

## PROGRESS IN METHODS DEVELOPMENT AND NEW NUTRIENT DATA

Gary R. Beecher  
USDA, Nutrient Composition Lab

The earlier papers in this session give you some appreciation for the very confusing and very difficult research areas we are facing in terms of nutrition, nutrients and foods. Today, I would like to discuss several items pertinent to food composition. Firstly, I'd like to give an overview of the history and organization of the Nutrient Composition Lab (NCL). Secondly, I want to reveal what's on the horizon for food composition data. Lastly, I will talk about what we're doing in the lab in terms of analyzing foods.

The Nutrient Composition Lab was developed in 1975 as the result of the lack of good data on fats and fatty acids in foods. NCL is a part of the Beltsville Human Nutrition Research Center which is one of the five human nutrition research centers in the U.S. that's associated with the Agricultural Research Service.

We have two goals : One, to develop analytical procedures for the analysis of nutrients in foods and two, to provide nutrient composition data for foods that are commonly eaten. Part of this last goal is to assess the variability of the nutrient content of foods.

We have 8 scientists who have been trained in such diverse areas as Food Science, Physical Chemistry, Organic Chemistry, Analytical Chemistry, and Biochemistry. In addition, the laboratory has two groups: Joanne Holden heads the Food Sampling Group which is responsible for developing and executing food sampling plans. The computer group, headed by Robert Doherty, is responsible for the computer system and the integration of computers with the scientific equipment.

Funding for NCL comes from a variety of sources including the Agricultural Research Service, NHLBI, and HNIS/USDA. Recently, funds from the National Cancer Institute (NCI) have been provided to work on selenium and carotenoids.

Next, I would like to discuss ongoing research activity to improve data on the carotenoid and fiber content of foods. There are really two problems with the vitamin A data as they are presented. Dr. Hankin discussed cancer epidemiological studies and what confidence you might have in the vitamin A data that are available. One problem is that vitamin A activity comes from many components including retinol, alpha-carotene, beta-carotene, and perhaps several minor components. The second problem is that there are many carotenoids in fruits and vegetables that do not have any or very little vitamin A activity, yet these components may be important in maintaining optimum health in human beings.

Let me point out where we are and what you can expect in terms of carotenoid data. Dr. Buzzard and her group at the Nutrition Coding Center in Minneapolis have evaluated existing vitamin A data and have converted vitamin A activity into carotenoid data using the FAO/WHO 1967 tables that Dr. Hankin referenced.

These data are available for your use. Dr. Hankin has recently extended this concept to other foods and mixed dishes.

In terms of carotenoid data, HNIS has acquired a contractor who is generating data on the carotenoid and retinol levels in several foods. He's analyzing a variety of foods for retinol, alpha-beta carotene and cryptoxanthin. These data will be available as soon as they can be organized into a table.

The National Cancer Institute has awarded a contract to Arthur D. Little, Inc. in Cambridge, Massachusetts to develop methods and to analyze a number of foods for carotenoids and retinoids. Dr. Richard Taylor is the Chief Scientist responsible for analyzing not only foods for vitamin A carotenoids, but for other abundant carotenoids in foods also.

NCL is developing methods for the analysis of the abundant carotenoids in fruits, vegetables and mixed diets and is analyzing fruits and vegetables for these components.

In terms of new fiber data, Dr. Elaine Tanga at NCI has compiled a table on fiber data which will be published in the Journal of the American Dietetic Association in the next few months. Ms. Ruth Matthews and her group at HNIS are compiling fiber data and will provide it in a provisional table which should be available in early 1986.

NCI has awarded contracts to 2 different laboratories with the specific purpose of developing methods and analyzing the fiber content of foods. The laboratories are at Cornell University and the University of Wisconsin in Madison. A large amount of data will be available from these contractors as soon as the analysis can be conducted, data verified and presented in a useable format.

Also, Dr. Betty Li at NCL is developing an analytical method for pectin in food.

Finally, I would like to discuss food sampling activity currently ongoing at NCL. Fast-food chicken was first sampled in the Baltimore-Washington area to assess the variability between such parameters as brand, type of cooking and cut of meat. After application of appropriate statistical procedures to those data, a nationwide sampling plan was developed and executed. Approximately one hundred samples of the most popular brands of fast-food chicken were acquired. Starch, moisture, fat and fatty acids were analyzed at NCL. In collaboration with Mr. Hepburn at HNIS, a contractor was selected to provide analytical data for the majority of the rest of the nutrients.

NCL is in the process of conducting the preliminary sampling for cookies and snack cakes. Analysis for selected nutrients, including fat, fatty acids, starch, sugars, niacin, thiamin, and riboflavin will be conducted.

Finally, NCL in collaboration with HNIS has begun to develop plans to improve selenium data on foods. We anticipate it will take 2-3 years to complete our efforts with the available resources.

Dr. Turnlund indicated a potential interaction between normal levels of dietary copper and high dietary fructose. Scientists at NCL have begun to carefully evaluate published

copper data on foods as the first step in a major effort to improve these data. If cardiovascular health is affected by a dietary copper-fructose interaction, we would like to be able to present a table of the best available copper data to the public health community as soon as it is needed.