FFV MANUAL

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2. Structure of the Factored Food Vocabulary

The Factored Food Vocabulary Provides a standardized language for the description of food Products from the Points of view that are of interest to the Center. Its structure is based on two main ideas;

(1)   A food Product can be described by a combination of several characteristics, each of which may serve as a retrieval term, or descriptor, for the food Product.

(2)   The characteristics can be brought together in a meaningful classification relating them to each other.

2.1   Describing food Products by a combination of several characteristics.

Consider the food Product textured vegetable Protein, derived from soybean meal, colored with caramel coloring, and encased in a Plastic bag. It might be of interest to several Center Programs from different Points of view:

Program interest	Data needed	Product characteristic to be retrieved
Nutrition	All soy Products	Product has a specific Plant as its sole source or its Princi-Pal comPonent or ingredient
Food Safety	All Products not fully cooked	Product is specified as being Partially cooked or raw, as-distinguished from fully cooked
Biological Con-tamination	All flour or meal Products	Product has a desig-nated Physical form which is susceptible to contamination
Direct Food Additive	All Products with colors added	Product has a speci-fic ingredient added
Indirect Food Additive	All Products Pack-aged in Plastic film	Product has a speci-fied container and food contact surface

This examPle illustrates the following imPortant food Product

characteristics:

      A Product type
      B Food origin
      C Physical state, shape or form
      D Processing operations
      E Packing or packaging
      F User group

     Each characteristic is called a factor and the descriptive terms under it are factor terms or factor values. The factors included in the vocabulary were selected for their importance to Center programs. They are listed with more detail in Figure 2/1 and illustrated through the examples in Figure 2/2 and 2/3.

     The sequence of factors was chosen to facilitate writing and reading food product descriptions and also to aid in comprehension of the vocabulary. After characterizing the food product as a whole (Factors A, B1-B2 and C), the factor sequence follows stages of processing (D1-D4), packing and packaging (E1-E3), and consumption (F). Each factor answers a question:

? To what food group does the product belong?

   This question is answered by the appropriate value from A. Product type.

? What is the origin of the food product?

   A food product can be specified by an appropriate combination of factor values from B1. Food source and B2. Part of plant or animal. A detailed product description can specify all ingredients; a simplified product description may specify only the first ingredient.

? What are the physical characteristics?

   A value from C. Physical state, shape or form is used to answer this question. The physical characteristics of food products may be inherent (*example*) or may be the result of processing (*example*). Both of these affect heat transfer and food safety.

? What processing operations have been performed to transform the food or ingredients into the final product?

   The factors primarily concerned with processing are D1. Degree of preparation, D2. Cooking method, D3. Treatment applied, and D4. Preservation method. In addition, preliminary processing may be implied by B2. Part of plant or animal (e.g., hulling or extracting) and by C. Physical state, shape or form

(e.g., divided or disintegrated). Final processing may also be implied by C. Physical state, shape or form (e.g., forming, molding, extruding).

? What is the product's packing medium? How is it packaged?

The packing characteristics are found in E1. Packing medium. Packaging description is simplified to consist only of E2. Container or wrapping and E3. Food contact surface.

? Who uses the food product? What are its special dietary characteristics?

These questions are answered by appropriate terms from F. User group/dietary characteristics.

The list of specifying factors included in the vocabulary is limited. For example, under A. Product type, ethnic characteristics are not considered. Because B1. Food source makes no provision for age or maturity, there is no distinction between beef liver and calf liver. Physical state and physical shape or form are combined into a single factor. The same is true of user groups and dietary characteristics. Certain aspects of E2. Container or wrapping could be considered as separate factors.

The specificity of the vocabulary is also limited. For example, B1. Food source does not include animal breeds. B2. Part of plant or animal does not include specific cuts of meat. D3. Preservation methods does not include individual antimicrobial agents or enzyme inhibitors.

Due to its flexible structure the vocabulary can be amended by adding new viewpoints for food description or by including more detail within factors.

The basic food vocabulary consists of factor terms, which are used to build food product descriptions. Examples are shown in Figures 2/2 and 2/3.

The vocabulary has been clarified by including precombined terms (PCT's), which are food product names to which factor terms have been assigned. These are not to be used for indexing. They are included for either of these reasons:

(1) The precombined term explains or illustrates the use of the factor, e.g., corned beef hash as an example of a food whose physical state is *Semisolid with discrete particles*.

(2) For some foods it is difficult for an indexer to select the proper combination of factor terms. For example, it

might be obvious that "Rhine wine" is a *Table wine*, but the indexer might not realize that *Alcohol fermented* should be used in D3. Treatment applied to describe the fermentation*.

For precombined terms the vocabulary always shows the factor values appropriate for A. Product type, B1. Food Source, B2. Part of Plant or animal and C. Physical state, shape or form. Additional descriptors from other factors are shown as needed to index the product information. For an example of PCT's, see Figure 2/3.

2.2 Hierarchy

Equally as important as the identification of meaningful characteristics is the arrangement of factor terms in a hierarchic structure so that information can be retrieved at varying levels of specificity. In a particular search one might be interested in all products with peanut as the food source. In another, one might need products with any nut as the food source. Or one might search specifically for *Vitamin A added*, more broadly for *Vitamins added*, or, still more broadly, for *Nutrients and/or dietary supplements added*. These are all examples of hierarchical relationships among factor terms.

Hierarchical relationships are extremely important for searching. Hierarchy is also a useful tool for displaying the vocabulary in a logical way so that it can be easily comprehended by both searcher and indexer. And finally it underlies the aggregation of numerical values when the food vocabulary is used in compiling data.

For these reasons all of the factors were fully structured. Care was taken to include all useful hierarchical relationships. Corresponding to its many uses, for instance, field corn appears under several broader terms:

     under *Grain*
     under *Plant used for producing starch*
     under *Plant used for producing sugar
 and under *Plant used for producing oil or fat*

Except in A. Product type, a descriptor may be placed wherever in the hierarchy it describes a useful subset of a factor term. In the hierarchy of A Product type, however, a descriptor may appear only once; if that descriptor seems appropriate in more than one context (as in the example of field corn, above), a choice must be made as to which is the more important. (See Factor A. Product type for the reasons for this restriction and the example, *Chocolate candy*.)

Broad terms can be used to describe very general groups of food products, such as frozen vegetables. Such a general description can be made more specific by using narrower terms and/or adding terms from additional factors, as seen in Figure 2/2.

The hierarchical relationships are complemented by additional cross references among factor terms, e.g., *Plant used for producing protein extract or concentrate* -

Narrower term   *Alfalfa*
Narrower term   *Soybean*
Related term   *Field corn*
Related term   *Sesame*

This indicates that any search for plant protein sources should employ *Alfalfa* and *Soybean* and a very thorough search should use in addition *Field corn* and *Sesame*.

2.3 Scope notes

The language of the food field is not always precise. Moreover, a factored vocabulary contains many general terms that require definition. Scope notes are therefore provided for many descriptors in order to achieve consistency in indexing and searching and, perhaps more importantly, to achieve the purpose of a common language for the description of foods.

2.4 Lead-in vocabulary (entry vocabulary)

For many of the factor terms in the vocabulary there exist synonyms. For the guidance of indexers and searchers these synonyms have been included in the lead-in vocabulary. They appear in the alphabetical lists with references to the descriptors to be used (e.g., Butterfat, use *Milkfat*).

2.5 Vocabulary displays

The vocabulary is displayed in a variety of formats, each appropriate for a specific purpose:

  (1) Hierarchical (classified) displays

      These displays show the logical structure of the vocabulary. They present this structure in varying levels of detail, from a broad overview to a full display including precombined terms.

  (1.1)   Summary outline

      Lists the twelve factor headings.

(1.2)   Detailed outline

Lists the twelve factor headings and the first level
of subordinate terms. This display provides an over-
view of the conceptual structure of the vocabulary.

(1.3)   Full hierarchy, factor terms only

This display is needed, in conjunction with the alpha-
betical index, for indexing and query formulation.
It can be used as a checklist to identify all factor
terms applicable to the product or query at hand.
It can also be used to view in their logical context
factor terms identified through the alphabetic index.

The display can be printed at four different levels
of generality and can even be custom-tailored for an
individually selected vocabulary.

(1.4)   Full hierarchy, factor value and precombined terms

This display is consulted when further clarification
about the use of a factor value is needed. It gives
for each factor value the precombined terms of which
the factor value is a component.

(2)   Alphabetical lists

The alphabetical lists include factor values, lead-in
terms, and precombined terms in a single alphabetical
array. Broader, narrower and related terms and scope notes
may also be included.

(3)   Display of precombined terms.

This display gives the factor values for selected precom-
bined terms. It is useful to explain the vocabulary
structure.

Figure 2/1.   Factors for the description of food products.

A. Product type   Derived from a combination of
                                         consumption, functional and
                                         manufacturing characteristics.

B. Food ingredient

        B1. Food source   Species of plant or animal,
                                         or chemical food source.

        B2. Part of plant or animal

C. Physical state, shape or form

D. Processing operations

        D1. Degree of preparation   Not cooked, raw; partially
                                         cooked; fully cooked.

        D2. Cooking method   Cooked by dry or moist heat;
                                         cooked with fat; cooked by
                                         microwave.

