codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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Agenda Item 2 **CX/FFP 00/2-Add.2**

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS
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MATTERS REFERRED BY THE CODEX ALIMENTARIUS COMMISSION AND OTHER CODEX COMMITTEES

LABELLING OF FISH STICKS

(Prepared by the United Kingdom)

Background

1. In May 1998, the Codex Committee on Food Labelling (Alinorm 99/22 paragraph 33)[i] recalled that a proposed draft amendment had been adopted by the Commission at Step 5 to the labelling provisions in the Standard for Quick Frozen Fish Sticks (Fish Fingers) and Fish Portions – Breaded or in Batter (Codex Stan 166-1989, Rev. 1-1995). This draft amendment proposed the inclusion within the Standard, of a requirement for product label declarations of the proportion of fish core within the product. The Committee forwarded the draft amendment to the Commission for adoption at Step 8.

2. It was considered that declaration of the proportion of the fish core would allow buyers and consumers to make an informed choice about the products they were purchasing. However, it was also suggested (Alinorm 99/22 paragraph 34)[i] that, as the term "fish core" may include ingredients other than fish, such as water, polyphosphates and other water retaining ingredients, the designation of the "fish content" might be more appropriate and meaningful.

3. In June 1998, the Codex Committee on Fish and Fishery Products (Alinorm 99/18, paragraph 103)[ii] was informed that since the amendment had been proposed to Codex Stan 166-1989 (Rev. 1 1995), the European Community had amended its food labelling legislation with the introduction of Directive 97/4/EC[iii]. The percentage of fish contained in a product (excluding water and additives) has now to be declared under EC legislation, which may be quite different from the "fish core" as described in Codex Stan 166-1989. The prospect of declaring "fish content" was reconsidered by the CCFFP but concerns existed as to the availability of and unfamiliarity with, suitable methods for the calculation of "fish content" within a product.

4. In June/July 1999, the Codex Alimentarius Commission (Alinorm 99/37, paragraphs 127-129)[iv] considered the draft amendment to Codex Stan 166-1989, but no consensus was reached and the matter was again referred to the Codex Committee on Food Labelling to determine the need for labelling requirements (due to be discussed at the 28th Session, 8-12 May 2000, Ottawa) and to the CCFFP to consider the technical aspects of the definition of fish core/fish content and the methodology.

5. In accordance with paragraph 103 of Alinorm 99/18[ii], the UK now presents this paper to assist in the discussion about whether "fish content", as opposed to "fish core" should be declared in coated fish products, and how it can be determined in practice.

Introduction

6. In order for a label declaration about the contents of a characterising ingredient in a food product to be meaningful, it is essential that it contains accurate information of relevance to the buyer or consumer and that it enables the product to be directly compared with other similar products. This is in line with the general viewpoint that informative labelling is a more flexible and effective approach to consumer choice than relying solely on compositional standards. Implementation of the Quantitative Ingredient Declaration (QUID)[v] requirements within the European Union put into practice this philosophy. When applied to fish products, a fish content declaration will provide a vital piece of information to the buyer or consumer when selecting and comparing different products.

7. Although the regulatory situation may not be similar in other countries, it is believed that an accurate label declaration of the main food ingredient in a product is of universal importance to buyers and consumers. For most, the amount of fish in a fish product would be understood as the amount of the raw ingredient (e.g. as a fresh whole fish) used to make the product.

8. Manufacturers determine the amount of fish present in a food product on a recipe basis by weighing the fish ingredient as a proportion of the total weight of ingredients. Problems arise when the amount of fish ingredient needs to be checked in the finished product. In the case of coated fish products, such as fish sticks, the characterising fish ingredient is often difficult to determine accurately in proportion to the other ingredients. Accordingly, the internationally accepted method of measuring fish in coated fish products is by the manual removal of the coating and weighing of the fish core (which is often perceived as pure fish), as in the method[vi] currently specified in Codex Stan 166-1989.

9. Thus, the fish core of many products, such as those to which Codex Stan 166-1989 applies, may not be a true indication of the 'real fish' content of a product since the core is frequently derived from frozen fish blocks which may contain other ingredients or added water. These blocks are made and sold on an international basis and, although a fish content is sometimes declared, buyers often have little control over the actual fish content of blocks purchased on an global commodity market.

