



# Review of European Legislation on Vegetable Protein in Meat Products

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## ABSTRACT

A review of the legislation concerning the use of vegetable protein products in meat products is given for 15 West European countries. Existing requirements in these countries concerning composition and labeling of meat products containing vegetable protein are compared, and it is shown that wide divergencies exist. Some countries explicitly forbid addition of vegetable protein to meat products, other countries permit such additions in specified amounts to specific meat products and others again do not set limitations on either the amount of vegetable protein or the type of meat products to which they may be added. Labeling provisions, likewise, vary to a great extent. These differences are linked to the regulations on meat products in the various countries which often reflect a strong national tradition. In most of the countries no general approach to regulating use of vegetable proteins in meat products has yet been taken. But a few of the countries are formulating such a policy, and the possible outcome of these ongoing deliberations is outlined.

## INTRODUCTION

Anybody who wants to manufacture and sell a product containing both meat and vegetable protein must ask: is vegetable protein allowed in this product on that particular market and, if so, under what conditions of quantitative limitations and/or labeling requirements? These questions are not always easily answered since they often have not been taken into account in the regulations governing the composition and labeling of meat products and therefore not only depend on the wording of the regulations but also on the way in which the general food law provision of "thou shalt not mislead the consumer" is interpreted.

In Western Europe a great variety of meat product regulations exists originating mostly from tradition within each country. In some countries the identity of traditional meat products is strongly protected by detailed regulations and/or official guidelines much the same as it is the case with dairy products, while other countries take a more liberal view and some even do not regulate meat products at all. Another important factor contributing to diversification is when the regulations first were issued and whether they are revised frequently in the light of technological innovations (such as the various vegetable protein products). Regulations which date back to the first half of this century usually require meat products to comply with very narrow compositional criteria and do not bother about labeling provisions while more modern regulations would contain more diversified criteria and to a greater extent rely on labeling as a means of informing the consumer. In many cases a mixture of these two extremes can be seen as a result of up-dating old regulations while still maintaining their basic approach.

In order to assess the situation with respect to the

permitted use of vegetable protein in meat products in Western Europe, a review has been made of the regulations in 15 countries: Austria, Belgium, Denmark, Fed. Rep. of Germany, Finland, France, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland and U.K. in Appendix I, and a comparison between these regulations is given in the following.

## Comparison of Compositional Requirements for Meat Products

Appendix II contains a schematic outline of the basic approach with respect to compositional requirements for meat products relative to nonmeat ingredients and analytical requirements for the final product. The differences are great.

Belgium, Denmark, Ireland and Spain (except for certain products) do not have regulations concerning the composition of meat products although the permitted food additives are specified.

The other countries, except the U.K., regulate composition of meat products by specifying type and amount of permitted nonmeat ingredients; e.g., it is stipulated to which products milk powder may be added and in what amounts. Many of these countries additionally describe the quality of the raw meat materials to be used in the various products and in some cases also the required amount of certain characterizing meat ingredients such as liver in liver paste.

United Kingdom bases its regulations on requiring the minimum amount of meat which must be used in the manufacture of meat products coupled with definitions of their general compositional characteristics. Thus the amount of nonmeat ingredients are limited indirectly, whereas there are no specifications as to which may be used except for food additives.

Sweden also for some chopped products applies the principle of minimum meat content, leaving it open which ingredients should make up the rest of the product.

In addition to specifying amount and type of permitted nonmeat ingredients, Austria, Fed. Rep. of Germany, France, Luxembourg, The Netherlands, Norway, Sweden and Switzerland lay down analytical criteria for the final product such as the maximum water/protein ratio, maximum amount of total fat, minimum amount of protein, etc.

In practice the compositional requirements are even more different than it will seem from such a general comparison. Although some countries may have similar basic principles for regulating composition, they would not define specific products in the same way and very often a product complying with the regulations of one country would not be permitted to be sold in another. As an example, the binders permitted in cooked vienna sausages are listed in Appendix III from where it can be seen that not any one binder can be used in all of the countries and that it would indeed be difficult to find a binder that could be used in more than five countries. Other compositional parameters are equally different and do indeed make up quite a puzzle for exporters of meat products.

## Comparison of Labeling Requirements for Meat Products

In modern labeling regulations, it is recognized that the way in which the ingredients are declared should give the consumer at least some idea of the composition of the product and that a full list of ingredients in descending order of proportion therefore is needed. However, as can be seen from Appendix IV, there are still seven of the reviewed countries (Belgium, Denmark, Fed. Rep. of Germany, Ireland, Luxembourg, The Netherlands and Switzerland) that do not provide for a complete list of ingredients but three of these (Belgium, Fed. Rep. of Germany and Switzerland) require that certain ingredients must be declared in connection with the name of the product. France has similar provisions in addition to the list of ingredients.

The principle of quantitative declaration of ingredients is a further step in giving information to the consumer and may even in some cases replace compositional requirements.

In France quantitative declaration is required for ingredients which are named in the designation of the product but does not replace compositional requirements for traditional meat products.

Swedish regulations require quantitative declaration of meat, meat by-products, vegetable protein product, potatoes and vegetables, and this system seems to make it possible to restrict compositional requirements to only the most common meat products.

Norway provides for quantitative declaration of the characterizing ingredients in composite meat products, and in Denmark nonmeat protein ingredients are to be declared quantitatively above 3%.

Appendix III includes a review of how binders added to cooked vienna sausages are declared in the various countries.

## Comparison of Provisions on Vegetable Proteins in Meat Products

So far only France and to some extent Sweden have decided how to regulate use of vegetable protein products in meat products in general, but regulations on this subject are under elaboration in The Netherlands, Norway, United Kingdom and possibly Spain. Furthermore, the Commission of the European Communities has produced a report on "Vegetable Proteins in Foodstuffs for Human Consumption in particular in Meat Products," which outlines the possibilities for harmonized legislation in the EEC.

In Appendix V, the existing provisions on vegetable proteins in meat products are compared schematically. A distinction is made between traditional and nontraditional meat products where *traditional meat products* are characteristic meat products with names that are connected with the use of meat, while *nontraditional meat products* are products containing meat and vegetable proteins but not presented or named as traditional meat products.

## Vegetable Protein in Traditional Meat Products

A distinction can be made between two different purposes with respect to the addition of vegetable proteins to traditional meat products: 1. for the purpose of a technological function such as fat emulsification or water binding similar to the use of other ingredients usually called "binders," e.g., caseinate, milk powder, starch; 2. for the purpose of substituting meat so that either – the product appears to contain more meat than is present but still contains the prescribed amount of meat, – the product contains less meat than is customarily expected so that part of the prescribed meat content is replaced. It should be noted that the two categories often overlap each other so that a distinction is difficult to assess accurately. For instance, vegetable protein added to raw, minced meat may reduce the cooking loss of water and fat as well as extend the amount of product.

## Vegetable Proteins as Binders

It is remarkable that seven countries (Austria, Fed. Rep. of Germany, Finland, Italy, Luxembourg, The Netherlands and Switzerland) do not permit vegetable protein in traditional meat products even though binders such as milk powder, caseinate and starch may be added to some products. In the Fed. Rep. of Germany, vegetable proteins are specifically prohibited in the text of the regulations, while the other countries simply do not list them as permitted ingredients.

In the rest of the countries, vegetable protein products are treated more or less in the same way as other ingredients with similar functions both with regard to the products in which they are permitted and with respect to labeling requirements. It should be noted, though, that France only permits concentrated and isolated vegetable protein in the powdered form as binders and that Norway requires that the vegetable protein product contain at least 85% protein.