        D3. Treatment applied   Additional processing steps,
                                         including adding, substituting,
                                         or removing components.

        D4. Preservation method   Primary preservation method.

E. Packing or packaging

        E1. Packing medium

        E2. Container, wrapping   Container material, form, and
                                         possibly other characteristics,
                                         e.g., glass container with
                                         aluminum lid.

        E3. Food contact surface   The surface(s) with which the
                                         food is in contact.

F. User group/dietary charac-   Human or animal: special
     teristics   dietary characteristics.

Figure 2/2.   Assignment of factor terms.

Food Product Name	Factor Term Assigned			
	A	B1	B2	C
Frozen vegetables	Vegetable or vegetable Product	Plant, vegetable	----	----
Frozen leafy vegetables	Vegetable or vegetable Product	Leafy vegetable	Leaf	----
Quick frozen leafy vegetables	Vegetable or vegetable Product	Leafy vegetable	Leaf	----
Quick frozen spinach	Vegetable or vegetable Product	Spinach	Leaf	----
Quick frozen cut spinach, cardboard box	Vegetable or vegetable Product	Spinach	Leaf	Cut, short Pieces
Quick frozen cut spinach in butter sauce, cardboard box	Vegetable or vegetable Product	Spinach	Leaf	Cut, short Pieces

Figure 2/2.   Assignment of factor terms (Part 2).

Food Product Name	Factor Term Assigned				
	D1	D3	D4	E1	E2
Frozen vegetables*	Partially cooked	----	Frozen	----	------
Frozen leafy vegetables	Partially cooked	----	Frozen	----	------
Quick frozen leafy vegetables	Partially cooked	----	Quick frozen	----	------
Quick frozen spinach	Partially cooked	----	Quick frozen	----	------
Quick frozen cut spinach, cardboard box	Partially cooked	----	Quick frozen	----	Paperboard container
Quick frozen cut spinach in butter sauce, cardboard box	Partially cooked	Butter added	Quick frozen	Packed in gravy or sauce	Paperboard container

*Frozen vegetables are blanched (i.e., *Partially cooked*) before freezing.

STRUCTURE   (6/18/86)

Figure 2/3.   Example 1: Coding form for fully factored precombined term <u>Bean Curd</u>.

FOOD PROD-
UCT NAME   __ BEAN CURD _____

            Precombined Term   X1262 _____   .
            Source   Ident. #

    SCOPE
    NOTE   _____

             _____

             _____

             _____

A	FPT	Vegetable or vegetable product	CODE	A152
B1	FSU	Soybean	CODE	B1452
B2	FPP	Protein extract, concentrate or isolate	CODE	C236
C	FPS	Semisolid with smooth consistency	CODE	E119
D1	FPN	Fully cooked	CODE	F14
D2	FKM	Cooking method not applicable	CODE	G003
D3	FTR	Treatment applied not known	CODE	H001
D4	FPV	Preservation method not known	CODE	J001
E1	FPK	Packing medium not known	CODE	K03
E2	FCN	Container or wrapping not known	CODE	M001
E3	FCS	Food contact surface not known	CODE	N01
F	FUS	Human food, no age specification, regular diet	CODE	P24

                                                     CODE _____

                                                     CODE _____

                                                     CODE _____

                                                     CODE _____

Figure 2/3. Example 2: Coding form for fully factored precombined term <u>Beer</u>.

FOOD PROD-
UCT NAME <u>BEER</u>_____

_____

<u>Precombined Term</u>   <u>X1201</u>_____
Source   Ident. #

SCOPE
NOTE   _____

          _____

          _____

          _____

A   FPT   <u>Malt beverage</u>_____ CODE <u>A195</u>_____

B1   FSU   <u>Barley</u>_____ CODE <u>B1230</u>_____

B2   FPP   <u>Germinated or sprouted seed</u>_____ CODE <u>C102</u>_____

C   FPS   <u>Liquid, low viscosity, with no visible</u> CODE <u>E123</u>_____
                                      <u>particles</u>

D1   FPN   <u>Degree of preparation not known</u>_____ CODE <u>F01</u>_____

D2   FKM   <u>Cooking method not applicable</u>_____ CODE <u>G003</u>_____

D3   FTR   <u>Alcohol fermented</u>_____ CODE <u>H232</u>_____

D4   FPV   <u>Preserved by filtration</u>_____ CODE <u>J121</u>_____

E1   FPK   <u>No packing medium used</u>_____ CODE <u>K03</u>_____

E2   FCN   <u>Container or wrapping not known</u>_____ CODE <u>M001</u>_____

E3   FCS   <u>Food contact surface not known</u>_____ CODE <u>N01</u>_____

F   FUS   <u>Human food, no age specification, regular</u> CODE <u>P24</u>
                                      <u>diet</u>

          <u>Carbonated by fermentation</u>_____ CODE <u>H246</u>_____

          _____ CODE _____

          _____ CODE _____

          _____ CODE _____

8. General Rules for Indexing

This chapter discusses the general rules for using the Factored Food Vocabulary to index food products at a level of moderate detail corresponding approximately to the information available from a food product label or recipe or even an inspection of the food product. Chapter 9 will elaborate general searching rules. Indexers and searchers should read both chapters. The indexer needs to know how the results of his or her work will be used in searching. The searcher must be familiar with indexing rules in order to develop suitable search strategies.

Full information about the use of individual factors will be found in the chapters which follow. Even more specific rules for the use of individual descriptors are in their scope notes.

8.1. Always consult the hierarchical list (tree structure) when selecting descriptors. It arrays in a logical framework the choices to be considered. Consult the scope notes of unfamiliar descriptors.

Each of the eleven factors in the vocabulary designates a characteristic of food products, such as product type, food source or treatment applied. Within each factor, descriptors are arranged in hierarchic order. Each descriptor is "narrower" (i.e., more specific) than the "broader" term above it in the tree structure. The user can readily explore the full structure by scanning the top-level descriptors and following each branch to its end.

In some factors a descriptor may be in more than one place in the hierarchy. Field corn, for example, is "oil-producing", "starch-producing", and "sugar-producing", even though *Field corn* is a single factor value when used for indexing.

The hierarchy shows the indexer broader, narrower and neighboring descriptors. He can consider all candidate descriptors and select the most appropriate one at the correct level of specificity. It is particularly important to scan the hierarchic structure in factors requiring all appropriate values to be indexed. These are: D2. Treatment applied, E3. Food contact surface, and the dietary characteristics descriptors in F. User group. In *B1. Food source*, even though most plant and animal names can be located in an alphabetical index, the indexer should confirm that he has located the most specific descriptor by scanning the tree structure. For example, *Walnut* is subdivided into *English walnut* and *Black walnut*. *Corn* has *Field corn*, *Popcorn*, and *Sweet corn*, and each of these has yellow and white varieties. These may be missed in a scan of the alphabetic list.

Scope notes explain the meaning or the use of a descriptor in the context of the Factored Food Vocabulary. For example, the indexer can find out what products fall under *Cacao or chocolate product* and what products fall under *Candy*, or at what fat level a cheese should be indexed by *Fat partially removed*. Thus the indexer should consult the scope note if there is the slightest doubt about the use of an unfamiliar descriptor.

8.2. To fully describe a food product, use a descriptor from each factor, following the specific rules for that factor. In two factors — D2. Treatment applied and E3. Food contact surface — and also for the dietary characteristics in F. User group, use all of the applicable descriptors.

The rule "at least one descriptor from each factor" ensures that the indexer does not overlook applicable descriptors. It also permits automatic checking of indexing completeness. Example:

Indexed product: "Apple juice, canned (glass bottle), unsweetened"

A.	Product type:	Fruit juice
B1.	Food source:	Apple
B2.	Part of plant or animal	Fruit or berry, peel present, core, pit or seed present
C	Physical state, shape or form	Liquid, low viscosity
D1.	Degree of preparation	Fully cooked
D2.	Treatment applied	Single strength; Unsweetened
D3.	Preservation method	Sterilized by heat, canned
E1.	Packing medium	. .
E2.	Container or wrapping	Glass container, aluminum lid, plastic lining
E3.	Food contact surface	Glass; Plastic
F.	User group	Human food, no age specification, regular diet

A set of descriptors, specific for each factor, is provided for instances of "not known", "not used", and "other".

8.3. Use each factor independently.

When selecting a descriptor from a factor, the indexer needs to consider what that factor is intended to accomplish. He should not be concerned for the moment with descriptors assigned in other factors, even when these overlap in meaning the descriptor under consideration. Examples of overlapping descriptors:

A.	Product type	:	Table wine
D2.	Treatment applied	:	Alcohol fermented

A.	Product type	:	Bakery Product, sweetened
D2.	Treatment applied	:	Sweetened with sugar

D3.	Preservation method	:	Preserved by salting
D2.	Treatment applied	:	Salted

A.	Product type	:	Milk or milk product
B2.	Part or portion	:	Milk

E2. Container or wrapping: Plastic container, rigid or
                              semirigid, aluminum lid
E3. Food contact surface :   Polyethylene; Aluminum

This rule simplifies the work of the indexer; when considering one factor, such as D2. Treatment applied, the indexer need not check to see whether a descriptor, such as *Alcohol fermented*, is implied by the descriptor assigned in A. Product type.

