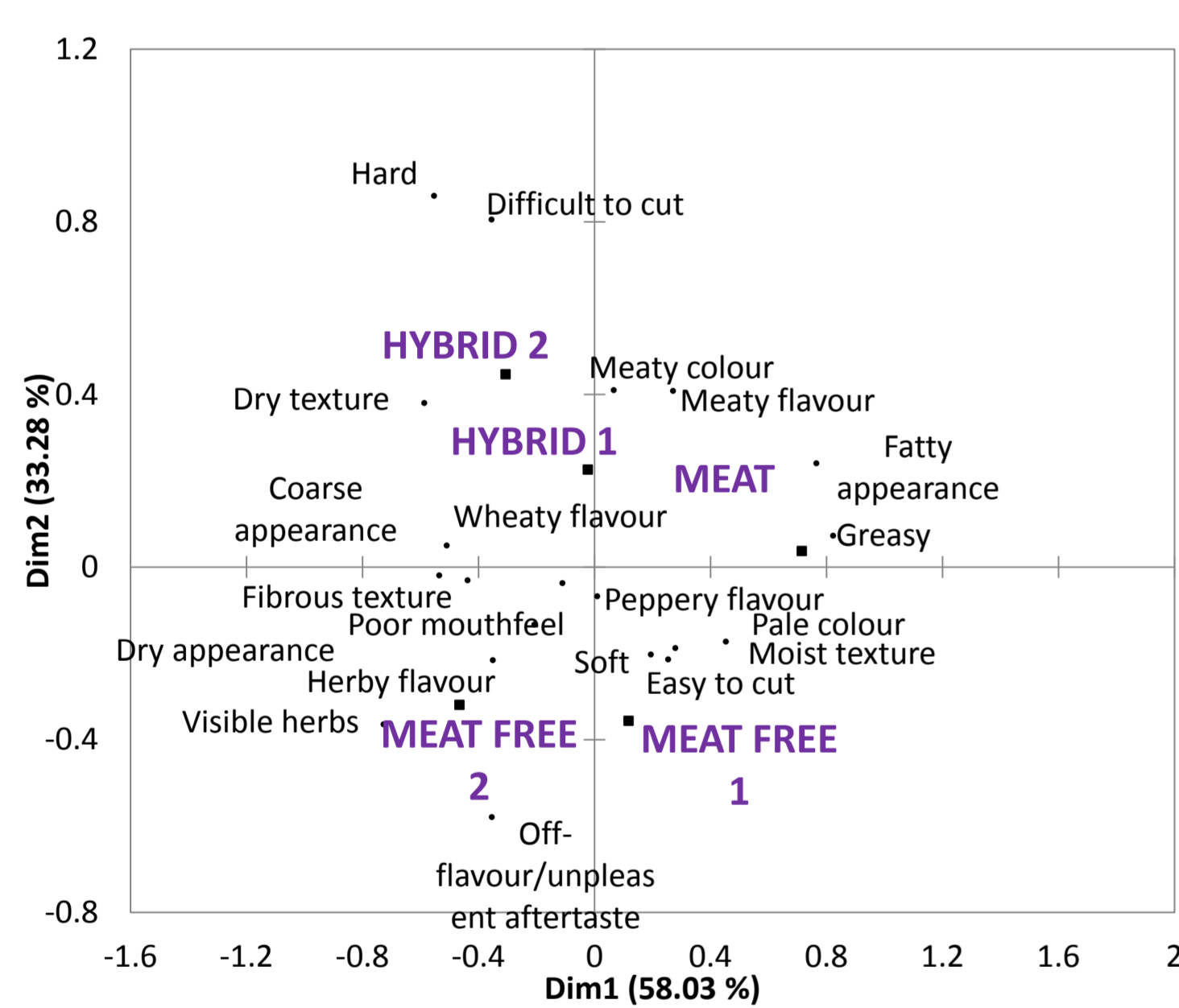


Consumer Acceptability of Hybrid Meat Products



Acceptability data shows that hybrid products were generally well liked by consumers. For both sausages and burgers consumer acceptability of commercial meat free products were low. However, acceptability of hybrid products was higher than that of the meat free products. Analysis of the significant groups using Tukey's HSD found no significant difference in consumer acceptability existed between meat and hybrid products where as significant differences could be identified between meat and meat free options. Acceptability data identified that hybrid products are able to bridge the acceptability gap between meat and meat free products.

