

Like a Kid In a Candy Store

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Background

The phrase, "Like a kid in a candy store!" describes in seven words what our industry is all about---delight, enjoyment, and a bewildering and seemingly endless array of variety---so much variety that there is no way you could experience each and every confectionery delight---a choice must be made. While eminently attractive to the kid in all of us, the candy aisle in the grocery store is only a small reflection of that variety which awaits you at a retail confectionery store.

This variety of products, while delighting both the palette and imagination of the buyer, turned into a nightmare with the passage of the NLEA. Most retail candy stores produce and sell between 100-200 different candy "pieces" plus assortments. The ease with which new products can be made is astounding. A confectioner can have an idea for a new confection in the morning and be offering it to the customer that afternoon. The prospect of having to perform laboratory analyses on each and every product and assortment was more than scary to the industry.

Three associations cover the range of businesses within our industry:

NCA	National Confectioners Association
RCI	Retail Confectioners International
CMA	Chocolate Manufacturers Association

Although their membership profiles overlap, the NCA represents large candy sold through the normal distribution system. The RCI generally represents smaller confectioners selling through candy stores and companies manufacturing for department and specialty stores. The CMA represents the chocolate industry covering the range of products from chocolate candy in retail distribution (Hershey, Mars, Nestle, etc.) to chocolate sold industrially in 10 lb. bars to NCA and RCI type companies for remanufacture.

NCA/RCI/CMA Nutrition Labeling Database Committee---Database Program

Shortly after the passage of the NLEA, the three associations formed a committee to create a rapid and economical means of developing nutrition profiles for our products using the database provisions of the then proposed regulations.

NCA/RCI/CMA
Nutrition Labeling Database Committee

The program developed by the Database Committee had to be consistent with the product variety and creation capabilities of the industry. We retained the consulting and development services of Ms. Charlene Rainey, President of Nutrition Network, to develop a complete database program which would meet these needs as well as meet the guidelines in the FDA's *Guide for Developing and Using Databases*. After a truly massive amount of work, the first phase was submitted to the FDA in July, 1993, and the last phase for their review this past March.

Notice that I have not described this as an industry "database". It is a complete database program that consists of four parts:

1. A database of ingredients used in the confectionery industry
2. A calculation program that uses recipes, finished product moistures, and ingredient nutrient values, calculates nutrient profiles and performs regulation mandated rounding
3. A modeling program verifying that finished product nutrient profiles can be calculated from ingredients used in the recipes
4. A quality management program to insure individual company accuracy, long term accuracy of program results, and a mechanism of specifying the quality of individual ingredient data and of improving those nutrient values used in the data base program.

For the purposes of this program, the target population was restricted to confectionery products and provides values only for the 14 mandatory nutrients. We specifically excluded from the program:

Nutrient content or health claims
Nutrient labeling of optional nutrients
Nutrient fortification and/or supplementation (enrichment)

Structure of Products in Confectionery Market

The development of the complete program rests upon two key characteristics of our industry---

1. Common basic ingredients used in the industry
2. Common processing conditions used in the industry.

Our industry is founded on the physical chemistry phase structure of sugar/corn syrup/water systems. The taste and textural properties of our products are integrally related to this one universal foundation. Based on this recognition, the target population was divided into five primary confectionery categories based on the ingredients and processing conditions used. In many cases, a single confection may be a combination of confections from several different categories.

Category I Sugar Based Hard Candy

The simplest of the categories, this consists of pressed tablets (such as mints and breath savers), uncooked confections made with fondant sugar, syrups and creme centers, and hard candies. Basic ingredients are sugar and corn syrup.

- Category II Sugar and Fat Based Caramels and Toffees
This category consists of truffles on the low cooked end, caramels and fudge in the medium cooked range, and brittles and toffees at the high cooked end. Basic ingredients are sugar, corn syrup, fat, and optional dairy ingredients.
- Category III Sugar and Whipping Aid Based Aerated Confections
This category is easily recognized as marshmallows, nougats and other aerated confections. Sugars and water are cooked as for Category I hard candy with whipping aids added at lower temperatures prior to whipping.
- Category IV Sugar and Gelling Agent Based Gelled Candy
This category is easily recognized as the ever popular jelly beans and gummy bears. Basic ingredients are sugar, corn syrup and gelling agents such as pectins, agar, or starches added to the cooked sugar mass at lower temperature.
- Category V Chocolate/Cocoa and Specialty Fat Compounds
Chocolate speaks for itself and consists of sugar, chocolate liquor, cocoa butter and milk. Compound coatings can include these same ingredients as well as cocoa powder and are made from specialty vegetable fats.

The complete database program works for our industry because of this structure. Now we go on to review the components of the program.

Ingredient Database

The ingredient database specifically covers ingredients used by the confectionery industry. To develop this database, association member companies and other industry companies solicited nutrient information from their suppliers. These were then submitted to Nutrition Network. Unlike other survey sources, information returned from ingredient suppliers was provided with sample documentation (Appendix I) which provided information on a number of key factors about the information.