8.4 Index as specifically as the vocabulary permits.

The objective expressed at the start of this chapter was to index at a level of moderate detail, corresponding to the information available from a food product label or a recipe. When such detail is present, it should be indexed to the extent provided by the vocabulary. To do otherwise results in loss of information that should be retrieved in searching.

Of course the amount of information available influences the specificity of indexing. For example, consider a sample product that is a bread. The factor being considered is *Part of plant or animal*. Assume the indexer can determine that the bread is made from grain without skin and without germ: the descriptor is *Seed or kernel, skin removed, germ removed*. Likewise, if the indexer can determine that the skin was removed and the germ is present, the descriptor is *Seed or kernel, skin removed, germ present*. On the other hand, if the indexer has definite information only about the skin - it was removed - but he cannot determine whether the germ is present, he can assign only the broader descriptor *Seed or kernel, skin removed*. If the indexer has no definite information either about the skin or about the germ, the best he can do is to assign the broader descriptor *Seed or kernel*.

Reasonable assumptions should be made - orange juice is surely a *Fruit juice* with *Orange* as its origin. However it cannot be indexed as *Frozen* or *Rehydrated* unless the label or recipe so indicates.

8.4.1 If a characteristic of a food product cannot be expressed
    specifically by a descriptor currently in the vocabulary,
    then use the most specific descriptor available.

    Consider, for example, a product that is preserved by
cryogenic freezing, which is not a descriptor. It is a kind of
"quick freezing"; therefore the descriptor *Quick frozen* should
be used. If the product is frozen by a new method such that none
of the descriptors listed under *Frozen* is applicable, use the
descriptor *Frozen*. If the product does not fall under any of the
major subdivisions of *D3. Preservation method*, then the index
term is *Preserved by other method*.

    The factor heading itself is never used in indexing. If
"(factor heading), other" is not a descriptor, the major
subdivisions are all-inclusive and the indexer should be able to
select the appropriate descriptor from them.

8.4.2 A broad descriptor is used for indexing only when:

    --not enough information is available to decide on a more
      specific descriptor;
    --the descriptor needed is not available in the vocabulary;
    --the product is a mixture of parts or a mixture of differ-
      ent size pieces and a specific descriptor for a mixture is
      not available.

8.5. For a mixture or other multiple-value characteristic, use the
specific descriptor if available; if not, select a descriptor
according to factor-specific rules.

    Rules governing the indexing of these multiple-value
characteristics are in Chapter --. The specific mixture terms for
each factor are listed in subsection -.5 of the appropriate
chapter.

Summary of the general indexing rules:

1. Always consult the hierarchical list (tree structure) when
selecting descriptors. It arrays in a logical framework the
choices to be considered. Consult the scope notes of unfamiliar
descriptors.

2. To fully describe a food product, use a descriptor from each
factor, following the specific rules for that factor. In two
factors - D2. Treatment applied and E3. Food contact surface - and
also for the dietary characteristics in F. User group, use all of
the applicable descriptors.

3. Use each factor independently.

4. Index as specifically as possible.

4.1   If a characteristic of a food product cannot be expressed
      specifically by a descriptor currently in the vocabulary,
      then use the most specific descriptor available.

4.2   Use a broad term in indexing only when:

      --not enough information is available to decide on a
        more specific descriptor;
      --the specific descriptor needed is not available
        in the vocabulary;
      --the product is a mixture of parts or a mixture of
        different size pieces and a specific descriptor for
        a mixture is not available.

5. For a mixture or other multiple-value characteristic, use the
specific descriptor if available; if not, select a descriptor
according to factor-specific rules.

9. MIXTURES AND OTHER MULTIPLE-VALUE FOOD PRODUCTS

In explaining the use of the vocabulary this manual generally employs examples based upon applying a single factor value to a single characteristic, since these are the ones most frequently encountered. However there are instances of multiple characteristics being combined in a single descriptor, such as *Peas and carrots*. Because the rules for handling multiple characteristics, or "mixtures", differ from one factor to another, they are summarized here for the convenience of those who use the vocabulary.

Typically a mixture consists of two to four significant components of the same kind when these are used together in a food product. Examples include mixed vegetables (e.g., *Carrots and peas* or *Succotash*) and ground meats for meat loaf (in B1. Food source, *Cattle and swine and calf*). Treating these as multiple ingredients provides more information for later retrieval than if only one ingredient is recorded. Any combination of characteristics, such as two or more parts (*Pod and full-size seed, mixture*), physical shapes (*Whole and pieces*), or packing media (*Packed in oil and vinegar*), may be handled in the same way. Therefore the food vocabulary includes specific descriptors for frequently-used mixtures and other multiple-value characteristics. These specific factor terms should always be used for mixtures, when available. If no mixture descriptor is available, one of the following ways of indexing should be employed:

(1) In B1. Food Source, index the first (predominant) ingredient and add other ingredients as directed under *Ingredient added* (D2.Treatment Applied). This is the usual way of indexing multiple-ingredient food products.

(2) Index the most specific broader term which includes the individual characteristics. This is done in B2. Part of plant or animal and in C. Physical state, shape or form. For example, a mixture consisting of leaves and roots is indexed under *Root, stem, leaf or flower*.

(3) Index only the predominant characteristic. Multiple assignment is not permitted. This is done in A, D3, E1 and E2; also for the user groups (but not dietary characteristics) in F. When indexing multiple cooking times (D1. Degree of Preparation), always use *Partially cooked*.

(4) Index multiple individual characteristics, as many as needed. This is permitted only in D2. Treatment Applied, in E3. Food Contact Surface, and in F. User Group/Dietary Use for dietary characteristics.

The "mixture" descriptors are listed in full in the chapters on individual factors, along with details of indexing in these factors. They are summarized here.

A. Product Type.

A mixture of product types occurs when several products belonging to different types are combined or packaged together as in a *Sandwich* or in *Multicomponent meal*.

B1. Food source.

Specific descriptors for frequently used food source mixtures are listed in the chapter for B1. Food source. The appropriate specific mixture descriptor is used if one of the components is the first ingredient and the other component is also a significant ingredient (second, third or fourth).

Mixtures not listed are indexed by the specific descriptor for the first ingredient (the major component of the mixture) in combination with the appropriate descriptor(s) from *Food added* (D2. Treatment applied), following the rules given there.

B2. Part of plant or animal.

The following specific mixture terms are provided, as required for frequently used combinations:

    Germ and bran
    Pod and full-size seed, mixture

These can be used for mixtures of different parts of the same plant or for different parts of different plants. Intact plant structures which contain various parts (e.g., pod containing full-size seeds) are not considered mixtures.

For other mixtures use the broad term that includes the parts in the mixture.

C. Physical state, shape or form.

The descriptors provided for specific mixtures are listed in the chapter explaining physical state. For other mixtures use the broader term that includes both components.

D1. Degree of Preparation.

The only type of product to which one might wish to apply more than one descriptor from this factor is a product with multiple components which vary in degree of cooking. Such a product is indexed by *Partially cooked*. See the scope note for

Partially cooked in manual chapter D1.

D2. Treatment Applied.

   Multiple individual characteristics - as many as needed -
should be indexed.

D3. Preservation Method.

   Preservation methods are typically sequential rather than
coexisting. Only the predominant method should be indexed.

E1. Packing Medium.

   The following specific mixture descriptors are provided:

      Packed in mixture of gases

      Packed in vinegar and oil

      Packed in vinegar with sugar

   Otherwise, if there are several packing media (e.g., peaches
packed in syrup with nitrogen in the headspace), the predominant
medium is indexed.

E2. Container or Wrapping.

   Index the primary container. Any other container should be
indexed only under E3. Food Contact Surface.

E3. Food Contact Surface.

   Index all materials with which the food comes in contact.

F. User Group/Dietary Use.

   Multiple user groups are not indexed. However, all special
dietary characteristics which are applicable should be indexed.

A. Product Type

The product type is the focal point in describing or defining a food product. One says "This product is a *Bread*" or "This product is a *Beverage*". To introduce more detail, one qualifies the food description by adding descriptors from other factors: "This is a *Bread* made from *Wheat* using the *Seed or kernel with bran and with germ*. It is *Fully cooked* and it is *Human food, no age specification, regular diet*."

The hierarchy of product types provides a summary-level division of food products that in certain applications can be used without any other factors. For food production statistics or for registration of food manufacturing establishments, for instance, food products might be described only at this level. Even at its most specific, the product type always describes a food class, such as *Cured cheese*, *Fruit juice*, *Salad*, or *Candy*, rather than an individual variety of food.

Product type is concerned with a food product as a whole — its manufacture and marketing — its consumption.

Use or consumption characteristics — such as the nutrient profile, the purpose of dish or drink (e.g., *Dessert*, *Alcoholic beverage*), the occasion at which the food is used (e.g., *Snack food*), and its use in preparing more complex foods (e.g., *Flavoring or seasoning*) — play key roles in defining product types.

Of equal importance are characteristics related to manufacture and marketing (e.g., *Dairy product*, *Confectionery*, *Meat or meat product*). These define product types that have in common plant or animal origin and/or manufacturing processes applied.

Food groups defined by use are similar to those defined by manufacture. Thus both aspects can be accommodated in a common classification that supports food consumption surveys and studies based on them as well as the collection of food production statistics and the registration of food manufacturing plants.