## Vegetable Proteins as Substitute for Meat

When there are no standards of composition for meat products, it is difficult to say when vegetable protein substitutes meat, since the usual meat content has not been specified directly or indirectly in the first place. However, in this case, it seems likely that it is permitted to add more than small amounts of vegetable proteins for other than technological purposes to customary meat products, provided that the labeling and presentation of the product does not mislead the consumer; e.g., the name of the product includes reference to addition of vegetable protein product. This is the situation in the countries which do not have compositional requirements for meat products, (Belgium, Denmark, Ireland and Spain, except for a few standardized products). It also applies to meat products in Sweden and U.K. for which standards have not been established.

Where compositional requirements for meat products exist, it is only in Sweden, U.K. and to a certain extent Norway that it is permitted to add vegetable proteins over and above the required meat content so that the product might appear to contain more meat than usual. In no country is it allowed to replace part of the meat content of standardized products by vegetable protein, but new provisions concerning this question are being elaborated in the Netherlands and U.K.

In The Netherlands it is proposed to allow meat to be replaced by nonmeat protein products on the following conditions: (a.) the product must be designated as "extended meat products" in addition to the names of traditional meat products but not necessarily in connection with those names; (b.) 50% (or perhaps 30%) of the usual meat product may be replaced except that for raw, minced meat only 25% of meat may be replaced; (c.) the final product may contain up to 50% (or 30%), respectively, 25% of nonmeat protein (analytically); (d.) compositional requirements concerning permitted food additives, relative water content, etc. will be stipulated so that the corresponding traditional meat products are matched as well as possible; (e.) the type of added nonmeat protein product and the amount of nonmeat protein must be declared.

In the United Kingdom, it is proposed to allow up to 30% of meat to be replaced by nonmeat protein products on the following conditions: (a.) the nonmeat protein product used must have a specified maximum content of water and fat and a specified minimum content of protein and of certain nutrients; (b.) the name of the meat product should include a reference to the nonmeat protein product added; (c.) the percentage of meat content and the percentage of hydrated nonmeat protein product must be declared in connection with the name of the product.

## Vegetable Protein in Nontraditional Meat Products

It seems reasonable to expect that a product containing two acceptable food ingredients such as meat and vegetable protein product may be marketed as long as information is given on its type and composition and it is not represented as a traditional meat product. This, however, is not always the case. In the Fed. Rep. of Germany, for instance, it is not permitted under any circumstances to add vegetable proteins to a product that contains more than 50% of meat and in Italy the combining of meat and textured, defatted soy protein is not allowed at all.

So far, only France and to some extent Sweden have issued specific provisions concerning the composition and/or labeling of products which due to their content of vegetable protein are classified as nontraditional meat products.

According to the French regulations, any vegetable protein added above that permitted as binder in traditional meat products automatically makes the product a nontraditional product which must be designated by a neutral name such as "product prepared from meat and vegetable protein" and a quantitative declaration of meat and of hydrated vegetable protein shall appear in the list of ingredients. It is interesting that in these products the amount of added vegetable protein product may not exceed 30% so that there is no possibility of producing a product with, for instance, 40% vegetable protein. Furthermore, it is specified that a picture of the product may appear on the label, but additional designations of the type "imitation sausage" are not permitted. However, products intended for collective consumption (restaurants, cafeterias, etc.) may be designated with a traditional name followed by an indication of the presence of vegetable proteins or by a fancy name.

In Sweden the question is dealt with by labeling requirements. First, any product containing meat and vegetable protein will have a quantitative declaration of these two ingredients in the list of ingredients. Second, when an ingredient other than meat (vegetable protein) has been used in a substantial amount, this would have to be reflected in the name of the product. Products containing less than 20% meat are not classified as meat products, and they may not be sold under designations which may lead to confusion with meat products or in any other way which conveys the impression of a meat product. They may, however, be designated with names such as "soya-sausage" or "sausage with soya."

Since the other 13 countries do not specifically regulate nontraditional meat products containing vegetable protein (except for the prohibitions mentioned in Germany and Italy), it is difficult to say whether they are permitted and if so under what conditions. In Belgium, Denmark, Ireland and Spain, which do not have compositional requirements, it would probably not be difficult to find an appropriate name for such products. In Germany (for products containing less than 50% meat), Italy (with the exception of textured soy flour), The Netherlands and the United Kingdom, it would be required that the product does not bear the name of a meat product and that the type and composition are clear from the designation, while it seems that in Austria, Finland, Luxembourg, Norway and Switzerland they could not be marketed at all.

In Norway, however, it is being proposed that nonmeat protein ingredients should be permitted in combination with chopped meat and/or fish provided that these products do not bear the names of traditional meat or fish products and they they comply with the following requirements: (a.) the nonmeat protein product must be approved by the authorities; (b.) the final product shall contain not less than 10% protein, not more than 3.5% starch, not more than 14% fat and not more than 80% water calculated on fat-free basis; (c.) the name of the product must give a correct indication of the nature of the product and fancy

names are not permitted alone; (d.) the amount of meat, fish and nonmeat protein ingredient shall be declared and the amount of nonmeat protein product shall refer to the hydrated state defined as containing 16% protein; (e.) the content of energy, fat, protein and carbohydrates per 100 g product shall be declared and the amount of protein derived from meat or fish shall be given separately. The question of whether a limitation on the amount of nonmeat protein ingredients should be given has not yet been settled, but 50% has been mentioned.

## Prospects for the Future

In many European countries, there is a strong tradition concerning the composition of meat products and hence reluctance to allow for the addition of vegetable protein products, even for technological purposes, and even though traditional ingredients such as milk powder and caseinate are permitted.

This is the reason why it is concluded in the EEC Commission report on vegetable proteins that at the present stage there is only a realistic possibility for harmonizing the legislation concerning vegetable proteins in nontraditional meat products (and products consisting mainly of vegetable protein products).

It may thus seem that it will still take some time before vegetable proteins are legally recognized as ingredients in meat products in quite a few countries, but it should also be taken into account that the pressure to do so is mounting, particularly when the price of meat goes up. Already a number of countries have issued or are about to issue regulations on the subject. In addition to the European countries mentioned above, they include Canada and the United States. A Codex Committee on Vegetable Proteins has been established, the EEC Commission has elaborated a report, and the subject seems in general to get a lot of attention all over the world.

It is, therefore, to be expected that quite some legal activity with respect to vegetable proteins in meat products will take place in the future. Based on the present and proposed regulations, the following are major issues to be solved and certain trends that can be identified.

**Binders.** Vegetable proteins added for a technological purpose will probably be permitted in most countries on the same basis as other similar ingredients, the so called binders. Establishment of a reliable and relatively simple analytical method to detect the vegetable protein quantitatively in the final product will help much in speeding up this process.

**Substitutes for meat.** Opinions seem divided on this issue. Some countries prefer to create a new category of products which must not be designated with the names of traditional meat products, while others intend to permit part of the meat content to be replaced by nonmeat protein ingredients depending mostly on whether there has been a strong traditional concept of meat products backed up by regulations or official guidelines. It is relevant to compare the situation to that for dairy products, although in general it is a little more relaxed in the context of meat products. It might have been better if there had been less mentioning of "substitution" or "replacement" and more focus on introducing ingredients which, in the amounts used, would maintain the characteristics of traditional meat products while also extending them and thereby making them less expensive. But the terms have been used so frequently by now that they probably cannot be changed.