Measurement of fish content

10. The general approach to determine or verify the quantity of fish within a coated fish product is by in-factory inspection of records and procedures, though this may be more difficult with imported product or for frozen fish blocks prepared on board a factory vessel. However proof that fish content is not as declared on the label is normally achieved by retrospective chemical analysis. In addition, to determine whether a factory inspection is necessary, some form of screening or monitoring is normally carried out based on end product analysis. Manufacturers also need to monitor the fish content of the frozen fish blocks they use in the preparation of coated fish products for their own control and their declaration of fish content. Until current research is successful in developing other methods, for example the development of reliable and quantitative DNA analyses, the nitrogen content of the fish flesh is used as the only realistic marker for determining fish content.

Nitrogen content of fish

11. The nitrogen in fish flesh is distributed mainly within the muscle tissue proteins and to a much lesser extent in other nitrogen-containing substances (non-protein nitrogen) [vii,viii,ix]. However, although nitrogen levels vary between different species of fish and also within species due to different fishing grounds, size, sex or spawning cycles, it has been demonstrated that most finfish muscle tissue contains about 18-22% protein, with an average of about 18.5%[x] in freshly harvested fish. Table 1 illustrates the natural range of nitrogen found in various white fish species. In some species there is some evidence of a significant seasonal variation in nitrogen but generally, nitrogen depletion is associated with increased water in the muscle as a result of processing.

Variations in nitrogen content of fish due to processing

12. The very nature of the wet processing of fish is such that changes can take place at virtually all stages of a process which alter the chemical composition of the fish, i.e. a degree of water absorption and loss of soluble nitrogen is inevitable[xi]. Although merely storing fish on ice can reduce the nitrogen content of fish, the principal processing variables having an effect on nitrogen or water contents include icing, washing and freezing.

13. Good manufacturing processes (GMP) can be achieved by ensuring processing stages are controlled to minimise the addition of excess water to the fish or the unnecessary alteration of the nitrogen content. An example of fish block manufacture is illustrated in Figure 1, and the processes involving washing, freezing and filleting provide the most vulnerable stages at which the fish may absorb excess water without adequate GMP controls.

Chemical methods

14. The standard method of chemically determining nitrogen content is very precise, but the use of conversion, or nitrogen factors to calculate the fish content gives an approximation of amounts present. The factors aim to take into consideration any inevitable nitrogen loss or water gain during normal processing (such as those stages outlined in Figure 1). The calculated fish content (see Annex A) is therefore reasonably accurate provided the handling, storing and processing has been conducted in accordance with GMP.

15. The variability of nitrogen content in white fish, to which Codex Stan 166-1989 relates, is also much less than in other types of fish, such as shellfish, and so a reasonably close approximation of fish content can be deduced.

UK experience

16. In 1998, in the light of the implementation of QUID[v] rules and a need to give consumers better information, a Code of Practice[xi] on the Declaration of Fish Content in Fish Products was published by UK food industry organisations with enforcement authorities. The determination of nitrogen has been used as the indictor of fish content (see Annex A), based on the Kjeldahl method, using BS4401 chemical methods[xii] (or equivalent) and calculated according to the Stubbs and More[xiii] procedure using a pre-determined factor to express the nitrogen in terms of fish content.

17. This Code acknowledges that for enforcement purposes, the best available procedure for verification of a final product declaration of fish content is the use of chemical analysis, followed by in-factory investigation if there is reasonable doubt that the declaration is correct. The approach encourages in-factory and in-processing 'self-regulating' methods by endorsing the application of good operating practices at all stages of the processing and manufacturing of fish products. It is recognised that following such procedures should help to ensure that products are not debased unnecessarily in relation to composition, quality, form or texture, lessening the need for large-scale in-factory investigations by enforcement authorities.

UK applied nitrogen factors

18. The UK has recently researched some interim nitrogen factors[xi], largely based on collected industry data, to be applied in the determination of fish content. These interim factors have been derived by reducing the nitrogen factor for freshly harvested fish by an element which accords with the effects of GMP and gives rise to the nitrogen factor commonly found in raw fish purchased by consumers. They are thought therefore to be reasonably indicative of the nitrogen level of the fish ingredient after it has been prepared by GMP and just prior to any further processing. These suggested nitrogen factors are shown in Table 2. It is however, intended by industry and enforcement authorities, that the factors will be reviewed periodically and revised in the light of experience, prevailing conditions, emerging technology, improvements in GMP or other factors to ensure their continuing appropriateness.

19. The interim figures in Table 2 are predominantly based on data from UK fisheries and similar figures would need to be developed to account for different fishery stocks and species of fish. Other countries may have data that could be used to develop a more comprehensive database.

Conclusions

20. Buyers and consumers of fish products are better informed by knowing the actual fish content of a product, which makes direct comparison with other products easier. This is better achieved by a 'fish content' declaration rather than a 'fish core' declaration which can include polyphosphates etc.