Because any product type descriptor may be associated with any plant or animal origin (see B1 Food source and B2 Part of plant or animal), the food vocabulary encourages a wide range of combinations, both usual (e.g., *Fruit jelly* with *Grape* and *Fruit or berry*) and unusual (*Vegetable or vegetable product* with *Grape* and *Leaf*). This makes it possible to retrieve all products of a given type, regardless of origin and, conversely, all products with a given origin, regardless of type.

A.1 Definition

Food group having common consumption, functional and manufacturing characteristics, e.g., *Fruit or vegetable product*; *Dairy product*; *Confectionery*; *Prepared food*.

A.2 Structure

Product types delineate food groups whose members share certain characteristics. These defining characteristics are:

- consumption characteristics, which determine the use of the food product.

- characteristics imparted by manufacturing, such as cooking, curing, extracting, concentrating, seasoning or sweetening.

- plant or animal origin (at the summary level).

Because product types are defined by applying these three different characteristics, sometimes simultaneously, the structure is not easy to determine. However each of the characteristics can affect the use of the food product and thus collectively they give rise to use-oriented product types. In this manner the food field has evolved a consensus on broad food groups to serve the needs of consumers, industry, distributors, researchers and others.

Product types can be separated into two broad groupings based on whether the food product's use is or is not related to the animal/plant origin of the product:

A. Product type

   Group 1. Use related to plant or animal origin

       Meat, poultry, seafood or related product
       Dairy product
       Egg or egg product
       Fruit or vegetable product
       Grain or starch product (includes bakery
            and other prepared grain products)
       Nut or nut product
       Cacao or chocolate product

   Group 2. Use unrelated to origin

       Beverage
       Prepared food product
       Snack food
       Confectionery
       Dressing, condiment, gravy or sauce

Sweetener
Flavor or seasoning
Food additive
Color additive
Refined or partially refined food product

At the broadest level product types characterized by animal or plant origin are roughly comparable to the major food groups traditionally described by nutritionists. At a somewhat more specific level these product types reflect major industries (e.g., *Meat or meat product* and *Fruit or fruit product*)(see Appendix to this section).

Characteristics imparted by manufacturing are seen in the subgroups, such as *Cured meat* and *Fruit juice*. Product analogs, such as nondairy creamer, are grouped here with their originals, because of common use characteristics.

The second broad grouping includes products whose uses are unrelated to their origins. Their definition is based predominantly on use.

A.3 Use

Since different criteria are used simultaneously to subdivide A. Product type, the resulting classes often overlap, so that a food product might be considered to belong to two classes. For example, potato chips might be considered both a vegetable product and a snack food; yet only one A Product type descriptor may be assigned. This puts the indexer in a quandary: which of two applicable product types should be used. The general rule is: Use a product type whose definition is based predominantly on use in preference to a product type whose definition is related to food source. Thus the product type for potato chips is *Snack food* rather than *Vegetable or vegetable product*; the product type for cherry pie is *Pie* (under *Bakery product*) rather than *Fruit or fruit product*.

Exceptions to this general rule are noted in scope notes: a *Fruit juice* (classed under *Fruit or fruit product*) is not indexed as a *Beverage*; plain or roasted peanuts, even if packed for a vending machine, should be indexed as *Nut or nut product*, not as *Snack food*. If no specific instructions are provided in a scope note, use the general rule, making exceptions as judgment dictates.

The presence of descriptors that denote plant or animal origin in both A Product type and B1 Food source/B2 Part of plant or animal has important consequences for searching. For example, when searching for all products made primarily of eggs, do not use *Egg or egg product*; use the *Part of animal* descriptor *Egg*.

This will not retrieve every *E99 or e99 Product* - some e99 Products, such as meringues, may have sugar as the first ingredient, while others may be analogs. On the other hand, *E99* may retrieve some *Dessert* Products. From the Point of view of Product type, *E99 or e99 Product* OR *Prepared e99 dish* is a good query formulation; include *E99* combined selectively with Product type descriptors from group 2, if desired.

A.4 Not known, not done, other

This factor includes:

Product type, other

Use very selectively; normally it should be possible to determine at least the broad category for a Product.

There is no factor value for "Product type not known" because it should always be Possible to determine the Product type, at least at a general level. There is no factor value for "no Product type" because every Product is of a type.

A.5 Treatment of mixtures

A mixture of Product types occurs when several Products belonging to different types are combined or packaged together as in a *Sandwich* or in a *Multicomponent meal*. If no factor term has been assigned for such a combination, it should be indexed as appropriate for the major component.

Appendix. Hierarchical structure of A. Product Type.

A. Product type

    Meat, Poultry, seafood or related Product

        Meat or meat Product
            Cured meat
            Meat Product analog
            Sausage or related Product
        Poultry or Poultry Product
            Poultry Product analog
            Poultry-based sausage
        Seafood or seafood Product
            Seafood Product analog

    Dairy Product

        Cheese or cheese Product
            Natural cheese
                Cured cheese
                Uncured cheese
            Processed cheese Product
                Cold Pack cheese Product
                Pasteurized cheese Product
                Cheese Product analog
        Frozen dairy dessert
        Milk or milk Product
            Cultured milk Product

            Milk or milk Product analog
                Butter Product analog
                Cream Product analog
                Milk analog

    Egg or egg Product

        Egg Product analog

    Fruit or vegetable Product

        Fruit or fruit Product
            Fruit butter, Jelly, Preserve...
            Fruit juice
        Vegetable or vegetable Product
            Vegetable Juice
            Vegetable Pickle

A. Product type (continued)

  Grain or starch Product

    Milled grain or starch Product
    PrePared grain or starch Product
      Bakery Product
        Bakery Product, sweetened
        Bakery Product, unsweetened
      Breakfast cereal
      Macaroni or noodle Product

  Nut or nut Product

  Cacao or chocolate Product

    Cacao or chocolate Product analog

  Beverage

    Alcoholic beverage
      Distilled sPirits
      Malt beverage
      Wine
    Nonalcoholic beverage
      Soft drink
      SteePed beverage

  PrePared food Product

    Dessert
    Meal rePlacement
    MulticomPonent meal
    Pasta dish
    Pie, Pastry or Pizza
    PrePared egg dish
    Salad
    Sandwich
    SouP
    Stew or hash

  Snack food

  Confectionery

    Candy
    Decoration
    Icing, frosting
    Sweet sauce or toPPing

A. Product type (continued)

    Dressing, condiment, gravy or sauce

        Condiment or relish
        Dressing for food
        Gravy or food

    Sweetener

        Nonnutritive sweetener
        Nutritive sweetener

    Flavor or seasoning

        Flavoring
        Salt or salt substitute
        Spice or herb

    Chewing gum

    Food additive

    Color additive

    Refined or partially refined food product

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B. Food Origin

B1. Food Source
B2. Part of Plant or Animal

The B factors describe the origin(s) of the food, specifically what plant, animal, or chemical source(s) it comes from and, for a plant or animal source, what part is used.

The origin of a simple food (e.g., wheat flour, an apple, a lamb chop, orange juice) can be indexed completely by a combination of one B1 Food source descriptor (e.g., *Wheat*) with one B2 Part of plant or animal descriptor (e.g., *Seed or kernel, skin removed, germ removed*). A composite food (e.g., cherry pie) can be indexed selectively, designating the origin(s) of one or a few ingredients, or completely by full ingredient indexing (see Chapter 7). This vocabulary is well suited for either approach. The rules given below are based on the premise that satisfactory retrieval can be obtained by indexing the origin of the major ingredient; this description is then augmented by *Food added* descriptors from D2. Treatment Applied.

B1. Food source

B1.1 Definition

Individual plant or animal from which the food product or its major ingredient is derived; also a chemical food source.

B1.2 Structure

Food sources are divided into live food sources (i.e., plants, animals, and microorganisms), and chemical food sources, which include substances such as water, salt and monosodium glutamate. The structure is shown in detail in the appendix to B1.

The two major subdivisions, *Plant used as food source* and *Animal used as food source*, are subdivided by consumer- and industry-oriented characteristics. For animals this corresponds by and large to taxonomic classification, except that invertebrates living in water are grouped with the fishes in *Fish or lower water animal* (source of seafood).

For plants, however, the consumer- and industry-oriented subdivision is quite different from taxonomic subdivision. For instance, plants from many taxa are used for producing sugar or vegetables or spice. A functional category, such as *Sugar-Producing plant*, contains the plants which are chiefly used in this category. Other plants that are also used for producing sugar, such as *Apple* as a source of apple-blossom honey, are cross referenced. The presence or absence of a plant within a specific section of hierarchy does not impose any constraints upon its use in indexing. For example, if hearts of palm are used as a vegetable, the food source descriptor will be *Palm* even though in the hierarchy *Palm* is listed only under *Oil-producing plant*.

With few exceptions, species is the lowest level of the B2 Food source classification. Cultivars, breeds and strains of plants, animals and microorganisms are not detailed.

B1.3 Use

If the food product has multiple ingredients, the source of the major ingredient is indexed. The major ingredient is the one which predominates by weight, as seen from the label statement, formulation, or recipe (not counting water). Water is considered an ingredient only if it is the sole ingredient (e.g., mineral water).