- Ingredient descriptions and formulation information
- Date samples were produced
- Method of sample collection
- Number of samples in composites
- Number of production lots represent by composites
- Laboratory certificates of analysis
- Laboratory methodology

The sample documentation was designed to provide the following information about each ingredient, the nature of the sampling, and how the nutrient values were specifically determined. The purpose of this documentation was to provide a basis to judge the quality of the analytical data as it was used to develop the ingredient database. It then becomes possible for future efforts to improve the quality of the data on ingredients where the sampling protocol or analytical methodology currently provides data of limited scope.

Before entry of data into the database, ingredients were quality checked by Nutrition Network to assure accuracy.

- Completeness of data for mandatory nutrients plus moisture and ash

- Comparability of data with other known values for similar ingredients reported by other manufacturers or in the literature.
- Proximate values were screened to assess the exactness of the data (carbohydrate, fat, protein, moisture, and ash should sum to near 100%)
- Calories were recalculated to affirm correctness and, where appropriate specific energy factors were used
- Data were converted to appropriate consistent units throughout the database
- Data and data entry were error checked to insure accuracy of the values in the database

Using this process, over 1000 ingredients in use by the industry were installed into the ingredient database portion of the program.

Calculation Program

Given the nature of the ingredients and processing used in the confectionery industry, calculations are simple and are based on the principle that "what goes into the candy kettle, adjusted for moisture loss, is what comes out." Within the industry, ingredients are carefully weighed or volumetrically measured and added to a "candy kettle" for cooking to the desired end point as measured by cook temperature. Most of you are familiar with many of the terms involved in the syrup cooking stage from your own cooking experience at home. These terms are in common use throughout confectionery and dessert cookbooks:

Cooking temperature terms

crystal syrup	219°F
thread	226
pearl	230
blow/soufflé	235
feather	241
soft ball	245
hard ball	253
crack	268
caramel	302

Kettle cooked ingredients, with specific moisture contents, are then combined with other ingredients and with other cooked ingredients to make a finished confection. An example of this "assembly" would be a Snickers bar consisting of nougat, caramel, peanuts, and overall enrobed in chocolate.

The texture and physical structure of confectionery products depend largely on the syrup, crystalline (grained), and glassy phases created when sugars and water are combined and heated. The finished product texture and structure is governed by this phase relationship and the ingredients and processing used are standardized for each product. The nutrition profile is standardized along with the taste and texture for each.

Following this principle, Nutrition Network developed a PC based computer program for our industry which combines the ingredient database with a calculation program that allows companies to input their specific recipe and its final moisture content.

It then calculates both exact nutrient profiles and rounded, labeled values of nutrients. The program also carries with it basic data on ingredient suppliers and analytical laboratories. The calculations are straight forward.

The company selects the ingredients for their recipe from the database, indicates the percent, provides the serving size information, and final moisture and the program calculates the profile. A provision is made in the program for identifying a product as a "base product" which then makes the results of the calculation available to other calculations using this as an ingredient. The Snickers bar is an example of this where the nougat, caramel, and the chocolate are each individually calculated as base products, and then "assembled" into the finished product which also includes peanuts.

A variety of reports and formats are available from the program depending on the needs and the desires of the company. The program itself performs all regulation-required rounding from the exact values given the declared serving size. Several of these reports are shown for typical confections in Appendix 2.

One key component of the modeling program follows the premise that ingredients must be specifically located in the database. Whey is not a substitute for nonfat milk, margarine is not a substitute for butter, one brand of shortening must not be substitutes for another, individual chocolates (differing from one another in milk, chocolate liquor, and fat content due to viscosity) are each unique, etc. We subscribe to the advertising programs of both Porsche and Maxwell House: Accept No Substitutes! With over 1000 ingredients and a program to continue to add ingredients as gaps are identified, there is little need to make substitutions that could risk the integrity.

Modeling Program

In order to verify the basic premise that what goes into the candy kettle comes out (adjusted for moisture loss), member companies submitted complete confectionery recipes and laboratory certificates of analysis showing nutrient profiles for the confections. The confections chosen were generally products in full market production and distribution and covered all five product categories. Using this base, over 420 independent comparisons were made between the calculated label value and those determined by laboratory analyses. 97% (406) of the comparisons were within FDA compliance guidelines. Of the 14 values outside of the compliance limits, all were in the very low range of values for that specific nutrient.

Simply put, calculations work for our industry.

Quality Management Procedures

The quality management program consists of four critical control points.

1. Documentation of nutrient values
2. Documentation of the recipe
3. Performance audits of the calculation program and all updates
4. Ongoing auditing of lab calculations and ingredient nutrient profiles

Responsibility for implementation of these control procedures is split between the developers of the database and the users of the software.

The documentation of the nutrient values for the ingredients, the first critical control point, has already been discussed. This is the specific responsibility of the NCA/RCI/CMA as executed by Nutrition Network, Inc.