**Limitations on the amount of vegetable protein.** When regulations are based on the concept of "substituting" meat, there is a general trend in Europe to limit the amount that may be substituted to 30% to 50% of the meat in the traditional products. For nontraditional products there does not seem any reason to limit the proportion of vegeta-

ble protein product to meat product, although this has been done in France and is considered a possibility in Norway.

**Fortification of vegetable proteins.** The proposed U.K. regulations stimulate a certain content of essential nutrients for the vegetable protein products which may be used as a replacement for meat. Such a measure is not required in the French and proposed Norwegian regulations on nontraditional products, perhaps because they do not deal with "substitution of meat." Since the attitude on the question of fortification varies widely between the European countries, it is difficult to predict a trend in this respect, but it seems that at present most European countries would not require fortification unless dietary deficiencies could be foreseen, and some might even not permit the marketing of fortified products.

**Labeling.** Clear and understandable labeling which informs the consumer about composition of the product is undoubtedly the most important issue with regard to products consisting of meat and vegetable protein products. A full list of ingredients will soon be mandatory in almost all European countries, and there is a definite trend towards requiring quantitative declarations of the meat and/or the vegetable protein product present. But, although it may be simple to say that the amounts shall be declared, the matter is much more complicated: what is meat? how much fat and connective tissue may it contain? how are meat by-products to be declared? should the vegetable protein product be declared as the dry product? and should added water then be declared quantitatively? should it be declared as the hydrated product? and, if so, calculated on which amount of water or protein? These questions have so far not been solved satisfactorily, but it is very important to reach some sort of harmonization among countries since the possibilities for further regulatory divergencies are so numerous.

## APPENDIX I

### Outline of European Regulations on Meat Products in Relation to the Addition of Vegetable Protein Products

This appendix contains a review of regulations on meat products in relation to the addition of vegetable protein products in the following 15 European countries: Austria, Belgium, Denmark, Federal Republic of Germany, Finland, France, Ireland, Italy, Luxembourg, The Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom. The review sets forth the basic principles of the meat product regulations in the various countries and focuses on the compositional and labeling requirements with respect to ingredients permitted as binders such as starch, milk powder, and caseinates. In the light of this information, the situation with respect to vegetable protein products in meat products is explained. It should be noted that the review does not intend to give a complete exposé of the provisions covering meat products. It is merely a summary from which many details necessarily have been omitted. Provisions on binders were changed in November 1978 as regards amounts and products to which permitted.

### AUSTRIA

#### General Compositional and Labeling Requirements

Official guidelines for meat products have been published since 1959 and by now cover most of the common meat products (1). They define the products according to good manufacturing practice and are used as a legal instrument for the purpose of control. The guidelines contain detailed descriptions of raw meat materials and nonmeat ingredients that may be used and in many cases establish

complete recipes for the different products. In addition they stipulate analytical requirements for the final product which in most cases specify the minimum amount of collagen-free protein, the maximum ratios for collagen/protein, water/protein, fat/protein and (water+fat)/protein as well as the maximum amount of starch calculated as potato starch. The permitted binders are potato starch which may be added to various types of cooked sausages in amounts about 1-2% and caseinate which may be added to some canned products. General labeling regulations (2) require a full list of ingredients in descending order of proportion and the weight of meat or meat product used in the preparation must be declared if it is different from the total net weight.

#### Specific Requirement for Vegetable Protein Products

Vegetable protein products are not permitted in meat products.

### REFERENCES

1. Österreichisches Lebensmittelbuch. III Auflage. 8. Lieferung B 14 Fleisch und Fleischwaren.
2. Lebensmittelkennzeichnungsverordnung, 1973.

### BELGIUM

#### General Compositional and Labeling Requirements

The regulations on meat and meat products which date back to 1946 (1) do not stipulate compositional requirements but only that the addition of nonmeat ingredients shall be declared in the name of the product. When the total amount of nonmeat ingredients exceed 10% of the final product, the percentage of each of these ingredients shall also be stated. However, these requirements do not apply to certain curing ingredients, eggs, gelatin and up to 5% of starch and/or milk powder in cooked products and dried sausages. Furthermore, maximum limitations have been laid down for food additives (2). A list of ingredients is not required.

#### Specific Requirements for Vegetable Proteins in Meat Products

Vegetable protein products may be added to meat products provided that they are declared in connection with the name of the product.

### REFERENCES

1. Arrêté du Régent du 10 février 1946 relatif au commerce des viandes et de certains produits analogues ou dérivés, modifié 28 février 1964 et 17 juin 1971.
2. Arrêté ministériel du 30 août 1976 fixant la liste des additifs autorisés dans les denrées alimentaires.

### DENMARK

#### General Compositional and Labeling Requirements

There are no compositional requirements for meat products except for maximum limitations of food additives (1).

General labeling provisions (2) only require the declaration of food additives, but specific provisions for frozen products require a list of the nutritive ingredients in descending order of proportion and the amount of the ingredient(s) which, according to the name characterizes the product, shall also be stated (3).

Furthermore, meat products produced for the Danish market in establishments authorized for export are subject to an administrative ruling that the addition of more than 3% of nonmeat protein ingredients such as caseinate and vegetable proteins (calculated as the dry ingredient on the total weight of the product) must be declared quantitatively.

tively on the label. This provision also applies to export, except where regulations of the importing country requires a different declaration. Meat products prepared in nonexporting establishments would normally follow this practice. It should be noted that although up to 3% nonmeat protein product may be added without declaration, this is subject to the general ruling of the food law that the consumer must not be misled – so that in many cases also the addition of amounts below 3% would have to be indicated.

Despite the lack of exhaustive labeling regulations, it is common practice that meat products are furnished with a full list of ingredients stating the amounts used during manufacture (when above 1%) and combined with a declaration of the amount of energy, protein, fat and carbohydrates per 100 g of the final product.

#### **Specific Requirements for Vegetable Protein in Meat Products**

Except for the above mentioned 3% rule, no provisions exist with respect to composition. The microbiological quality of vegetable protein products used in meat products must conform to specific standards.

#### **REFERENCES**

1. Fortegnelse over godkendte tilsætningsstoffer til levnedsmidler, Oktober 1977.
2. Bekendtgørelse nr. 316 af 8. juni 1973 om tilsætningsstoffer til levnedsmidler og om ikrafttræden af visse bestemmelser i lov af 6. juni 1973 om levnedsmidler m.m. som ændret ved bekendtgørelse nr. 70 (12. februar 1974), bekendtgørelse nr. 470 (15. september 1975) og bekendtgørelse nr. 523 (3. oktober 1975).
3. Bekendtgørelse nr. 414 af 21. august 1969 om dybfrosne levnedsmidler som ændret ved bekendtgørelse nr. 472 af 17. september 1974.

### **FEDERAL REPUBLIC OF GERMANY**

#### **General Compositional and Labeling Requirements**

The composition of meat products with respect to permitted nonmeat ingredients (1), the composition of raw, chopped meat products (2) and labeling (3) are regulated by federal regulations which apply to the whole of the territory of the Fed. Rep. In addition, the analytical composition of the final product must correspond to good manufacturing practice, and this is controlled by means of guidelines issued and controlled by the local authorities in each state of the Fed. Rep. Due to traditional differences, they are often at variance with each other. However, since 1975 the local conception of good manufacturing practice is gradually being replaced by official guidelines (4) which apply nationwide.