A mixture of two or more similar food sources is sometimes indexed as one ingredient, e.g., if wheat and rye are listed as ingredients, the descriptor is *Wheat and rye*; see B1.5, Treatment of mixtures for a detailed explanation.

If the major ingredient is in itself a composite product, such as "bread" in bread pudding, the major ingredient of that product determines the origin descriptors (i.e., *Wheat*, combined with *Seed or kernel*). In the case of chicken broth it would be *Chicken* combined with *Water extract of plant or animal*.

The indexer or searcher new to the vocabulary should examine the hierarchical list to find the most specific descriptor applicable. Indexing by a descriptor that is too broad adversely affects retrieval. For example, *Corn* is usually too broad for indexing; normally the indexer should be able to determine whether the food source is *Field corn*, *Popcorn*, or *Sweet corn*, and, for each, whether it is yellow or white. Searching for a descriptor that is too broad results in low precision; when the requestor needs all food products originating from *Sweet corn, yellow*, that descriptor — and not *Corn* — should be used. To give another example, the indexer should not use *Walnut* without first trying to ascertain the species at hand (*Black walnut*, *Butternut*, or *English walnut*).

If a specific food source is not found in the alphabetic
list, scanning the hierarchic list in the appropriate section may
help. If a species of plant or animal is not in the Food
Vocabulary, use its name for indexing so that the vocabulary may
be updated.

B1.4 Not known, not done, other

This factor includes:

Food source not known

Used in the rare case that the food source
cannot be determined even at the highest
level (animal, plant, microorganism,
chemical).

There is no descriptor for "no food source" because there
always is a food source. There is no descriptor for "food source,
other" because the broad subdivisions (plant, animal,
microorganism, chemical food source) exhaust all the
possibilities.

B1.5 Mixtures

The following specific descriptors are provided for
frequently used food source mixtures:

Field corn and rice
Cattle and swine
Cattle and swine and calf
Grapefruit and orange
Oat and soy
Peanuts with other nuts or seeds
Peas and carrots
Peas and onions
Pineapple and grapefruit
Pineapple and orange
Sodium chloride mixed with potassium chloride
Succotash
Sugar cane and field corn
Triple succotash
Wheat and corn
Wheat and oat
Wheat and rye
Wheat and soy

The appropriate specific mixture descriptor is used if one of
the components is the first ingredient and the other component is
a significant ingredient (second, third, or fourth). The order in
which the ingredients are listed in the mixture descriptions is

not of significance. Example:

    Label: Flour, corn syrup, oat flour
    Indexing: Wheat and oat; corn syrup added

    Mixtures not listed are indexed by the specific descriptor
for the first ingredient (the major component of the mixture) in
combination with the appropriate descriptor(s) from *Food added*
(D2. Treatment applied), following the rules given there. Example:

    Label: Pineapple juice, grape juice, water
    Indexing: Pineapple; Fruit added

Appendix to B1. Classification of food sources.

Plant used as food source

    Plant used for producing extract or concentrate

            Carbohydrate-producing plant
                Polysaccharide-producing plant
                Sugar-producing plant
            Oil-producing plant
            Protein-producing plant
            Steeped beverage-producing plant

    Spice or flavor-producing plant

    Vegetable-producing plant

            Vegetable-producing plant, above-ground parts used
            Vegetable-producing plant, all parts used
            Vegetable-producing plant, root, tuber or bulb used

    Fruit-producing plant

    Grain or seed-producing plant

Animal used as food source

        Invertebrate, land

        Fish or lower water animal
        Reptile, amphibian
        Poultry, game bird
        Meat animal (i.e., mammal)

Human as milk source

Microorganism used as food source

Chemical food ingredient

B2. Part of plant or animal

B2.1 Definition

The anatomical part of the plant or animal from which the food product or its major ingredient is derived, e.g., leaf, root or tuber, organ meat, milk, or egg; it also includes components of parts, such as cream, and extracts, concentrates or isolates, such as protein extract or sugar.

B2.2 Structure

This factor treats two characteristics, anatomical part and extract. The two characteristics could be in separate factors so that they could be freely combined to index such products as cod liver oil (anatomical part *Liver* and extract type *Fat or oil*). However in the more compact structure used here a decision must be made as to which of these descriptors should be used; this is explained under B2.3 Use in indexing and searching. The top-level structure, then, is as follows:

> Extract, isolate, or concentrate of plant, animal, or microorganism
>
> Anatomical part of plant, animal, or microorganism (not an actual descriptor, but included to show structure
>
>> Part of plant
>> Part of animal
>> Part of microorganism
>
> Part not applicable (chemical food source)

Plant secretions (subsumed under extracts) are considered *Part of plant*, and *Milk* and *Egg* are considered *Part of animal*, reflecting the fact that their composition depends on the nutrient intake and physiology of the plant or animal.

The appendix to this section gives a more detailed overview.

B2.3 Use in indexing and searching

B2. Part of plant or animal completes the origin specification of the major ingredient. If the part is not an extract, use the appropriate *Part of plant*, *Part of animal*, or *Part of microorganism* descriptor. Always verify the choice, especially the level of specificity, by consulting the tree structure.

In the case of an extract, the anatomical part from which the extract is made is usually ignored. Examples:

Product	A Product Type	B1 Food Source	B2 Part indexed (or ignored)
Cod liver oil	Refined or	Codfish	Fat or oil (Liver)
Corn oil	Partially	Field corn	Fat or oil (Seed/kernel)
Corn syrup	refined food	Field corn	Dextrose (Seed/kernel)
Cane sugar	Product	Sugar cane	Sucrose (Stem/stalk)

This rule has important consequences for searching: a search for an anatomical part descriptor may not retrieve all the relevant products. For example, a search for all products made from fish liver and formulated as *Fish* and *Liver* does not retrieve products which are extracted from fish liver, such as cod liver oil.

If on the other hand the product type implies a specific kind of extract, use the appropriate anatomical part descriptor instead of the extract descriptor, which would be redundant. Examples:

Product	A Product Type	B1 Food Source	B2 Part indexed
Apple juice	Fruit juice	Apple	Fruit or berry, peel
Grape jelly	Fruit jelly	Grape	present, core, pit
Burgundy	Table wine	Grape	or seed present
Beer	Malt beverage	Barley	Germinated or sprouted seed
Carrot juice	Vegetable juice	Carrot	Root, tuber, bulb
Peppermint tea	Steeped beverage	Peppermint	Leaf

The *Part of plant* to be indexed is the part that enters the process of making the juice, wine, or other extract, since the extract stays in contact with this part and substances may be extracted from all subparts, such as peels and seeds. Apple juice, for instance, is made from chopped whole apples (*Fruit or berry, peel present, core, pit or seed present*).

B2.4 Not known, not done, other

This factor includes:

Part not known.

Use only in combination with *Food source not
known*. If the food source is known to be a plant,
then the part is known to be *Part of plant*
even if nothing else can be said.

There is no descriptor for "no part" because for a living
source there is always a part from which the product is made, nor
for "other part" because the top-level descriptors exhaust all the
possibilities. For a nonliving (chemical) food source, use *Part
not applicable (chemical food source)*.

B2.5 Mixtures.

The following specific mixture descriptors are provided, as
required for frequently used combinations:

Germ and bran
Pod and full-size seed, mixture

These can be used for mixtures of different parts of the same
plant or for different plants. Intact plants (e.g., pod containing
full-size seeds) are not considered mixtures.

For other mixtures use the broad term that includes the parts
in the mixture.

Appendix to B2. Part of Plant or animal

Extract, concentrate or isolate of Plant or animal

    Carbohydrate
    Protein extract. concentrate or isolate
    Fat or oil
    Essential oil
    Water extract of Plant or animal
    Alcohol extract of Plant

Anatomical Part of Plant, animal, or microorganism+

    Part of Plant

        Root, stem, leaves, flowers. etc. (not fruit)

            Whole Plant or most Partsused
            Plant above surface
            Root, tuber, bulb

        Fruit, seed

            Fruit or berry
            Seed or Pod

    Part of animal

        Animal body or body Part

            Whole animal or most Parts used
            Meat Part
                Organ meat
                Skeletal meat Part
            Nonmeat Part

        Egg

        Milk

    Part of microorganism

Part not aPPlicable (Chemical food source)

+ ExPlanatory heading, not a descriptor

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C. PHYSICAL STATE, SHAPE OR FORM

The physical state and shape of a food product have important implications for food safety and nutrition. They directly affect heat transfer through the product in processing (e.g., warming, cooking, freezing). They also affect the product's susceptibility to permeation by chemical substances and to invasion by microorganisms. All of these are influenced by the physical state and, for solid products, by size, surface-to-volume ratio, and type of surface (unbroken skin or crust vs. exposed internal areas).

C.1 Definition

The physical state of the food product (liquid, semiliquid, semisolid, or solid). Solid food products are further subdivided by shape or form.

C.2 Structure

The physical states of food products are arranged on a continuum from the liquid to the solid state, i.e., liquid (including low-viscosity and high-viscosity liquids), semiliquid, semisolid, and solid.