21. Fish blocks used in the manufacture of fish sticks /fish fingers are traded on a world market basis, which makes it difficult for processors to determine whether they have been produced in accordance with good manufacturing practice with regard to their fish content.

22. Currently the most practical way of determining the fish content in fish blocks or products is through the use of chemical methods based on the measurement of their nitrogen content. Using appropriate nitrogen conversion factors it is possible to take account of inevitable changes in nitrogen levels that will occur during the normal processing of the fish.

23. The determination of fish content by chemical analysis should be carried out in conjunction with a programme of in-factory inspection to verify that nitrogen factors used are appropriate and that production complies with GMP, particularly during icing, freezing and washing operations.

Proposals

24. It is proposed that Codex Stan 166-1989 should be amended to include a requirement to declare fish content on fish product labels. This may also require a subsequent similar amendment in the Codex Standard for Quick Frozen Blocks of Fish Fillet, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh (Codex Stan 165-1989).

25. In order to be able to achieve the above requirement, it is proposed that the draft Codex Code of Practice for Fish and Fishery Products is amended to include reference to the GMP requirements necessary for minimising the loss of nitrogen and excessive uptake of water during fish processing.

26. Chemical analysis based on nitrogen content should be considered as an acceptable method for the determination of the fish content in coated fish products coupled with in-factory inspection of records and processes if necessary or appropriate.

27. Other countries may like to submit alternative methods in current use for the measurement of fish content in fish products.

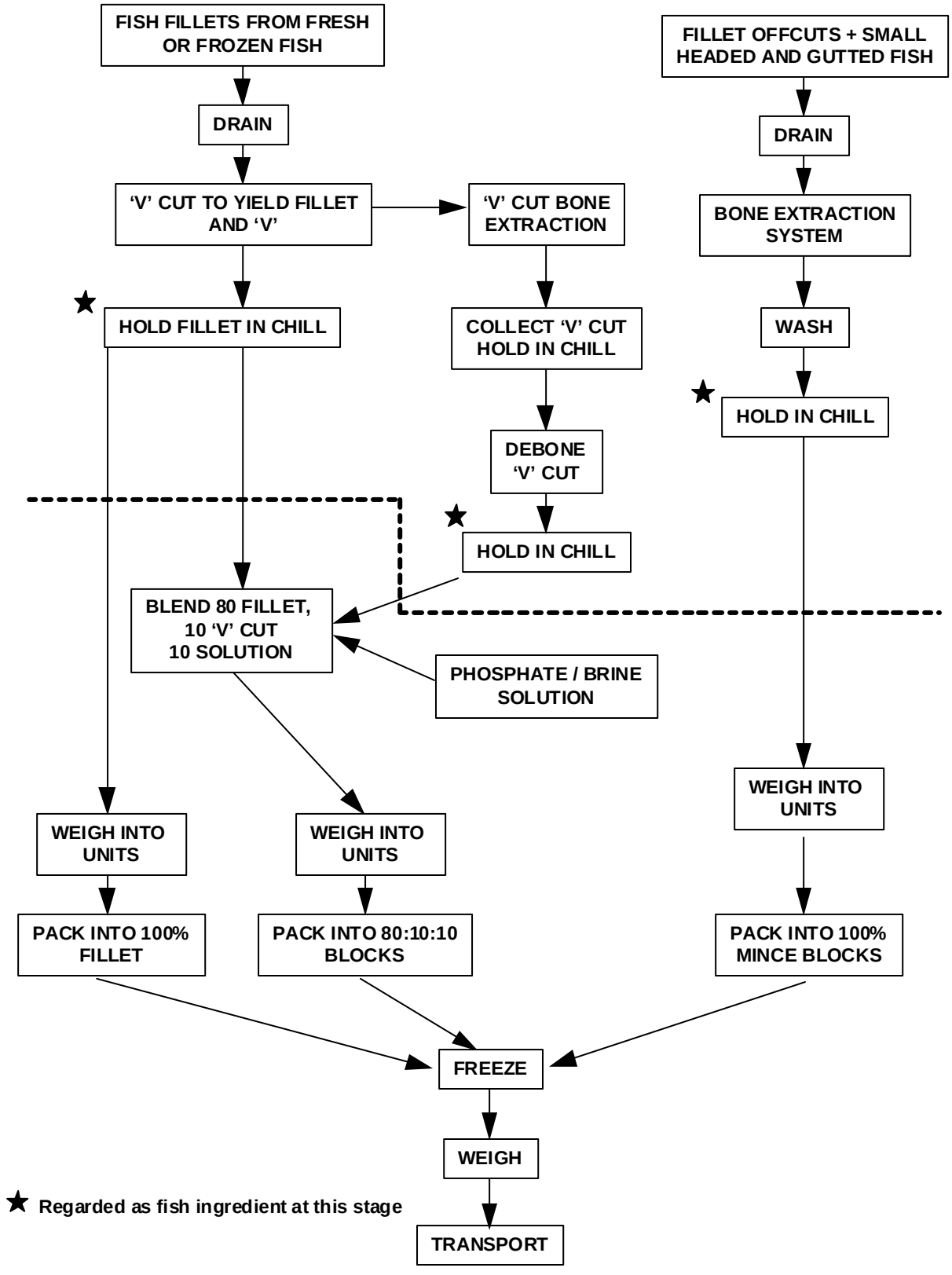
Table 1: Showing the range of nitrogen content in various white fish species[xiv]