It should be noted that meat products are defined as products containing at least 50% of meat.

#### **Regulations Concerning Permitted Nonmeat Ingredients and Raw Chopped Meat Products**

For all processed meat products, the types and amounts of permitted nonmeat ingredients are specified. This applies to curing ingredients, food additives and the following binders (only the main products to which they are allowed have been mentioned): (a.) cream, milk, skimmed milk and milk concentrates (does not include milk powder or caseinate) may be added to ready meals such as meat balls and in an amount of 5% to liver sausage and liver paste and one type of sausages (Bratwurst) provided that the addition is declared in connection with the name of the product; (b.) egg and egg products may be added to ready meals such as meat balls, whole eggs and egg yolks may be added in an amount of 5% to liver, sausage and liver paste and egg whites may be added in an amount of 3% to cooked sausages and similar products such as luncheon meat provided

that the addition is declared in connection with the name of the product; (c.) starch-containing ingredients may be added to ready meals such as meat balls and may be used for breading and for emulsifying sauces; (d.) sodium caseinate may be added in an amount of 2% to some canned products: sausages, luncheon meat, meat pastes, liver-sausage, liver paste and ready meals such as meat balls, goulash and the like provided that the statement "with milk protein" is declared in connection with the name of the product; (e.) dried blood plasma may be added in an amount of 2% to the same canned products as caseinate (but not simultaneously), and fluid blood plasma may be added in the amount of 10% to cooked sausages and meat paste. Declaration of the addition of blood plasma is not required.

For raw chopped meat products, specific regulations are in force which specify the raw meat materials and for some products the maximum fat content of the final product; e.g., 25% for chopped beef and 40% for chopped pork.

For products containing less than 50% of meat, the meat or meat product component must conform to the requirements for meat products if present in a separable form (e.g., spaghetti with meat balls). In the case of mixed products containing less than 50% of meat (e.g., a spread), no specific requirements exist for their composition, but the product must not be sold under the name of a meat product.

#### **Guidelines on Analytical Composition and Raw Meat Materials**

Regional requirements normally specify limitations on added water, fat content and collagen content, but, as mentioned above, they are being replaced by nationwide general guidelines.

The general guidelines for meat and meat products at present cover dried sausages, cooked sausages of the type vienna, mortadella etc. and similar chopped, cooked, cured products such as luncheon meat. For each type of product the raw meat materials, the processing method, and any specific characteristics are described. Furthermore, limits are laid down for the content of protein derived from muscle meat (i.e., meat protein chemically free from collagen) and for the ratio of muscle protein/total meat protein in the final product. The minimum amount of muscle protein required for most dried, sliceable sausages is 12%, and for vienna and frankfurter sausages as well as luncheon meat it is 8%.

The general guidelines will in the near future be extended to cover meat products consisting of cooked, cured whole pieces of meat (such as hams and pork shoulders) for which a minimum of total meat protein on fat-free basis will probably be laid down.

#### **Labeling Requirements**

The general labeling regulations cover meat products and do not require a list of ingredients; however, the addition of some ingredients must appear in the name of the product. Furthermore, the amount of meat or meat product used at the time of preparation must be stated on the label in addition to the total net weight when these two amounts are not identical.

Voluntary declaration of fat content is used to a great extent, and it is expected that if the voluntary system does not work to the satisfaction of consumers, a regulation will be issued requiring this information.

#### **Specific Requirements for Vegetable Proteins in Meat Products**

The addition of vegetable protein products to meat products is specifically prohibited. Products containing less than 50% of meat may therefore not contain vegetable

proteins in the meat or meat product component if it can be separated from the rest of the product. For mixed products containing less than 50% of meat, no restrictions with respect to vegetable proteins exist, but the name of the product must clearly indicate the nature of the product.

#### REFERENCES

1. Verordnung über Fleisch und erzeugnisse vom 6. Juni 1973, Änderungs-Verordnungen vom 10. Mai 1975 und vom 20. Dezember 1977.
2. Verordnung über Hackfleisch, Schabefleisch und anderes zerkleinertes rohes Fleisch vom 10. Mai 1976.
3. Verordnung über die äussere Kennzeichnung von Lebensmitteln vom 25. Januar 1972.
4. Leitsätze für Fleisch und Fleischerzeugnisse vom 25. Juli 1975.

### FINLAND

#### General Compositional and Labeling Requirements

The regulations on meat and meat products from 1957 (1) and the general regulations on food additives (2) specify the nonmeat ingredients which may be used in meat products.

Products consisting of whole pieces of meat, such as ham and dried sausages, may only contain curing agents and permitted food additives.

Cooked sausages and other cooked chopped meat products may in addition to curing ingredients and food additives contain the following binders: pork rind, blood products, milk and milk powder, egg and egg powder for quality A sausage products; additional potato starch and wheat flour in an amount of maximum 6% for quality B sausage products.

Canned meat products may in addition to curing ingredients and permitted food additives contain a maximum of 2% potato flour or wheat flour except that canned sausages shall comply with the requirements for sausages.

Ready meals, whether frozen or not (but not canned), may contain whey protein, caseinate and hydrolyzed proteins in a maximum amount of 2%. These additions are listed as food additives. For most of the above mentioned meat products the raw meat material is also specified. General labeling regulations require a full list of ingredients.

#### Specific Requirements for Vegetable Proteins in Meat Products

Vegetable protein ingredients are not allowed in the common meat products to which the regulations apply except for hydrolyzed protein in ready meals which supposedly would be added as a flavor enhancer.

#### REFERENCES

1. Förordning om kött och köttprodukter, 11. oktober 1957.
2. Näringsstyrelsens beslut om tillåtna tillsatssämnen i livsmedel, 20. december 1973.

### FRANCE

#### General Compositional and Labeling Requirements

Only a few regulations concerning the composition of meat products are in force, but a Code of Practice first issued in 1967 (1) defines the various meat products according to good manufacturing practice and is used as a legal instrument for the purpose of control.

#### Composition of Traditional Meat Products

For *traditional* meat products (i.e., any well known meat product designated by a usual name such as "sausage," "pâté," "ham"), the types and amounts of permitted nonmeat ingredients are specified. This applies to curing ingredients, food additives and the following binders (only

the main products to which they are allowed have been mentioned): (a.) starch may be added to cooked sausages (except if designated as frankfurter or vienna sausage) provided that the addition is declared in connection with the name of the product, and to liverpaste, pâtés, terrines and galantines in an amount of 5% without declaration in the product name (if more than 5% is added, the addition must be declared in connection with the name of the product); (b.) milk products such as milk powder and caseinate may be added to liverpaste, pâtés, terrines and galantines in an amount of 3% calculated as dry matter and to other chopped cooked meat products (including cooked sausages) in an amount of 1% calculated as milk protein; (c.) egg products may be added to pâtés and galantines; (d.) egg products are specifically permitted to pâtés and galantines and the use of egg white in cooked sausages is considered normal practice; (e.) blood serum and blood plasma are specifically permitted in an amount of 0.5% calculated as blood protein in pâtés (except liver paste), and their use in cooked sausages is considered normal practice; (f.) edible gums may be used to replace starch subject to similar labeling provisions as those applicable to starch (0.5% of alginates or carragenates corresponds to 5% of starch, while 1% of carob meal or guar meal corresponds to 5% of starch); (g.) concentrated or isolated vegetable protein products in powdered form may replace starch (1.5% of protein corresponds to 5% of starch), subject to similar labeling provisions as those applicable to starch, and 1% of vegetable protein may replace an equivalent amount of protein from milk or egg.