C1. Physical state, shape, or form

Liquid

Liquid, low viscosity

Liquid, high viscosity

Semiliquid

Semisolid

Solid

Liquid, low viscosity, *Liquid, high viscosity*, *Semiliquid* and *Semisolid* are each subdivided by degree of homogeneity: some products are homogeneous liquids or semisolids, others contain solid particles in a liquid or semisolid base.

Liquid

Liquid, low viscosity

Liquid, low viscosity, with no visible particles
Liquid, low viscosity, with very small particles
Liquid, low viscosity, with discrete particles

Liquid, high viscosity

    Liquid, high viscosity, with no visible particles
    Liquid, high viscosity, with very small particles
    Liquid, high viscosity, with discrete particles

Semiliquid

    Semiliquid with smooth consistency

    Semiliquid with discrete particles

Semisolid

    Semisolid with smooth consistency

    Semisolid with discrete particles

Solid is subdivided by shape or form; no distinction is made between hard and soft, between firm and not firm, or between homogeneous and particulate structure. Within *Divided or disintegrated* distinctions are based on the size of the pieces or particles. For products that are *Whole, natural shape* or *Divided into halves, quarters, or segments*, the size can be inferred from the food source (for example, a coconut vs. a poppy seed); this is discussed further below.

Solid

    Whole

        Whole, natural shape
        Whole, shape achieved by forming

            -----, thickness <0.3 cm.
            -----, thickness 0.3 - 1.5 cm.
            -----, thickness 1.5 - 7 cm.
            -----, thickness >7 cm.

    Divided or disintegrated

        Divided into halves, quarters or segments

            Divided into halves
            Divided into quarters
            Divided into segments or wedges

        Divided into pieces

            Divided into pieces, thickness >1.5 cm.
            Divided into pieces, thickness 0.3 - 1.5 cm.
            Divided into pieces, thickness <0.3 cm.

Disintegrated or ground

Finely ground
Medium ground

Crystal

Whole and Pieces

C3. Use in indexing and searching

The physical state of the food product is determined on a
uniform temperature basis, namely at room temperature (20 degrees
C., 68 degrees F.). Liquid and semiliquid products are pourable,
semisolid products are spreadable or formable, and solid products
(hard or soft, firm or not firm) are capable of retaining their
shapes.

To determine the physical shape or form of a *Solid* product,
the following procedure should be used:

- For a product that is a whole plant or animal or a whole
  part thereof (as indexed in B2), the descriptor is *Whole,
  natural shape* regardless of the size (from a beef carcass
  to a poppyseed).

- If the shape of a whole product is achieved by forming, e.g.,
  molding or extrusion, the descriptor is *Whole, shape
  achieved by forming, thickness...*

- For a product that is not whole, determine how it is
  Divided or disintegrated.

- If the product is *Divided into halves, quarters or seg-
  ments*, i.e., pieces whose shape is defined in relation to
  the whole, use the descriptor appropriate for the segment,
  regardless of size. The whole being divided may be natural
  or formed.

- If the product is divided into pieces that bear little or
  no relationship to the shape of the whole, the descriptor is
  Divided into pieces, thickness...

- If the product is ground, i.e., if all particle dimensions
  are below 0.2 cm., the descriptor is *Disintegrated or
  ground* or the appropriate narrower term.

- Crystal is a partial exception to these rules. The descriptor
  Crystal is used for whole and broken crystals. If crystals
  are ground (as in confectioner's sugar) the descriptor is
  Disintegrated or ground or the appropriate narrower term.

A number of complications arise in the use of this factor:

(1) Physical state is dependent on temperature. At what
    temperature should the physical state of a food product
    be determined?

(2) Dividing or disintegrating a solid food product may result
    in a product that is closer to a semisolid mass than to
    an assembly of solid parts. Should the shape descriptor
    Divided or disintegrated or the physical state descriptor
    Semisolid be used?

(3) "Whole" is an ambiguous term, with different meanings in
    different factors.

(4) Some shape descriptors do not   consider size - the
    searcher should be aware of this.

(5) For products packed in a packing medium one must decide
    whether to determine the physical state with or without
    the packing medium.

These complications are discussed in the following sections.

C.3.1 Temperature for determining physical state

        Physical state varies with temperature. Because food products
are often processed, handled and consumed at various temperatures,
complete description would require giving the physical state at
several temperatures. For a simple description one physical state
descriptor must do. The question then arises what the temperature
basis should be. The following possibilities were considered in
formulating the rule:

 - Physical state at a given point during processing;
 - Physical state at the point of sale;
 - Physical state at the point of consumption;
 - Physical state at 20 degrees C., 68 F. (room temperature).

The following table illustrates the physical state of selected
products under each possibility.

Product	During Process- ing	Point of sale	Point of consump- tion	Room temp- erature
Frozen broccoli	Solid	Solid	Solid	Solid
Ice cream	Liquid	Solid	Solid	Liquid

Orange Juice concentrate	Liquid, high vis-cosity	Semisolid	n.a.	* Liquid, high vis-cosity *
Chicken broth	Liquid,	Semisolid	Liquid (at 55 degrees C.	* Semisolid *
Frozen soup	Liquid	Solid	Liquid	* Liquid *

* * * *

All frozen products are solid or semisolid at the point of sale. Indexing at the point-of-sale temperature does not preserve the distinction between frozen products that remain solid when thawed and frozen products that become liquid when thawed; indexing uniformly at room temperature does preserve this distinction and thus gives more information. Furthermore it is common and usual to determine physical properties at 20 degrees C. It was decided that for the purpose of indexing, the physical state should be determined at 20 degrees. Therefore this rule was chosen even though in a few instances it leads to counterintuitive results: ice cream is not ordinarily thought of as *Liquid, high viscosity*, chicken broth is not ordinarily thought of as semisolid. To find all products that are solid at the point of sale, include *Frozen* in the query formulation.

C.3.2 Divided vs. semisolid with particles

It may be difficult to decide between *Divided or disintegrated* and *Semisolid with discrete particles*. The decision depends on the degree to which the particles are bound together. The following examples should help the indexer or searcher in making such decisions:

Beef cubes Chopped peanuts Cut green beans	Clearly *Divided or disintegrated*
Cut green bean salad Cole slaw	Still *Divided or disintegrated*, but borderline
Chicken salad bound with mayon-naise	*Semisolid with discrete particles*, but borderline
Chunky peanut butter	Clearly *Semisolid with discrete particles*

C.3.3 *Whole, natural shape* applied to an anatomical part

Whole, natural shape applies to the plant or animal part indexed in B2; this may be the entire plant or animal (e.9., *Whole animal*) or a whole part thereof, such as a *Skeletal meat Part*, a *Liver*, a *Leaf* or a *Fruit*. A chicken leg is a whole *Skeletal meat Part* and is thus indexed by *Whole, natural shape*. A cut-up chicken (a whole chicken divided into whole parts) is an assembly of whole parts and is also indexed by *Whole, natural shape*. (The distinction between a chicken leg and an entire chicken is made in B2: *Whole animal* vs. *Skeletal meat Part*.)

C.3.4 Size considerations

Size distinctions are explicit under *Whole, shape achieved by forming* and under most of *Divided, disintegrated*, but for products that are *Whole, natural shape* or *Divided into halves, quarters, or segments* size distinctions are merely implied by the food source. A searcher interested in the flow characteristics of food products needs to remember that a product consisting of small whole units (e.9., poppy seeds) flows like medium 9round meal, since the particle size is the same. (Likewise a product consisting of intact microorganisms (e.9., yeast cells) resembles finely 9round flour). An exhaustive search for products with the flow characteristics of a meal should be formulated as follows:

Medium 9round OR [*Seed or kernel* AND (*Poppy* OR *Saf-flower* OR *Millet* OR... (other plants with very small seeds))]

C.3.5 Packing medium and physical state

Many products consist of a food and a packing medium; for example, a can of peas contains peas and brine. The physical state of the food proper should be indexed without regard to the packing medium; the packing medium will be indexed separately in E1. In this example the physical state descriptor is *Whole, natural shape*. The packing medium is indexed *Packed in salt brine*.

On the other hand, canned ve9etable soup containing peas is a product in which the liquid component is an integral part of the food — without the liquid there is no soup. The descriptors for physical state and packing medium are *Liquid, high viscosity, with discrete particles* and *No packing medium used*, respectively.

Some products contain a liquid, semiliquid or semisolid component that facilitates packing but is at the same time an integral part meant for consumption. Components used in this way are 9ravies, sauces, 9elatins, and perhaps syrups. Such components should be indexed as packing media. For example, spa9hetti with

meatballs in (or with) tomato sauce is indexed by *Packed in
tomato sauce*. If a liquid, semiliquid, or semisolid is indexed as
a packing medium, it is disregarded in the determination of the
physical state. (If the application requires it, the packing
medium can be indexed by its own combination of factor terms,
including *Physical state, shape or form*).

A searcher interested in all products that consist of solid
parts in liquids should use the query formulation:

> *Liquid, low viscosity, with discrete particles* OR
> *Liquid, high viscosity, with discrete particles* OR
> *Packed in edible medium*

C.4 Not known, not done, other

This factor includes:

> *Physical state, shape or form not known*

> > This may be needed when indexing from a label or
> > recipe, or when the product cannot be examined at
> > room temperature.

There is no factor value for "no physical state, shape, or
form" because every product has a physical state, shape, or form,
nor for "physical state, shape, or form, other" because the
top-level descriptors exhaust all the possibilities.

