

A CONSUMER-ORIENTED CLASSIFICATION FOR HOME MEAL REPLACEMENTS AND ITS SAFETY IMPLICATIONS

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INTRODUCTION

Home Meal Replacements (HMR) are main courses or assemblies of main course components of a meal - (animal) protein + (starch) carbohydrate + vegetables -, in single or multiple portion containers, designed to fully replace the main course of a home-made meal. HMR can be manufactured, preserved and prepared for serving by any degree of technological/kitchen processing. Thus, they can present various levels of readiness (though, as a replacement, they should require only little or no further preparation/cooking before consumption) and of keeping quality, as well as a wide-ranging shelf life. Whether or not they are intended for in-house consumption is not relevant. In this context, HMR can be as varied as a take-out Chinese meal, frozen seafood pizza, canned stew, or a catered 'sous-vide' gourmet salmon meal.

We have extended existing HMR definitions¹⁻², in order to encompass a complex multitude of ingredients, processes and distribution solutions on behalf of the end-consumer or customer, who increasingly demands for more convenience and quality in the everyday meals³. Moreover, companies are gradually integrating (both vertically and horizontally) these different solutions in their own assortment³. Consequently, HMR terminology is as complex and varied as one can imagine. 'Sous-vide', 'cook-frozen', 'ready-to-eat', 'REPFED', 'minimally processed', 'convenience', 'pre-cooked chilled', are just a minority of the designations used, which are mostly obscure in their scope and definition. One direct result of this disarray is the lack of harmonisation of safety criteria for HMR among EU countries and the difficulties faced by those who attempt this harmonisation⁴. Effective classification systems for HMR are thus greatly needed by legislators, while being also much required by manufacturers, researchers and consumers.

OBJECTIVES

- To develop a consumer-oriented classification system for the HMR concept presented
- To extend that classification, in order to encompass a microbial safety evaluative dimension

BACKGROUND KNOWLEDGE

Classifications in general should be based on clear criteria and definitions, providing for the hierarchical ranking of items, for correct product designations and for plainly defined categories, thus avoiding ambiguities. Nevertheless, most standard food classifications are just more or less extensive lists of food items, grouped by similarity in appearance, origin or manufacturing process. These standards, which can be found within the structure of nutritional tables, brand catalogues, statistical consumption data collections, international safety guidelines, risk analysis or epidemiological studies for food-borne illness, etc., often lack coherence and clear definition⁴⁻⁷.

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Furthermore, they have been designed to meet the classifier's special needs and do not reflect the way consumers themselves would make the groupings⁸. Hence they are of limited use for the food manufacturers in their effort to develop and market products that are consistent with consumer's perceptions regarding foods and their uses.

On the other hand, in sociological/anthropological food classifications (like 'food-use' systems), categories are frequently generated directly from consumer data, which is an improvement. However, since consumers mostly classify foods based on their own preferences, resulting classifications tend to be extensive and still not comprehensive enough⁸. Moreover, 'food-use' classification systems tend to be highly subjective and very difficult to translate into technological terms, although they can provide for some useful marketing information.

In our view, classifications must be based in criteria which are straightforward and easily translated into technological terms, but which are also relevant for consumers when they are grouping, evaluating and choosing for food products.

A CONSUMER-ORIENTED CLASSIFICATION SYSTEM FOR HMR

Taking into consideration what has been discussed so far, two criteria were chosen for classifying HMR - *shelf-life* and *convenience*. Regarding *shelf-life*, three classes with increasing shelf-life were formed:

S1 – Shelf-life measurable in days;

S2 – Shelf-life measurable in weeks;

S3 – Shelf-life measurable in months.

Convenience was defined as being “the extent of preparation time, culinary skills, use of appliances and energy input that has been transferred from the home kitchen to the manufacturer or distributor, in the activity of fully or partially preparing a meal”^{7,9}. Regarding convenience, four classes with increasing convenience were formed:

C1 – *Ready to cook* – meals which have been minimally prepared for cooking (trimmed, shelled, peeled, cut, washed, etc.) but still require full cooking before consumption.

C2 – *Ready to finish cooking* – meals requiring heat to finalise cooking, before consumption;

C3 – *Ready to heat* - meals requiring only heating, but not cooking, before consumption (includes meals processed up to a stage which renders them fit for immediate consumption after thawing or re-hydration);

C4 – *Ready to eat* - meals consumed as purchased, i.e., requiring no further preparation before consumption.

For the sake of simplicity, we shall exclude HMR consumed in the premises where they are made, sold or supplied from the universe of this classification, thus excluding the foodservice industry. However, this classification and its criteria can be equally applied to this sector, since manufacturers use similar processes and products for their retail and service customers, and since convenience and shelf-life are also attributes used by caterers to classify and evaluate suppliers¹⁰.