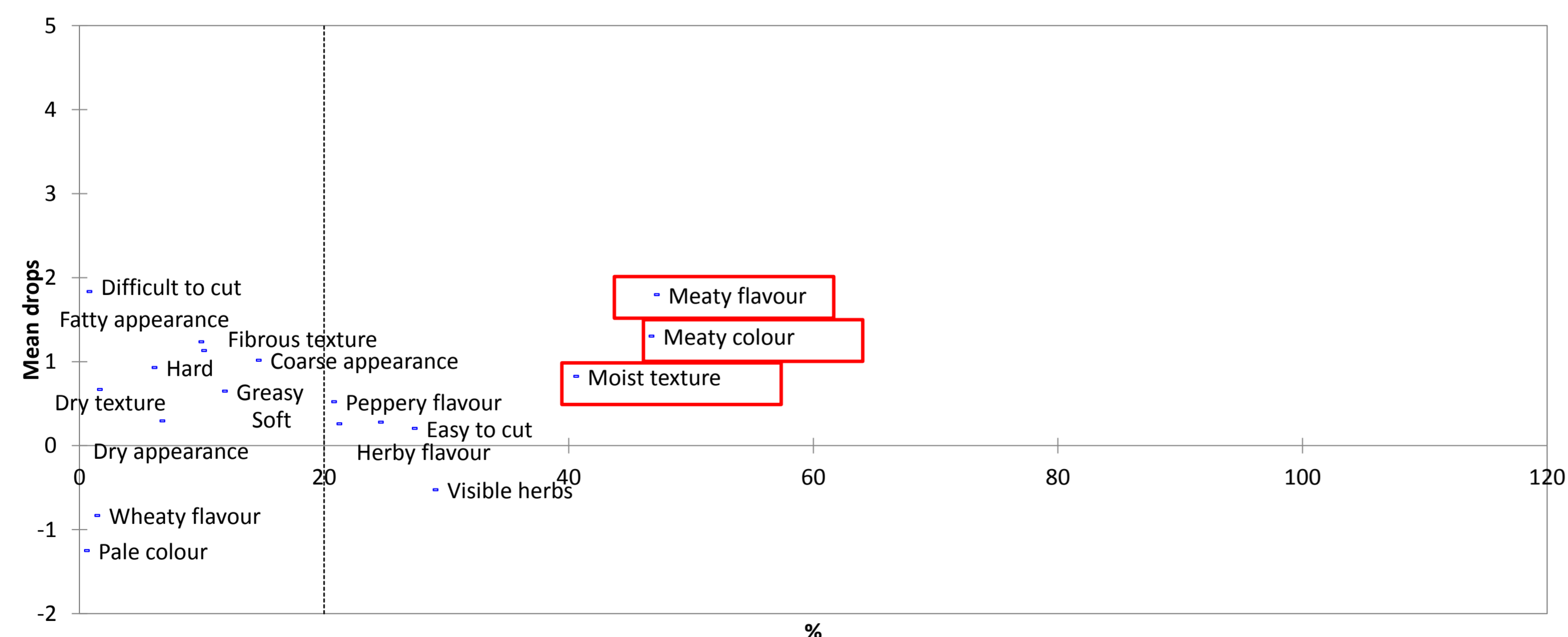
Correspondence analysis



Sample grouping indicates that the samples are similar in their attributes. The two hybrid products were grouped due to their similar formulations with the only differing factor being the meat replacer used.