C.5 Mixtures

The following descriptors for specific mixtures are provided:

> Whole and pieces
> Liquid, low viscosity, with very small particles
> Liquid, low viscosity, with discrete particles
> Liquid, high viscosity, with very small particles
> Liquid, high viscosity, with discrete particles
> Semiliquid, high viscosity, with discrete particles
> Semisolid, with discrete particles

For other mixtures use the broader term that includes both
components.

D. Processing Operations

DRAFT

D1. Degree of Preparation
D2. Treatment Applied
D3. Preservation Method

The D factors designate selected Processing operations which modify the food product — its flavor, texture and other functional characteristics, its nutritional value and its shelf life. The descriptors in D1. Degree of Preparation are very broad. D2. Treatment applied includes specific descriptors for a wide range of operations. D3. Preservation method includes operations that have as their main purpose preservation.

Often a processing operation affects more than one characteristic of the food product. Such an operation may therefore require several descriptors, each reflecting the viewpoint of a particular factor. Examples:

(1) A product that is sterilized by heat is also fully cooked; thus, the two descriptors *Fully cooked* (D1) and *Sterilized by heat, canned (D3).

(2) A product that is smoked for preservation also had its taste changed; thus, the two descriptors, *Smoked by smoke infiltration* (D2) and *Preserved by smoking* (D3).

Because each factor is considered independently of the others, all of the viewpoints will be included. This ensures complete retrieval under any descriptor. For example *Fully cooked* retrieves all fully cooked products whether the cooking was intended for preparation or for preservation; *Smoked by smoke infiltration* retrieves all products so treated regardless of the purpose of the treatment.

The factors in this group do not cover all processing operations. Other processing operations are implied by descriptors in B2. Part of plant or animal (which may imply such operations as hulling or extracting), C. Physical state, shape, or form (which may imply cutting, grinding, or forming), and E. Packing and Packaging.

D1. Degree of Preparation

D1.1 Definition

Used to broadly characterize a food Product based on the Preparation steps Performed to ready it for consumption. Specifics of Preparation are covered by D2. Treatment applied.

D1.2 Structure

D1. Degree of Preparation

Degree of cooking

Formulated mix

D1.3 Use in indexing and searching

First the indexer must determine whether the Product is a formulated mix. If so, *Formulated mix* or the appropriate narrower descriptor is used. In this instance *Degree of cooking* is not indexed.

Products other than formulated mixes are indexed by the appropriate descriptors under *Degree of cooking*. The only aspect of cooking considered here is the application of heat. Many Products are heated for the express Purpose of effecting changes in the Product. For other Products the heating may be a byProduct of the Processing, such as grain being heated during grinding or oil during extraction. Any significant application of heat induces changes in the food, especially in nutritional and safety characteristics. Therefore the degree of heating should be indicated by using *Partially cooked* or *Fully cooked*, as appropriate. The *Degree of cooking* descriptors are defined as follows:

- A food Product is *Uncooked, raw* when no heat was applied or when the heat applied was insignificant.

- A food Product is *Partially cooked* when heat was applied for a time sufficient to Partially change some characteristics, especially flavor or texture. This often decreases consumer Preparation time. Partial cooking also causes some chemical changes and reduction of enzyme activity and of microbes. In a Product having multiple components requiring different cooking times, Partial cooking achieves a degree of doneness such that time for completion is the same for all components; a component such as Pie crust may not have been cooked at all. Products labeled "quick cooking" are often *Partially cooked*.

- A Product is *Fully cooked* when heat was applied for a time sufficient to fully change some of its characteristics,

especially flavor or texture. The cooking process also causes significant chemical changes and destruction of enzyme activity and of microbes. The product is offered for consumption without a requirement for further cooking.

The following examples illustrate further how this factor is used:

Food Product	Degree of Preparation
Cake mix	Formulated mix
Artificial lemonade mix	Beverage base
Cookie dough	Uncooked, raw
Cookies	Fully cooked
TV dinner	Partially cooked
Pasteurized milk	Partially cooked
Cold-pressed oil	Uncooked, raw
Hot-pressed oil	Partially cooked
Rolled oats	Partially cooked
Sugar	Fully cooked

D1.4 Not known, not done, other

This factor includes:

Degree of Preparation not known

Preparation not done is *Uncooked, raw*.

There is no factor value for "Degree of Preparation, other" because every product is either raw, partially cooked, or fully cooked.

D1.5 Mixtures

The only type of product to which one might wish to apply more than one descriptor from this factor is a product with multiple components that vary in degree of cooking. Such a product is indexed by *Partially cooked*.

D2. Treatment Applied

D2.1 Definition

Used to specifically characterize a food product based on the treatments or processes applied to the product or any indexed ingredient. The processes include adding, substituting or removing components and modifying the food or component, e.g., through fermentation. Multiple values may be assigned.

D2.2 Structure

D2. Treatment applied

    Component removed
    Component substituted
    Food or component modified
    Ingredient or food added
    Treatment not applied

D2.3 Use

The treatments considered are those applied to the product as a whole or to any indexed ingredient. For example, if a product has hydrogenated fat as a second ingredient, it is indexed by *Fat or oil added* and *Hydrogenated*.

All applicable descriptors from this factor must be assigned, even if they are implied by descriptors from other factors. For example, *Natural cheese* (A. Product Type) is also indexed by *Lactic acid-other organism fermented*; a product that is indexed by *Preserved by smoking* (D3. Preservation) is also indexed by *Smoked by smoke infiltration*; a product that is indexed by *Packed in sweetened liquid* (E1. Packing Medium) is also indexed by *Sweetened with sugar* or the appropriate narrower term.

To ensure that no important descriptor is overlooked, the indexer must systematically examine the tree structure, using the following procedure:

- Consider the five main subdivisions and select all that apply.

- In the subdivisions that do apply examine the specific descriptors and use all that apply.

- If all the treatments listed can be ruled out, the descriptor is *No treatment applied*.

- If the information available is not sufficient to index any treatment but also not sufficient to rule out all treatments, the descriptor is *Treatment applied not

known*.

Information for indexing may come from label statements, recipes, general knowledge and inferences drawn from these. From this information, some treatments can be positively identified and are indexed, others cannot be identified but also cannot be ruled out, and still others can be ruled out. Thus indexing by treatment descriptors is sometimes incomplete. The recall achievable in retrieval depends upon the information used in indexing, its source and extent.

In many applications of the vocabulary, *Treatment applied* descriptors should be assigned only if their significance for the product at hand warrants it. The scope notes give rules for indexing at a medium level of completeness. These rules are based on the significance of the treatment for the safety and the nutritional value of the food product. A rule given for a broad descriptor, such as *Sweetened with sugar*, holds for all its narrower terms, such as *Corn syrup added*, unless stated otherwise. A handy reference list for the use of *Treatment applied* is given in ......; it arranges the descriptors in classified order and gives for each descriptor a condensed version of its scope note.

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D2.4 Not done, not known, other

The following descriptors are included:

No treatment applied

Used when none of the treatments listed and defined in this factor pertains to the food product (i.e., all listed treatments can be ruled out with reasonable certainty).

Treatment applied not known

Used when the information available is not sufficient to index any treatment but also not sufficient to rule out all treatments. If all the treatments listed can be ruled out, the descriptor is *No treatment applied*. Thus *Treatment applied not known* serves to indicate that the indexer has considered all the treatments.

A more specific type of descriptor is also included:

Treatment not applied

Used for a product to which a treatment customary for the type of product has not been applied, or has been applied in lesser

degree than is common. An applicable descrip-
tor from this group must be used if a corres-
ponding statement appears on the principal
display panel (example: unsalted peanut,
unsalted potato chips). This descriptor must
be distinguished from "No treatment applied".
This group of descriptors is unique to
D2. Treatment applied. They are important
because the corresponding treatments are so
standard that the user gains little informa-
tion by knowing they are present but much
information from knowing that they are absent.

There is no factor value for "treatment applied, other". A
treatment not falling in one of the five major subdivisions is
not of interest and should not be indexed.

D2.5 Mixtures

Multiple individual characteristics - as many as needed -
should be indexed.

D3. Preservation Method

D3.1 Definition

The primary method used to prevent microbial and enzymatic spoilage.

D3.2 Structure

D3. Preservation method

Dried or dehydrated
Preserved by fermentation
Preserved by filtration
Preserved by thermal processing
Irradiated
Preserved by addition of or treatment with chemicals
Preserved by cold
Preserved by storage in modified atmosphere

D3.3 Use

Preservation is a complex subject which is not easily separated from the other aspects of food technology covered in Factors D1. Degree of Preparation, D2. Treatment applied and E. Packing and packaging. Preservation usually involves several operations which often affect other characteristics of the food product as well. The main classes of these operations are:

- Treating the food product to modify it and/or to destroy microbes and enzymes and/or to prevent their growth or activity (relationship with D1. Degree of Preparation and D2. Treatment applied).

- Packaging (relationship with E1. Packing medium and E2. Container or wrapping).

- Storage and handling, an aspect not covered elsewhere in the vocabulary and often implied rather than indexed explicitly.

A preservation method may consist of a combination of operations (e.g., *Sterilized by heat, canned* combines fully cooking with packaging in a sterile container) or it may imply a method of storage and handling to be used subsequently, as *Pasteurized* implies refrigeration.