EXTENDING THE HMR CLASSIFICATION SYSTEM WITH A MICROBIAL SAFETY DIMENSION

One of the advantages of the proposed classification system for HMR is its flexibility. Other criteria can be added to reflect supplementary attributes that, in particular circumstances are also relevant for manufacturers or consumers in classifying HMR. For instance, an extra dimension may be added, in order to evaluate how consumers classify the different **S x C** class combinations according to their perception of the “freshness” or “healthiness” of HMR products.

To illustrate the flexibility of the proposed system in the context of this presentation, we can add a microbial safety dimension to the HMR classification. Supported on literature review¹¹⁻¹³ and on our expertise, we have assigned a few examples of potential microbial hazards to meals representing some of the possible **S** x **C** class combinations (Fig. 1).

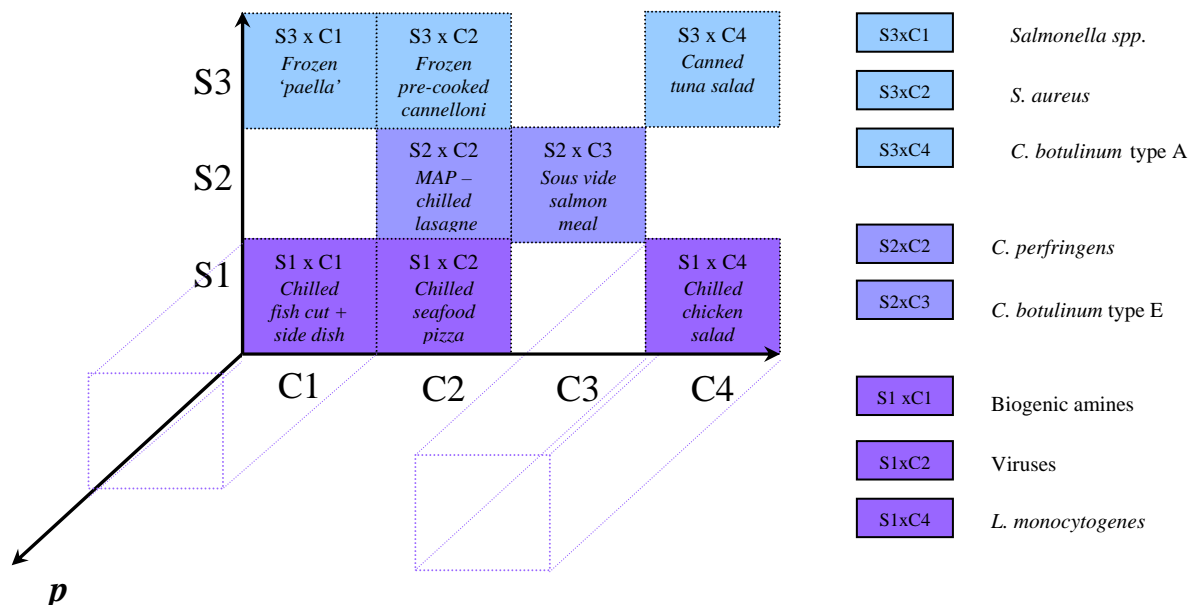


Fig. 1 –‘Shelf-life’ x ‘Convenience’ classification system of HMR. Potential microbial hazards were assigned to a few meals representative of several **S** x **C** class combinations. These combinations can be extended along a third dimension **p**, quantifying the probability of microbial growth up to a level that can cause food-borne illness. The columns’ length is merely illustrative and does not represent any actual probability.

Colour intensities can be assigned to the different **S** x **C** combinations, either to better illustrate differences between classes (as done in Fig.1 for the shelf-life criteria) or to introduce a third independent criteria in the classification, such as minimum storage temperature required, for instance. We can also extend the **S** x **C** combinations along a quantitative third dimension, according to the probability of microbial growth up to a level causing food-borne illness **p** (also in Fig. 1). In this manner, the classification can be used for microbial risk-analysis tasks, hazard analysis, challenge tests, etc.

CONCLUSIONS AND FURTHER RESEARCH RECOMMENDED

There is much need and use for effective HMR classifications. They can guide manufacturers, marketers and researchers in product development and marketing strategy; they can help legislators in their effort to harmonise safety criteria in a highly complex and varied group of foods such as HMR. Finally, they can help nutritionists and microbiologists in protecting HMR consumers from unbalanced diets or unsafe post-purchase conducts.

Food classification systems should be scientifically founded as well as relevant for consumers. Its potential users should be involved in their validation. Consumers, retailers, caterers and researchers ought to evaluate the proposed classification system, in order to assess the validity of the concepts and methodologies within it, its reliability and fitness for intended purpose, and its user-friendliness.

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