Furthermore, the water content of products such as cooked hams and pork shoulders, cooked and dried sausages, liverpaste and other pâtés is regulated by limits on the amount of water on fat-free basis. The fat content is limited in products such as cooked and dried sausages, liverpaste and other pâtés, and the collagen content is limited by a maximum ratio of collagen/protein in products such as cooked and dried sausages, liverpaste and other pâtés.

Additionally, the raw meat material used in the production are specified for some of the main meat products.

#### Composition of Nontraditional Products

Nontraditional meat products (i.e., new products and products which resemble traditional products but are of different composition) are permitted, provided that they are not designated with a name of a traditional meat product but as "product prepared from meat and X" (or some similar neutral expression), where X stands for the ingredient whose presence is the reason for not complying with the composition of traditional products.

#### Labeling Requirements

General labeling regulations (2) require a complete list of ingredients (meat and meat by-products are listed separately) in which any ingredient mentioned in the name of the product must be declared quantitatively. Thus, if the name of the product indicates a specific type of meat (e.g., pork liver, ham, poultry) and/or any other ingredient (e.g., starch, truffles) the amount of meat and/or meat by-products of the ingredient is to be declared in the list of ingredients. For traditional meat products, the usual types of meat - pork, beef, veal and mutton - need not be declared quantitatively if mentioned in the name, whereas this would be required for the nontraditional meat products.

#### Specific Requirements for Vegetable Protein in Meat Products

The following categories of vegetable protein products are defined (3):

Flour: granular product of about 0.1 mm

Meal: granular product of about 0.5 to 3 mm.

Structured protein: products to which a honey-combed or fibrous structure has been given by extrusion, compaction, spinning, etc. They appear in the form of granular pieces with varying density.

Concentrated proteins: powdered or granulated products containing about 70% protein calculated on dry matter.

Isolated proteins: pulverulent products containing about 95% protein calculated on dry matter.

Concentrated and isolated vegetable protein products in the powdered form may replace starch and milk and egg proteins as binders in traditional meat products (1). It is declared in the list of ingredients and, in some cases, in the name of the product as "vegetable protein binder." When quantitative declaration is required, it refers to the dry vegetable protein product.

Any of the types of vegetable protein product as defined may be added to meat products in an amount not exceeding 30%. Such usage entails that the meat product is regarded as a nontraditional meat product (i.e., the product shall be designated as "product prepared from meat and vegetable protein," and the amount of meat and of vegetable protein shall be given in the list of ingredients. The vegetable protein product shall be listed as "vegetable proteins...%," where the percentage refers to the hydrated protein product (4).

A picture of the product may be shown in the label, but designations such as "imitation pâté," "imitation sausage" and the like are forbidden.

However, products intended for collective consumption (restaurants, cafeterias etc.) may be designated in the following way: with a traditional name followed by an indication of the presence of vegetable proteins in close connection to the name; with a traditional name followed by an asterisk which in a menu refers to a general statement such as "names followed by an asterisk correspond to products containing vegetable proteins;" with a fancy name that does not lead to confusion with traditional products.

#### REFERENCES

1. Code des Usages en Charcuterie et Conserves de Viandes, Octobre 1969, mise à jour août 1974, édité par le Centre Technique de la Salaison, de la Charcuterie et des Conserves de Viandes.
2. Décret no 72-937, 12 octobre 1972.
3. Circulaire du 27 août 1975 de la Répression des Fraudes et du Contrôle de la Qualité sur les définitions et utilisations des protéines végétales dans les denrées alimentaires (DGAF/SRF/C - 1 375).
4. Circulaire du 3 octobre 1977 de la Répression des Fraudes et du Contrôle de la Qualité sur l'étiquetage des denrées refermant des protéines végétales.

### IRELAND

#### General Compositional and Labeling Requirements

There are no compositional or labeling requirements for meat products.

#### Specific Requirements for Vegetable Proteins in Meat Products

Vegetable protein products may be added to meat products subject to the conditions of the general food legislation that the consumer must not be misled about the nature or quality of the foodstuff. This would be complied with if the name of the product indicates the presence of the vegetable protein product.

### ITALY

#### General Compositional and Labeling Requirements

According to the regulations on meat and meat products from 1928 (1), only a few nonmeat ingredients are permitted in traditional meat products such as curing ingredients and 4% defatted milk powder to sausage products. Limitations on food additives are regulated separately.

Products which are regarded as specialty products (meat pastes, ready meals) may also contain binders such as starch and milk powder if in accordance with the original recipes or if necessary for the preparation of the product.

A full list of ingredients is required and for sausages which are not prepacked, the addition of milk powder must be indicated on a special seal attached to the sausage.

#### Specific Requirements for Vegetable Proteins in Meat Products

Vegetable protein products might be permitted in some specialty products or products which could be classified as new products. However, the addition of textured, defatted soya flour is specifically prohibited to meat products (2).

Nevertheless, in some school feeding programs, it is permitted to use textured soy protein (hydrated by 2 parts of water) as a replacement of max. 30% of the meat (3).

#### REFERENCES

1. Regio Decreto 20 dicembre 1928, Regolamento per la vigilanza sanitaria delle carni.
2. Decreto Ministeriale 23 settembre 1970, Autorizzazione alla produzione, alla importazione ed al commercio di farina di soia sgrassata e ristrutturata.
3. Circolare n. 14, 13 marzo 1975. Ripartizione Economata, Serv. Referz. Scolastica. Distribuzione integratore proteico "Temptein."

### LUXEMBOURG

#### General Compositional and Labeling Requirements

For all meat products the regulations from 1960 (1) lay down limitations for the amounts and types of nonmeat ingredients that may be added. Dried sausages may contain 5% milk powder, liver paste may contain 5% starch and other products may as binders only contain fresh eggs, pork skin and certain other collagen-containing substances from beef and pork. Furthermore, the water content of some cooked sausages is regulated by a maximum limit of 78% water on a fat-free basis.

Raw meat materials used in the preparation are specified for some meat products; e.g., liver sausage and liver paste must contain at least 10% liver, and blood plasma may only be used for cooked sausages in an amount of max. 10%. Labeling regulations do not require the declaration of ingredients.

#### Specific Requirements for Vegetable Proteins in Meat Products

Addition of vegetable protein products to meat products is not permitted.

#### REFERENCES

1. Arrêté grand-ducal du 3 novembre 1960 concernant le contrôle des viandes.

### THE NETHERLANDS

#### General Composition and Labeling Requirements

According to the meat product regulations which date back to 1938 (1), all meat products (with a few specific exceptions) must be designated as "worst" (sausage) or

"vleeswaar" (meat product) in addition to their common name but not necessarily in connection with that name.

To these meat products, only a few nonmeat ingredients are permitted such as curing ingredients, some food additives and 4% starch to cooked products. Furthermore, the water content of these products is regulated by limiting the ratio water/organic nonfat (organic nonfat =  $100 - [(\% \text{ water} + \% \text{ fat} + \% \text{ starch} + \% \text{ ash})]$ ) to a maximum of 4.

Special permission may, however, be given to market products containing meat and ingredients not permitted in meat products on the condition that they are designated by a fancy name followed by an indication of the main ingredients used.

Regulations are presently being revised, and new regulations on meat products are expected to be published in the beginning of 1979. Labeling regulations do not require a list of ingredients.