The indexer must select the primary preservation method. For example the descriptor for canned smoked oysters is *Sterilized by heat, canned* rather than *Preserved by smoking* even though smoking contributes to preservation. On the other hand, the descriptor for smoked ham wrapped in cloth is *Preserved by smoking*. Following general indexing rule 2, both products are indexed by *Smoked by smoke infiltration* in D2.

Treatment applied and by the appropriate descriptor in E2. Container or wrapping.

An implied storage and handling method is not indexed; for example, Pasteurized milk is under *Pasteurized*, not under *Refrigerated*. Thus, the descriptor *Refrigerated* retrieves only products where refrigeration is the sole preservation method. To find all refrigerated products, consider also the descriptors *Pasteurized*, *Irradiated* and often *Dried or dehydrated*.

If there is a doubt as to which is the primary preservation method, choose the method that cannot be expressed through one of the other factors.

For processes listed both under D3. Preservation and under D2. Treatment applied, the usage of the descriptor under D3. Preservation is more restrictive: the D3 descriptor *Preserved by smoking* finds only the products for which smoking is the primary preservation method; the D2 descriptor *Smoked by smoke infiltration* finds all products that were treated with smoke.

D3.4 Not known, not done, other.

This factor includes:

Preservation method not known

Used when nothing is known about the preservation method, if any.

No preservation method used

Used when a food product is not treated to prevent or retard microbial or enzymatic spoilage. Wax coating is considered packaging and not preservation.

Preserved by other method

Used only when the preservation method does not fall under any of the major categories of preservation. Wax coating is considered packaging and not preservation.

D3.5 Mixtures

Preservation methods are typically sequential, rather than coexistent. Only the predominant method should be indexed.

E. Packing and Packaging

E1. Packing Medium
E2. Container or wrapping
E3. Food contact surface

The E factors deal with the roles of packing media (internal to the container), the container itself, and the food contact surface (the container's inner surface, sometimes modified by a coating). The complexities of container description and the simplified scheme chosen for this vocabulary are discussed in Section E2.2, Container or wrapping. Structure.

E1. Packing Medium

E1.1 Definition

The medium in which the food is packed for preservation and handling and/or for palatability and consumer appeal. The packing medium provides a controlled environment for the food.

E1.2 Structure

Foods are packed either in gases (other than air) or in edible liquids or semisolids. Packing under vacuum is a closely related technic which also provides a controlled environment for the food.

E1.3 Use in indexing and searching

The descriptors in this factor are used for products that consist of a food and a packing medium. A packing medium is a gas, liquid, or semisolid that surrounds or covers solid parts or that fills free space in a container. Usually the packing medium can be separated from the food proper without changing the basic character of the food as indexed in A. Product Type. For example, peas without brine are still peas and peach halves without syrup are still peach halves.

On the other hand, in a vegetable soup the water or broth cannot be separated without changing the basic character of the food – without water or broth there is no soup. Even if the vegetable component consists primarily of whole peas, the product

type descriptor is *Soup* and the packing medium is indexed *No packing medium used*.

Some products contain a liquid, semiliquid or semisolid component that facilitates packing but is at the same time an integral part meant for consumption. Components used in this way are gravies, sauces, gelatins, and perhaps syrups. Such components should be indexed as packing media. For example, spaghetti with meatballs in (or with) tomato sauce is indexed by *Packed in tomato sauce*.

The decision on how to deal with the packing medium affects the indexing in C. Physical state, shape and form; see the discussion there.

E1.4 Not known, not done, other

This factor includes:

Packing medium not known

No packing medium used

Examples: soup in a can; tomato paste in a tube; apple juice in a bottle. (If the headspace is filled with a gas other than air, use the appropriate descriptor for the gas. If a vacuum higher than 26 in. exists, the descriptor is *Vacuum packed*. *No packing medium used* also indexes products that are merely wrapped or not packed at all.

Packing medium, other

E1.5 Treatment of mixtures

The following specific mixture descriptors are provided:

Packed in mixture of gases

Packed in vinegar and oil

Packed in vinegar with sugar

Otherwise, if there are several media (e.g., peaches packed in syrup with nitrogen in the headspace), the predominant medium is indexed.

E2. Container or Wrapping

E2.1 Definition

Primary container type as defined by the main container material, the container form, and the materials of liner, lids, and ends.

E2.2 Structure

The description of containers is very complex because of the large number of characteristics to be considered:

Main container structure

    Material
    Form
    Method of construction
    Size

Lid, ends, or crown (cork)

    Material
    Form
    Method of seal

Inner liner material

Outer liner/wrapper material

Coating materials used for any of the above

Other materials used

    Sealants
    Adhesives
    Printing ink

The materials may be composite materials. Some products have multiple containers.

In the food vocabulary much of this complexity had to be abandoned in favor of a simpler, less detailed description. This simplified description consists of an indication of the primary container type (factor E2) and of all the food contact surfaces (factor E3).

E2 Container or wrapping subdivides the most prevalent container types based on two characteristics. The first subdivision is by material:

            Metal container
            Glass container
            Ceramic or earthenware container
            Plastic container
          ` Laminate container
            Fiberboard or paper container
            Wood container
            Textile or fabric container

     Within material, containers are subdivided by shape, such as
can, tube, tray, and/or type of lid and/or type of liner. If a
container shape is not specifically listed under a material, index
under the broader term, e.g., aluminum box under *Aluminum
container*.

E2.3 Use

     For most products the primary container is easily recognized.
The following instructions deal with complex situations:

            If a product is packed in multiple containers, index
            the innermost (primary) container. Example: for Edam
            cheese packed in a wax shell and wrapped in plastic the
            descriptor is *Wax container*. Exception: fiberboard
            containers with liners and paper bags with liners
            are specifically included as descriptors (e.g., cereal
            box with laminate liner or cheese packed in a box
            with aluminum foil liner wrapped around the cheese.)

            Some food products have an outside surface that ful-
            fills some of the functions of a container; such
            a surface is not considered a container. Examples:
            sausage, the casing of which is an integral part of
            the product; a product with an edible protective
            surface. On the other hand the wax shell around Edam
            cheese is not an integral part of the product and is
            therefore considered part of the packaging.

E2.4 Not known, not done, other

     This factor includes:

            Container or wrapping not known

                  Used only when indexing a product from a descrip-
                  tion that gives no information about the container.

            No container or wrapping used

            Container or wrapping, other

E2.5 Mixtures

   · Index the primary container. Any other container should be
indexed under under food contact surface.

E3. Food Contact Surface

E3.1 Definition

The specific container materials in direct contact with the food. Multiple values can be assigned.

E3.2 Structure

The descriptors cover the following classes of materials:

    Metal
    Glass and ceramic
    Plastic
    Enamel
    Fiberboard or paper, cork, wood or textile
    Wax

E3.3 Use

All materials in direct contact with the food must be indexed. If the main container indexed in E2 is coated, the coating material is the food contact surface. Otherwise the food contact surface is the container material, which should therefore be indexed in E3, even though it may seem redundant. Example:

    E2. Aluminum can, drum or barrel
    E3. Aluminum (if not coated)

The E3 descriptor may be more specific than the E2 descriptor. Example:

    E2. Plastic wrapper
    E3. Polyethylene

Other container parts, including lid, end, crown, and window, are in contact with the food and the materials they are made of (or their coatings) must also be indexed.

E3.4 Not known, not done, other

This factor includes:

    Food contact surface not known
    No food contact surface present
    Food contact surface, other

E3.5 Mixtures

Index all materials with which the food comes in contact.

DRAFT

F. User Group/Dietary Use

F.1 Definition

User group, human or animal, for which the food product is produced and marketed.

F.2 Structure

There are two major subdivisions:

Animal food

        Feed for food animals
        Food for nonfood animals

Human food

        Human food, no age specification, regular diet
        Human food, no age specification, special diet
                Human food, low calorie
                ..etc.
        Infant or junior food, regular infant diet
        Infant or junior food, special infant diet

Human food, no age specification, special diet, is further subdivided to accommodate dietary label claims.

F.3 Use in indexing and searching

Foods produced and marketed specifically for infants or juniors (age up to 1 year) are so indexed; all other foods are indexed under "No age specification".

The dietary use descriptors, such as *Human food, low calorie*, are used for foods which are selected by individuals because of the label claims. These claims may be stated as "Low calorie", "Artificially sweetened", "Sugar free", "Low cholesterol", "Reduced sodium", "Caffeine free", "Diabetic", etc., or by the word "Diet" or "Dietetic". The individuals may adhere to otherwise regular diets or may be actually consuming special diets because of particular dietary needs which exist by reason of a physical, physiological or pathological condition (21 CFR 105.3(A)(1)(i)). Foods fall in the special diet category if the label bears special dietary claims pertaining to conditions such as overweight, diabetes, lactose intolerance, or allergic hypersensitivity.

F.4 Not known, not done, other

This factor includes:

User group not known

There is no factor for "No user group", which is clearly not meaningful, nor for "User group, other", because *Human food* and *Animal food* exhaust the scope of this vocabulary.

F.5 Mixtures

Multiple user groups are not indexed. However, all special dietary characteristics which are applicable should be indexed.