The second critical control point is the documentation of the recipe which is the responsibility of the manufacturer. Recipes are the basis for all chocolate and confectionery products. Each product, or piece as it is called in the industry, and manufacturer has unique recipes and process conditions which make it

necessary for the manufacturer to identify the control points for all of their products to assure the consistency of the recipe composition. In all cases, use of the modeling database require that documentation of these parameters be maintained for each product, including the assembly of assortments. The basic steps are:

1. Batch ingredient weight verification. Each ingredient must be weighted or measured volumetrically. If volume measurements are used, volume to weight conversions must be confirmed. This also includes programs to assure that only the listed ingredients are used in the recipe—not substitutions.
2. Moisture content verification. Tests for final moisture content or alternately the moisture loss must be conducted on each product. Note that once confections are made, little moisture loss or gain occurs without dramatic disruption of the product taste and texture. Hence, little change occurs or is allowed in the trade.
3. Piece weight verification. Assembly ratios for individual pieces (e.g.: percentage of chocolate on a piece) are verified and controlled to assure accurate proportioning of "base product" ingredients on the production lines.
4. Ingredient count for individual pieces. In some instances, such as some products containing nuts, individual piece count is controlled.

The third quality control point is the audit of the computer calculations. This was done initially by Nutrition Network, Inc. and the NCA/RCI/CMA Database Committee following development of the program and is an integral part of all "beta testing" of program additions and revisions.

Fourth, the NCA, RCI, and CMA have recognized the need for ongoing improvement in the quality of the data contained in the ingredient portion of the database. While present efforts are focused on the addition of ingredients to the database to cover over the few initial gaps in the data, longer term efforts will be focused against improving the quality of the nutrient values in the database itself.

Bottom line to the database is that it works by providing highly accurate nutrient values and allows confections to provide the nutrition information for labeling with speed and economy. While label printing remains a significant issue given the wide variety and broad range of both products and packaging, the recently passed Small Business Exemption allows the small confectioner time to work through their product lines in order of volume sold.

As an industry, we are appreciative of the help which we have received from all of the members of the industry, both members and non-members of the three associations; Nutrition Network; and the staff of the FDA.

Nutrition Network Labeling System*Monday, May 09, 1994***Product Recipe - Summary****Company: Classic Candy Fudge Co.****Fudge, Chocolate****2 Squares Serving Weight 35 grams**

Ingredient Name	Percent	Cost
Sugar, Granulated, All	30.9	
Sugar, Fondant, Easy Fond	16.6	
Corn Syrup, 43/43 DE, Staley 1300	15.4	
Water	14.3	
Milk, Sweetened Condensed, Whole	14.1	
Chocolate, Baking	8.5	
Salt	0.2	
Totals:	100	

SAMPLE DOCUMENTATION

CONFIDENTIAL PRODUCT INFORMATION FORM

Please attach laboratory certificate and answer the following questions to the best of your ability. Attach additional sheets as necessary.

Company Name: _____ Phone: _____

Contact Name: _____ Title: _____

Product/Ingredient Name: _____

As supplied to (company requesting this information): _____

Ingredients/formulation information: _____

How many samples were composited for this analysis? _____

How were the samples collected? _____

Were samples from the same production run/lot? _____

On what date were samples produced? (if different dates, list number of samples from each date)

On what date were samples analyzed? _____

At which laboratory? _____

List analytical method used for each nutrient _____

Please provide any other information you believe to be relevant to this research:

SEND LAB DATA AND COMPLETED FORMS

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THANK YOU FOR YOUR PARTICIPATION IN THIS IMPORTANT RESEARCH

Nutrition Network Labeling System

Product Nutrition Information - Mandatory

Monday, May 09, 1994

Company: Classic Candy Fudge Co.

Product: Fudge, Chocolate

Serving Size: 2 Squares

Serving Weight: 35 grams

Final Moisture: 7.3 %

Nutrient Name	Per 100 Grams	Per Serving	Label Value	%DV
Calories	375.867 cal	131.553 cal	130 cal	
Calories From Fat	57.823 cal	20.238 cal	20 cal	
Fat	6.840 g	2.394 g	2.5 g	4 %
Saturated Fat	4.069 g	1.424 g	1.5 g	7 %
Cholesterol	4.858 mg	1.700 mg	0 mg	1 %
Sodium	116.000 mg	40.600 mg	40 mg	2 %
Total Carbohydrates	82.213 g	28.774 g	29 g	10 %
Dietary Fiber	1.536 g	0.538 g	<1 g	2 %
Sugars	73.124 g	25.593 g	26 g	
Protein	2.497 g	0.874 g	<1 g	
Vitamin A	62.517 IU	21.881 IU		0 %
Vitamin C	0.460 mg	0.161 mg		0 %
Calcium	58.961 mg	20.636 mg		2 %
Iron	0.657 mg	0.230 mg		0 %