### Specific Requirements for Vegetable Proteins in Meat Products

Vegetable protein products are not allowed in meat products designated as "worst" (sausage) or "vleeswar" (meat product).

Products containing meat and vegetable protein may be granted special permission (see I) which would require a name not connected with meat products (e.g., soup balls) and a declaration of the compositional characteristics, e.g., "minced meat with X% of textured soy protein."

At present regulations for the use of nonmeat proteins in meat products are under elaboration. It is expected that nonmeat proteins such as vegetable proteins will be permitted in meat products on the following conditions: (a.) the products must be designated as "extended meat products" in addition to the names of traditional meat products but not necessarily in connection with those names; (b.) 50% (or perhaps 30%) of the usual meat product may be replaced, except that for raw, minced meat only 25% of meat may be replaced; (c.) the final product may contain up to 50% (or 30%) respectively, 25% of nonmeat protein (analytically); (d.) compositional requirements concerning permitted food additives, relative water content etc. will be stipulated so that the corresponding traditional meat products are matched as well as possible; (e.) the type of added nonmeat protein product and the amount of nonmeat protein must be declared.

### REFERENCES

1. "Vlees- en Vleeswarenbesluit (Warenwet)," Besluit van 22 augustus 1938, Staatsblad 865 (as amended).

### NORWAY

#### General Compositional and Labeling Requirements

The meat product regulations which were issued in 1973 (1) define the composition of all products prepared wholly or partly from meat by specifying three categories of meat products.

All meat products are raw chopped-minced meat products consisting of whole pieces of meat (e.g., ham) and dried sausages. To these products only curing ingredients and permitted food additives may be added (except for raw chopped meat), and for specific products such as raw chopped meat and dried sausages, the maximum content of fat in the final product is stipulated. Furthermore, the raw meat materials used are specified.

Processed chopped meat products such as cooked sausages, meat balls and meat pastes may, in addition to curing ingredients and permitted food additives, contain the following binders in general: starch (the binder must consist of at least 80% starch) in a maximum amount of 3.5% in the final product; nonmeat protein product (the binder

must contain at least 85% protein of animal or vegetable origin) in a maximum amount of 2% in the final product calculated as protein. Furthermore, a maximum protein content of 10%, a maximum fat content of 23% and a maximum water content of 80% on fat-free basis are stipulated, but for specific products (e.g., liver paste), a higher fat content is permitted. The raw meat materials for these processed chopped meat products are also specified.

Composite products containing meat products in a mixture with other ingredients such as rice, potatoes, vegetables etc. and soups containing meat shall comply with the compositional requirements for meat products in so far as regards the meat product component.

### Labeling Requirements

General labeling regulations (2) require a complete list of ingredients in descending order of proportion referring to the amounts used in the preparation. Meat and by-products (including blood) are declared separately. Processed chopped meat products containing nonmeat protein ingredients shall be labeled with the statement "foreign protein added." This also applies to non-prepackaged products. Starch added to these products are not required to be labeled in a specific way. For composite products, the amounts of such ingredients as meat, vegetables etc. shall be declared. This is normally done in connection with the net weight declaration. For products consisting of chopped meat, the fat content of the final product shall be declared.

### Specific Requirements for Vegetable Proteins in Meat Products

Only vegetable protein products containing at least 85% of protein may be added to processed, chopped meat products in an amount of 2% calculated as protein, and must then be declared as "foreign protein added." In this case the vegetable protein added will be included in the required amount of the total protein. Composite products such as goulash may contain vegetable protein products provided that the amount present in the final product is declared.

New regulations concerning chopped products containing nonmeat proteins ingredients and meat and/or fish are nearing completion (3). According to the latest proposal, a new category of mixed products would be created which are not allowed to use the traditional names for meat or fish products and which would have to comply with the following requirements: (a.) the nonmeat protein product must be approved by the authorities; (b.) the final product shall contain not less than 10% of protein, not more than 3.5% starch, not more than 14% fat and not more than 80% water calculated on fat-free basis; (c.) the name of the product must give a correct indication of the nature of the product, and fancy names are not permitted alone; (d.) the amount of meat, fish and nonmeat protein ingredients shall be declared, and the amount of nonmeat protein product shall refer to the hydrated state defined as containing 16% protein; (e.) the content of energy, fat, protein and carbohydrates per 100 g product shall be declared, and the amount of protein derived from meat or fish shall be stated specifically.

The question of whether a limitation on the amount of nonmeat protein ingredients should be given has not yet been settled, but 50% has been mentioned.

### REFERENCES

1. Forskrifter om kjøtt og kjøttvarer, 1. februar 1977.
2. Forskrifter om merkning av ferdigpakkede næringsmidler, 25. juli 1975.
3. Utkast til forskrifter for næringsmidler framstilt av protein-konsentrater i blanding med kjøtt og/eller fisk. 26. juni 1978.



## SPAIN

### General Compositional and Labeling Requirements

For meat products in general, there are no compositional requirements except for food additives and a limitation of the starch content of cooked, chopped meat products of 10% (1).

However, standards have been issued for products consisting of whole pieces of cooked, cured pork for which the types and amounts of nonmeat ingredients are specified (2): products designated as "cooked ham" or "cooked pork shoulder" may not contain binders such as starch, nonmeat proteins etc. — only gelatine, agar-agar, alginates and caragenates are permitted presumably to stabilize the exuded jelly; products designated as "fiambre de paleta" (a cooked, nonchopped pork shoulder product) and as "pastel de carne de cerdo" (a product consisting mainly of cooked, cured whole pieces of pork meat) may contain 5% and 8% starch, respectively, and 1% and 2% nonmeat protein, respectively. These provisions on ingredients are coupled with analytical criteria for water on a fat-free basis, minimum protein content on a fat-free basis and others. General labeling provisions require a full list of ingredients (3).

### Specific Requirements for Vegetable Proteins in Meat Products

In general, vegetable protein products would be considered acceptable ingredients in meat products subject to declaration in the list of ingredients. However, as described above, vegetable proteins are not allowed in cooked ham and cooked pork shoulder, and specific maximum limits have been laid down for other products consisting of whole pieces of cooked cured pork.

Work on establishing general rules for the use of vegetable protein products has been undertaken, but so far the principles of the future regulations are not known.

## REFERENCES

1. Orden de 25 Abril 1955 por la que se autoriza la adición de materias colorantes y féculas en los preparados carnicos o de fiambria.
2. Orden de 17 septiembre 1975 por la que se aprueban las normas de calidad para jamón cocido, fiambre de paleta y pastel de cerdo, destinados al mercado nacional.
3. Decreto 336/1975, de 7 de marzo 1975 por el que se aprueba la Norma General para rotulacion, etiquetado y publicidad de los alimentos envasados y embalados.

## SWEDEN

### General Compositional and Labeling Requirements

The meat product regulations which were issued in 1973 (1) define the composition of the most common types of meat products and lay down special labeling requirements for all meat products. A meat product is defined as a product containing at least 20% meat (corresponding to 3% meat protein), or other meat ingredients having a protein value nutritionally equivalent to the protein value of meat.

### Compositional Requirements

To products consisting of whole pieces of meat, only curing ingredients and permitted food additives may be added. The water content of the most common type of such products (e.g., cooked ham) is regulated by a maximum limit on the amount of water calculated on a fat- and ash-free basis in the final product. This limit ranges from 76% to 81% for the various products.