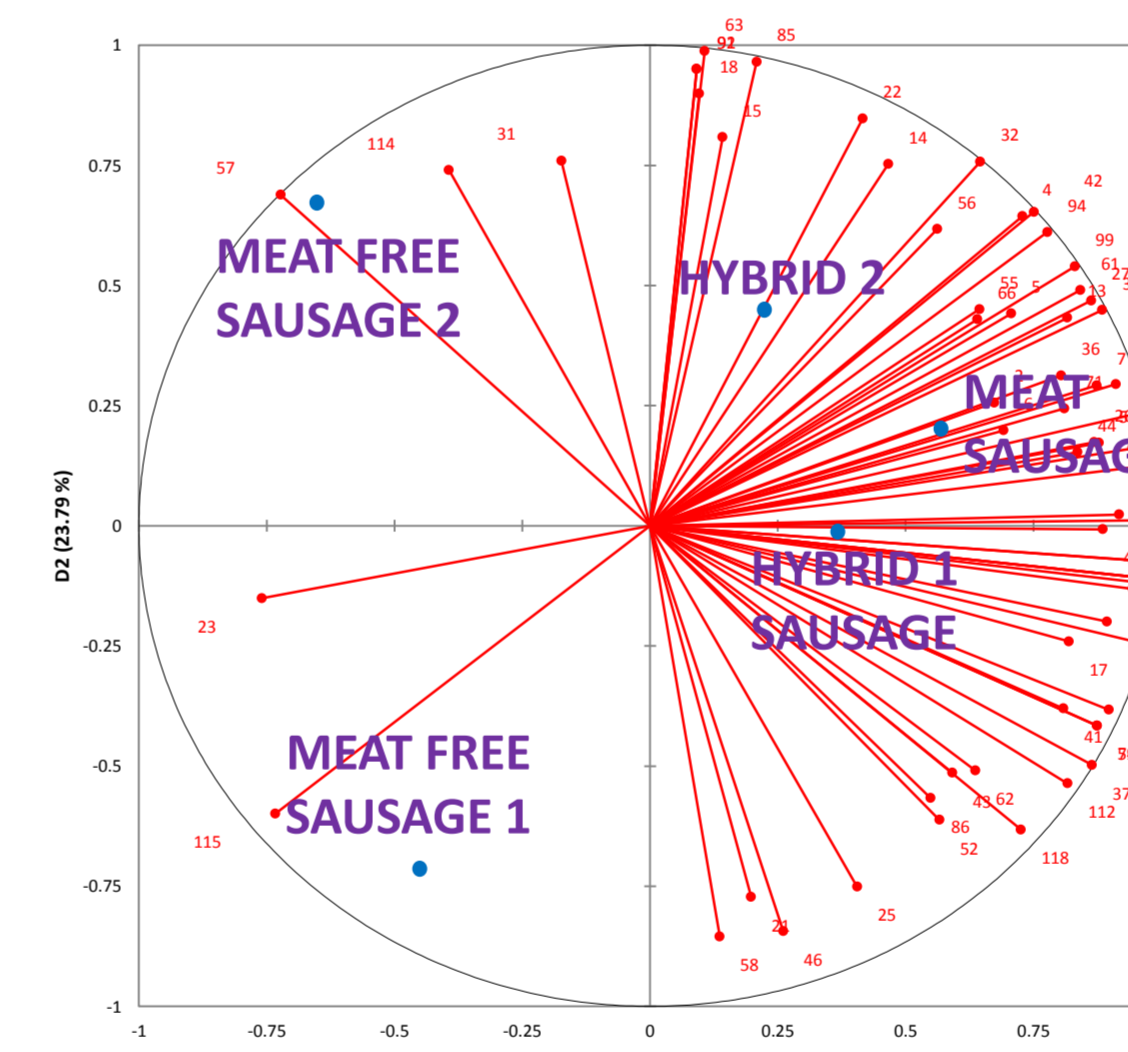
Sample grouping indicates that the samples are similar in their attributes. The two hybrid products were grouped due to their similar formulations with the only differing factor being the meat replacer used.

Acceptance drivers



Acceptance drivers are the sensory attributes that were found to boost consumer liking. The key attributes were identified as meaty flavour, meaty colour and moist texture. Absence of these attributes resulted in a drop in overall liking. The CATA method along with penalty analysis also allowed the identification of the sensory attributes that consumers did not like. These were identified as off-flavour/unpleasant aftertaste and poor mouthfeel. Presence of these attributes within a sample significantly reduced consumer acceptability providing an explanation of the low consumer acceptability of the meat free options.