SPECIES	No of samples	Mean N (%)	Range
Cod	295	2.871	2.21-3.20[xv]
	182	2.906	2.64-3.29[xvi]
Coley/Saithe	95	2.923	2.52-3.27[xvii]
	256	2.926	2.54-3.32[xvi]
European Hake	183	2.871	2.52-3.28[xvi]
Haddock	361	2.962	2.52-3.31[xvi]
Ling	271	3.020	2.70-3.36[xvi]
Plaice	182	2.665	1.91-3.19[xvi]
Whiting	365	2.912	2.35-3.35[xvi]

Table 2 Interim nitrogen factors for white fish as an ingredient

SPECIES	Nitrogen (%)
Cod	2.66[xiv, xviii]
Minced Cod	2.61[xix]
Coley/Saithe	2.69[xiv, xviii]
European Hake	2.64[xviii]
Haddock	2.72[xviii]
Ling	2.78[xviii]
Plaice	2.46[xviii]
Alaskan Pollack	2.59[xix]
Whiting	2.68[xviii]
White fish mean	*2.65*

Figure 1 Showing processing stages for fish block manufacture[xi]



Annex A

Calculation of fish content

The fish content of a fish product can be calculated on one of the following two bases:

Either

As a percentage total of the weight of the in-going raw ingredients used during the preparation of the food i.e. at the point of their incorporation into a recipe (commonly called the 'mixing bowl stage').

or

As an initial raw ingredient percentage of the final product weight. For products such as fish fingers (fish sticks) which include a frying stage as part of the processing, this basis is more appropriate. During the frying process, loss of water and uptake of oil occurs and this may alter the apparent weight of the initial raw ingredients e.g. as moisture is driven off.

The fish content of a fish finger (fish stick) is calculated by using the following equation:

$$\% \text{ Fish Content } = \frac{\text{Weight of ingoing fish}}{\text{Weight of final product}} \times 100$$

For most products therefore, the fish ingredient weight is that of the raw ingredient. Any figure placed or declared on a product label would be a typical quantity reflecting the producer's normal manufacturing variations, in accordance with good manufacturing practice.

References

[i] *Alinorm 99/22* Report of the Twenty-sixth Session of the Codex Committee on Food Labelling, Ottawa, Canada, 26-29 May 1998.

[ii] *Alinorm 99/18* Report of the Twenty-third Session of the Codex Committee on Fish and Fishery Products, Bergen, Norway, 8-12 June 1998.

[iii] Directive 97/4/EC of the European Parliament and of the Council of 27 January 1997 amending Directive 79/112/EEC on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs. OJ No L43 of 14.2.97, p21.

[iv] *Alinorm 99/37* Report of the Twenty-third Session of the Codex Alimentarius Commission, FAO Headquarters, Rome, 28 June-3 July 1999.

[v] Directive 97/4/EC of the European Parliament and of the Council of 27 January 1997 amending Directive 79/112/EEC on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs and UK Food Labelling (Amendment) Regulations 1998 & Food Labelling (Amendment) (No 2) Regulations 1999.

[vi] AOAC Method 18.003. Fish content of Frozen Breaded Fish Products.

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[xvi] Private Communication from Torry Research Station (1985).

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[xviii] Holland, B., Brown, J. and Buss, DH. 1993. Fish and Fish Products. Third supplement to the fifth edition of McCance and Widdowson's *The Composition of Foods*. The Royal Society of Chemistry / Ministry of Agriculture, Fisheries and Food.

[xix] Ross Youngs Ltd, - unpublished data.