Dried sausages may not contain other nonmeat ingredients than curing ingredient and permitted food additives, while cooked sausages sold under the most common names (such as vienna) may contain 3% (calculated as dry matter on the final product) of potato starch, milk, milk powder,

caseinate, blood product or vegetable protein. In addition, a maximum water content of 65% and a maximum fat content of 23% are stipulated for these cooked sausages. Sausages designated with other names that do not lead to confusion with the standardized products are not required to comply with the limitations.

For some other chopped meat products, the minimum amount of meat used in the preparation of the product is stipulated. This applies, for instance, to hamburgers (min. 80% meat), to meat balls (min. 60% meat) and to liver paste (min. 30% liver), and as long as this is complied with, any acceptable nonmeat ingredient may be added.

For meat products not specifically mentioned in the regulations, no compositional requirements exist and the labeling is relied on for information. However, the meat product regulations are presently undergoing a revision with the intention of extending the range of products with specified compositional characteristics.

### Labeling Requirements

The general labeling regulations (2) require a full list of ingredients in descending order of proportion related to the amount used at the time of manufacture. Meat and meat by-products shall be declared separately with indication of the species of animal from which the meat is derived. Meat is defined as skeletal muscle with a maximum of 30% fat (analytical), thus "pork" and "beef" in the list of ingredients indicate a maximum of 30% fat. For pork, however, a special designation, "fläsk," may be used for pork meat containing up to 75% fat. Sweetbread, brain, heart, liver, lung and kidney must be declared with specific designations while other permitted by-products such as fat, pork skin and blood products may be declared as "meat by-products" (subject to indication of the species of animal).

Additionally, the average amount of meat and meat by-products must be stated in the list of ingredients as g per 100 g for meat products containing meat and meat by-products simultaneously. For products containing more than one ingredient (excepting food additives), the amount of meat, meat by-products, vegetable protein product, potatoes and vegetables must be specified. These requirements for quantitative declaration also apply to products containing less than 20% of meat, although they are not classified as meat products.

Additionally, the total fat content of the final product must be declared for meat products containing more than one ingredient (does not include food additives) and having a fat content of 23% or more.

### Specific Requirements of Vegetable Protein in Meat Products

Specific limitations only exist with respect to vegetable proteins in certain cooked sausages. In other meat products, vegetable protein products may be used provided that the compositional requirements on, for instance, meat content, are complied with — except that vegetable proteins may not be added to products consisting of whole pieces of meat and to products designated as "salami," or "mettwurst."

Products not classified as meat products (i.e., less than 20% meat) may contain vegetable protein subject to the following restrictions: products which are not meat products but which in type are similar to meat products may not be sold under designations which may lead to confusion with meat products or in any other way which conveys the impression of a meat product. Such products must in their name indicate that another ingredient than meat has been used in an essential amount, and the names "soy sausage" or sausage with soya" have been given as examples.

Whenever vegetable protein ingredients have been added

to a meat product or a product containing meat, the amount of the vegetable protein ingredient used in the preparation must be declared in the list of ingredients as g per 100 g of product.

#### REFERENCES

1. Statens livsmedelsverks kungörelse om köttvaror, 6 mars 1973.
2. Statens livsmedelsverks allmänna tillämpningskungörelse, 3. juni 1975.

### SWITZERLAND

#### General Compositional and Labeling Requirements

The regulations on meat from 1957 (1) state that for meat products only a few nonmeat ingredients are allowed in specified amounts such as curing agents, some food additives and the following binders: caseinate may be added to canned meat products and may for products cooked to at least 110 C for a minimum of 30 min be supplemented by 7% agar-agar or carraghen (calculated on the amount of gelatine); starch may be added to spreadable products in an amount of 5%. The addition of other binders such as milk powder, vegetable proteins and edible gums are specifically prohibited.

The composition of cooked ham and pork shoulder is regulated by a maximum limit on the ratio water/protein in the final product.

Labeling regulations do not require the listing of ingredients, but if a canned product contains more than 10% of added gelatine (or combination of gelatine and carraghenan or agar-agar), the addition must be declared on the label, and the weight of the meat product without jelly shall be given in addition to the total net weight of the product.

#### Specific Requirements for Vegetable Proteins in Meat Products

Vegetable protein products are not permitted in meat products which are defined as any product prepared from meat with the exception of products not having the structure of meat such as meat extract, rendered fat and gelatine.

#### REFERENCES

1. Eidgenössische Fleischverordnung, 11. Oktober 1957, with later amendments.

### UNITED KINGDOM

#### General Compositional and Labeling Requirements

Regulations covering most of the common types of meat products were issued in 1967 and 1968 (1). Their basic principle is to regulate the minimum meat content, i.e., the amount of meat used in the preparation of the product expressed as a percentage of the total weight of the product and for some products, egg may replace up to one-fifth of the required meat content. In this connection "meat" includes permitted by-products (such as fat, rind, blood) and cured meat. Furthermore, the amount of lean meat (i.e., meat without visible fat) is controlled by requiring that the stipulated minimum meat content shall consist of at least 60% lean meat (or 50% for some products). The total amount of fat is thus controlled indirectly.

As an example, a product designated as "luncheon meat" must contain at least 80% meat of which 60% shall be lean meat, and consequently at least 48% of the total weight of the product shall consist of lean meat. The remaining 32% of the required meat content may be fat, but can, of course, also be made up by other meat ingredients as defined.

When the required meat content is complied with, the

rest of the product may consist of any acceptable ingredient except that for some products the regulations define further compositional characteristics. Thus for luncheon meat it is required that the principal ingredient by weight, other than meat, must be cereals, but otherwise there are no restrictions on the ingredients which may be added above the required meat content (except for limitations of some food additives). However, in the case that the addition of an ingredient results in a product which is different from the traditional, the name of the product would have to indicate the change according to the general provisions of the food law and the labeling regulations.

Meat product regulations are under revision (see below with regard to vegetable protein products), and it is expected that a declaration of the meat content will be required. At present the general labeling regulations require a full list of ingredients in descending order of proportion.

#### Specific Requirements for Vegetable Protein Products

As mentioned above, the meat product regulations are being revised, and specific recommendations with respect to nonmeat proteins in meat products have been published (2). In the following the existing and proposed provisions are summarized.

#### Existing Provisions Concerning Vegetable Proteins in Meat Products

Under the present regulations, any acceptable nonmeat ingredient including vegetable protein products may be added to meat products provided that the required meat content and compositional characteristics are complied with. For those products for which a minimum meat content has not been specified, no limitations exist on the amount of vegetable protein product that may be added.

Addition of vegetable protein products under these conditions shall be declared in the list of ingredients, and in the case that the addition results in a different product from the traditional, the name would have to indicate the change.

#### Proposed Provisions Concerning Vegetable Proteins in Meat Products

In 1974 the Food Standards' Committee published its report on *Novel Protein Foods* in which a number of recommendations are given with respect to changing the existing legislation to take into account the use of unconventional sources of protein in food. These recommendations which are presently under review by the Ministry of Agriculture, Fisheries and Food, may be summarized as follows concerning the addition of vegetable protein products to meat products.

*Replacement of meat.* It is proposed that vegetable protein products (and other acceptable novel protein products) be permitted to replace a maximum of 30% of the required meat content in the controlled meat products.