Internal Preference Mapping

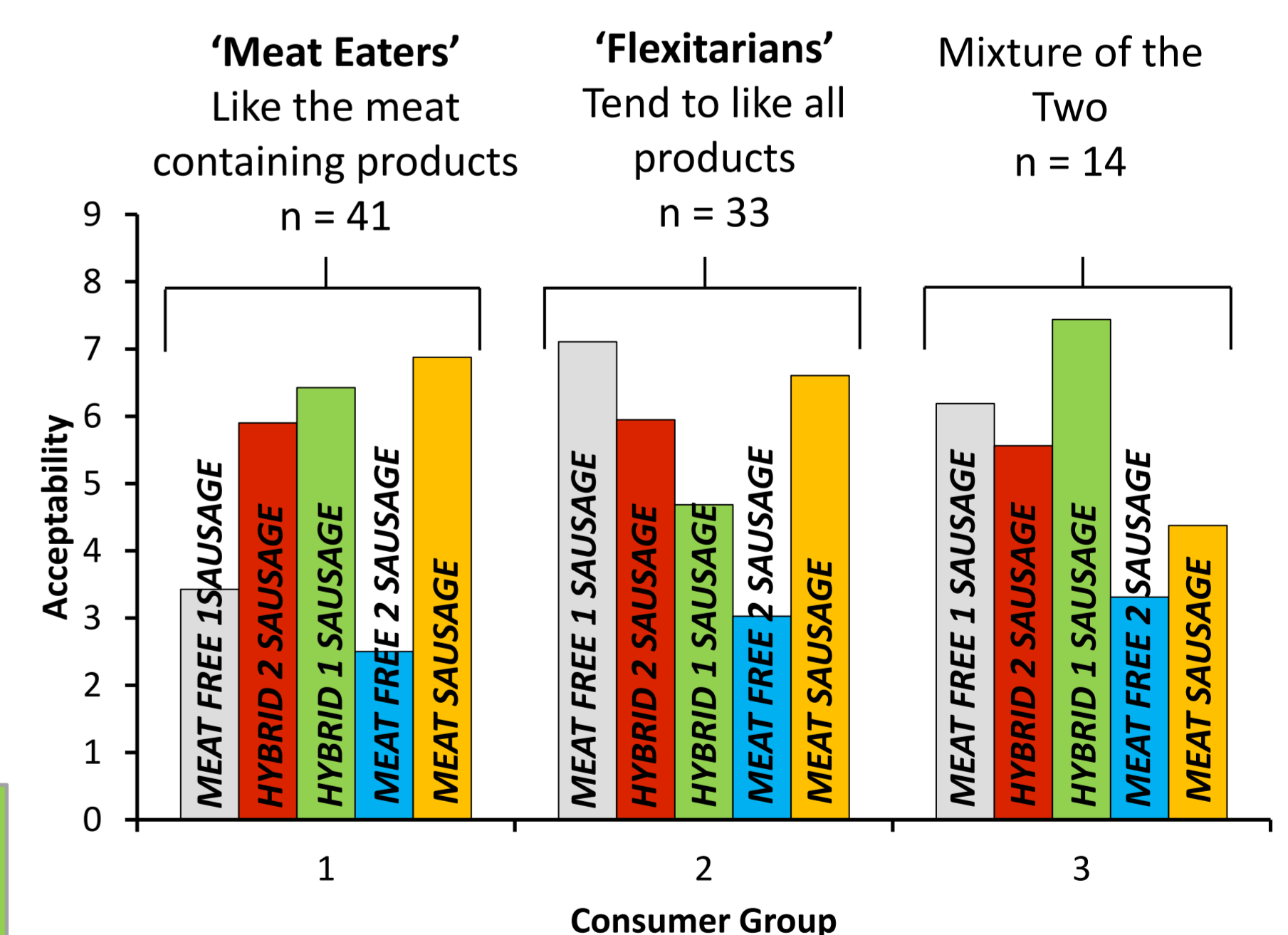


By combining the individual consumer preference data shown above with the consumer meat consumption demographics and analysed by cluster analysis, significant differences in preferences between consumer groups were identified.

Consumer group 1 (meat eaters) were found to have a higher preference for only the meat containing products, including hybrids.

Thus showing that the project aims have been achieved: creating a meat alternative attractive to meat eating consumers.

Cluster Analysis



Conclusions

Products that are attractive to consumers as well as providing convenience are key to converting consumers to healthier diets. This study identified that acceptability of meat free alternatives among meat eating consumers was low which is in line with the results of previous literature. However, consumer acceptability of hybrid products was significantly higher than that of meat free and no significant difference in consumer acceptability could be identified between hybrid and full meat commercial products. Hybrid products were found to be able to bridge the acceptability gap between meat and meat free. Thus the hybrid theory could possibly providing a stepping stone for consumers in the transition to healthier diets.

Half the meat means half the negative health effects related to meat consumption and half the saturated fat!



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