A vegetable protein product used to replace meat should comply with the following compositional requirements:

- minimum protein content of 50% calculated on the dry weight
- maximum water content of 66% calculated on the fat-free, hydrated weight\*
- maximum fat content of 50% calculated on the hydrated weight\*, except that products used to substitute chicken meat may not contain more than 10% fat
- minimum 2.6 g methionine per 100 g protein\*\*
- minimum 10.6 mg iron per 100 g dry matter\*\*
- minimum 2.0 mg thiamin per 100 g dry matter\*\*
- minimum 0.8 mg riboflavin per 100 g dry matter\*\*
- minimum 5.0 µg vitamin B<sub>12</sub> per 100 g dry matter\*\*.

\*When the vegetable protein product contains at least 90% protein on a dry, fat-free basis, the weight of the fully hydrated product (i.e., a maximum water content of 66% on a fat-free, hydrated basis) should be regarded as the meat equivalent, but only 15% of its fat content should be counted as meat while the rest of its permitted fat content should be regarded as added fat. When the vegetable protein product contains between 50% and 90% protein on a dry, fat-free basis, the weight of the fully hydrated product which may be regarded as equivalent to meat should be reduced in the ratio (actual % protein on dry, fat-free basis)/90, and the permitted maximum fat content reduced in the same ratio.

\*\*The required levels for menthionine, vitamins and minerals are only applicable to vegetable protein products derived from field beans or soya, but similar provisions are envisaged for products from other sources.

When part of the required meat content is replaced by vegetable protein products, the name of the meat product should include a reference to the vegetable protein product and the following example has been given: "Beef and spun bean protein product sausage." Furthermore, the percentage meat content and the percentage vegetable protein product in hydrated form should be declared in connection with the name of the product. The list of ingredients should

reflect the addition of the vegetable protein product based on the hydrated weight in its sequence.

*Additions other than replacement of meat.* When vegetable protein products are added to meat products in addition to the required meat content or to meat products for which a minimum meat content has not been specified (i.e., under the conditions presently permitted, no specific compositional requirements are proposed for the vegetable protein product used. However, the word "protein" may not be used in the name of vegetable products containing less than 50% protein on a fat-free, dry basis.

It is further recommended that when textured protein products are added, their presence should be declared in connection with the name of the meat product, e.g., "Pork sausage with textured soya protein food," and that the addition of any type of vegetable protein product should entail quantitative declaration of meat and of vegetable protein product in connection with the name of the product in the same way as described in *Replacement of meat*.

#### REFERENCES

1. The Canned Meat Product Regulations, 1967, The Sausage and Other Meat Products Regulations, 1967, The Fish and Meat Spreadable Products Regulations, 1968.
2. Food Standards' Committee Report on Novel Protein Foods, 1974.

APPENDIX II

Comparison of the Basic Approach to Compositional Requirements for Meat Products

Country	Permitted nonmeat ingredients specified	Requirements for min. amount of meat content	Analytical requirements for final product
Austria	Yes		Min. collagen-free protein, max. collagen/protein, max. water/protein, max. fat/protein, max. water + fat/protein
Belgium	Only food additives		
Denmark	Only food additives		
Fed. Rep. of Germany	Yes		Min. muscle protein, min. muscle protein/meat protein
Finland	Yes		Max. water on fat-free basis, max. fat content, max. collagen/protein
Ireland			
Italy	Yes		
Luxembourg	Yes		Max. water on fat-free basis
The Netherlands	Yes		Max. water/organic nonfat
Norway	Yes		Max. fat, min. protein, max. water on fat-free basis
Spain	Only a few standardized products		Max. fat, max. water on fat-free basis and others.
Sweden	Yes	For some products	Max. fat, max. water on fat-free basis.
Switzerland	Yes		Max. water/protein
UK		Yes	

APPENDIX III

Requirements for Cooked Vienna Sausages (Not Canned)

Country	Permitted binders	Specific labeling requirements
Austria	1% potato starch.	In list of ingredients.
Belgium	No restrictions.	In name of product except for eggs, Gelatin and up to 5% starch and/or milk powder.
Denmark	No restrictions.	Quantitative declaration when more than 3% nonmeat protein ingredients added.
Fed. Rep. of Germany	3% egg white or 10% blood plasma.	Egg white in name of product.
Finland	Pork rind, blood products, milk and milk powder, egg and egg powder.	In list of ingredients.
France	Egg products and blood products. 1% milk protein or vegetable protein (only concentrates and isolates in powdered form).	In list of ingredients.
Ireland	No restrictions.	
Italy	4% defatted milk powder.	In list of ingredients.
Luxembourg	Pork rind, fresh eggs and 10% blood plasma.	
The Netherlands	4% starch.	
Norway	3.5% starch and 2% nonmeat protein derived from a product with at least 85% protein, blood plasma.	In list of ingredients, nonmeat protein as "foreign protein added."
Spain	No restrictions except max. 10% starch.	In list of ingredients.
Sweden	3% potato starch, milk, milk powder, caseinate, blood product or vegetable protein calculated as dry matter on final product.	Quantitative declaration in list of ingredients as g per 100 g product referring to amount used in preparation.
Switzerland	None.	
UK	No restrictions as long as product contains 75% meat.	In list of ingredient.

APPENDIX IV

Comparison of Labeling Requirements for Meat Products

Country	List of ingredients	Ingredient in name	Qualitative declarations
Austria	Yes		
Belgium	a	Most nonmeat ingredients.	
Denmark	Only food additives <sup>a</sup>		More than 3% of nonmeat protein ingredients.
Fed. Rep. of Germany	a	Phosphates and certain binders.	Ingoing weight of meat or meat products.
Finland	Yes		
France	Yes	Certain binders.	Ingredients indicated in name.
Ireland	a		
Italy	Yes		
Luxembourg	a		
The Netherlands	a		
Norway	Yes		Main ingredients for composite products, fat for some products.
Spain	Yes		
Sweden	Yes		Meat, meat by-products, vegetables etc. for products containing more than one ingredient, fat for some products.
Switzerland		Certain binders.	
UK	Yes		

<sup>a</sup>The EEC labeling directive will require a full list of ingredients in these countries in the near future.

APPENDIX V

Comparison of Provisions of Vegetable Proteins in Meat Products

Country	As binders	In traditional products		In nontraditional products
		As substitute for meat giving <sup>a</sup> impression of higher meat content	As substitute for meat so that <sup>a</sup> product contains less meat than usually	
Austria	Not permitted.	Not permitted.	Not permitted.	Not permitted.
Belgium	As other binders.			
Denmark	As other binders.			
Fed. Rep. of Germany	Not permitted.		Not permitted.	Only in products with less than 50% meat where meat product component cannot be separated.
Finland	Not permitted.	Not permitted.	Not permitted.	Not permitted.
France	As other binders (but only concentrated or isolated proteins).			Max. 30% of product.
Ireland	As other binders.			
Italy	Not permitted.	Not permitted.		Textured soya flour specifically prohibited, other vegetable proteins allowed.
Luxembourg	Not permitted.		Not permitted.	Not permitted.
The Netherlands	Not permitted.	Not permitted.	Not permitted. <sup>b</sup>	According to special provisions.
Norway	As other binders (but only products with min. 85% protein).	Only in mixed products where meat product component can be separated.	Not permitted.	Not permitted. <sup>b</sup>
Spain	As other binders.	Not in standardized products.	Not in standardized products.	
Sweden	As other binders.		Not permitted.	
Switzerland	Not permitted.	Not permitted.	Not permitted.	Not permitted.
U.K.	As other binders.		Not permitted <sup>b</sup> for standardized products.	

<sup>a</sup> Provided product is presented and labeled so that it does not mislead.

<sup>b</sup> New provisions under elaboration.