

**17th National Nutrient Databank Conference
Poster Session Abstracts**

Pasta Sodium as Affected by Egg and Boiling Treatment

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Na content of pasta due to egg in the formula and salted boiling water was measured following a 3 X 5 factorial design. Fresh pasta shells were prepared with 0, 1, 2, 3 or 4 eggs per 2 kg flour. Randomly selected samples, boiled in salted (4 g NaCl per liter) or unsalted tap water, were compared with uncooked shells. Pasta shells were also boiled in salted and unsalted distilled water. Triplicate samples were ashed by a low temperature (375° C) combination wet/dry ashing procedure that utilized nitric acid and hydrogen peroxide for the wet ashing. They were diluted with 0.19% KCl and analyzed for Na using atomic absorption spectroscopy.

Values ranged from over 6,000 mg/kg to less than 250 mg/kg. Analysis of variance showed significant differences in Na levels ($P = .001$) due to both factors, with the greater effect due to boiling treatment. A Duncan's test (salted means excluded) showed the 0 and 1-egg levels significantly lower ($P < 0.05$) in Na than higher egg levels. In all instances, pasta shells boiled in distilled water had lower Na than those in tap water. Analysis of local tap water showed 152 mg/kg Na. In summary, boiling treatment, egg level, and tap water all affected the Na content of pasta. Samples of wheat varieties from different Experiment Station plots are being collected and analyzed to test the impact of variety and region on the Na content of the flour.

Food Group Analysis of Eating Patterns with Modified Nutrient Analysis Software

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Epidemiological study of eating patterns and disease is limited by our ability to examine food consumed and food patterns. Currently, nutrient analysis software do not allow ready analysis of diets according to the U.S. Dietary Guidelines. For this reason the nutrient analysis program developed at Michigan State University, MSU NutriGuide, is being modified to include analysis of dietary intake by food group along with nutritional intake. The Red Cross Food Wheel was used to define standard food group classifications and serving sizes with the following modifications: 1) fruit and vegetables were classified according to vitamin A and C rich sources ($\geq 20\%$ of USRDA/serving); 2) servings of meat were equal to 3 oz., when not easily identified as a 2-4 oz. serving; 3) the category of "others" was further subdivided to differentiate food sources of fat, sugar and alcohol. In the database for this modified software, all mixed dishes are broken down into major component food groups. The food description by name, default serving, and amount of food consumed by unit are paired with the default food group serving as defined in the database to calculate the total number of different food groups consumed. This computerized food grouping system will enhance the investigation of eating patterns based on food intake records and the association with nutrient intake, U.S. dietary Guidelines and other epidemiological concerns.

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Discovering the Great Unknown: Describing the Composition of Mixed and Ethnic Dishes Consumed in Clinical Trials - The Modification of Diet in Renal Disease (MDRD) Study.

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The MDRD Study is a nationwide multicenter clinical trial, sponsored by the NIH and HCFA, designed to determine whether the regulating of dietary protein and phosphorus intake to specific levels and/or the reduction of blood pressure to two target levels will reduce the rate of progression of chronic renal disease. MDRD Study participants' diet modifications can be complex and may require significant changes in usual eating patterns. Evaluation of dietary intake is done (in part) through bimonthly three-day food records. Due to the significant differences in nutrients between standard recipes used in the USDA Nutrient Databases and modified mixed items consumed by the MDRD patients, patients are encouraged to include recipes or break down the mixed dishes into separate food items in their food records. Patients are encouraged to weigh foods separately or to provide a volumetric measure or estimate of individual ingredients (percentages) in mixed dishes.

To many patients, food mixtures are "great unknowns" - great to eat and taste but difficult to accurately describe as to preparation method, and individual ingredient identity and quantity. To facilitate patient report of recipes, mixed dishes and ethnic foods for study data, specific educational materials have been developed. Probing lists on ethnic dishes have been generically designed to allow for regional variances in the preparation of these foods and modification of these items to meet study goals. These probe lists, designed for data documentors, suggest open ended questions to document the mixture and encourage the use of volumetric measuring. Other sheets have also been designed to help document difficult to describe but commonly eaten foods such as pizza and convenience foods and to identify preparation methods of many foods. The educational materials used to describe those "great unknown" food mixtures help support the efforts of the dietitian and patient in documenting mixed dishes with the result of more complete documentation and greater accuracy of dietary intake assessment.

Stability of Total Fat, Individual Fatty Acids and Cholesterol in a Total Diet Reference Material

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Levels of total fat, fatty acids, cholesterol and moisture in a total diet control material were monitored for three years to assess the stability of the Se components. The frozen slurry material (moisture: 65%) was formulated from samples of approximately 200 foods obtained from the U.S. Food and Drug Administration's Total Diet Study. The types and amounts of foods selected represent the food intake of the U.S. adult population and were composited in a manner similar to the Standard Reference Material (SRM) 1548 Total Diet available from the U.S. National Institutes of Standards and Technology (NIST). After compositing, homogeneity of the mixture was assured. Levels of individual fatty acids were determined at regular intervals by a validated gas-liquid chromatographic method. Cholesterol (23mg/100g food) was determined by gas chromatography while total fat (6g/100g food or 28% of calories) was measured after acid hydrolysis. Accuracy of measurements was assured by

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repeated analyses of NIST SRM's and in-house control materials. Results indicate no significant changes in levels of fatty acids, total fat, cholesterol, or moisture during the duration of the study. This study indicates that a wet basis frozen diet material can be used to monitor accuracy in total fat, fatty acid, and cholesterol analyses in diet composites.

The Development and Application of a Carotenoid Database for Fruits, Vegetables and Multi-Component Foods Containing Fruits and Vegetables

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The study of the association between the dietary intake of carotenoids and cancer requires accurate and current food composition data for specific carotenoids in foods customarily eaten in the United States. In order to develop a database with values for the five most common carotenoids in over 2300 foods, including fruits, vegetables, and multi-component foods, a systematic approach was used. First, the quality of published carotenoid data for 120 fruits and vegetables was evaluated using an expert artificial intelligence system based on the following criteria: analytical method, quality control, sampling strategy, sample handling, and number of samples analyzed. Acceptable carotenoid values for each food were used to compute median values. Next, these values were combined with the National Nutrient Data Bank Recipe file to calculate the carotenoid values for individual and multi-component foods as consumed by the U.S. population. As an illustration of a possible application of the database, these data were combined with food consumption data from the Continuing Survey of Food Intake by Individuals, 1986, to rank foods by their contribution to the intake of specific carotenoids (alpha-carotene, beta-carotene, beta-cryptoxanthin, lycopene, lutein) by women aged 19-50 years. Our results indicate that carrots, cantaloupe, and broccoli contribute 24.3%, 6.2% and 4.8%, respectively, of beta-carotene consumed by this population.

Adjusted Consumption of Meat, Poultry and Fish, Vegetable, Grain, and Milk Products: Inclusion of Ingredients from Food Mixtures

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In the Nationwide Food Consumption Surveys, food mixtures are grouped on the basis of their main ingredient. For example, meat loaf with tomato sauce is categorized as a "meat poultry and fish" mixture; pizza is categorized as a grain-based mixture. In the NFCS 1987-88, meat poultry and fish mixtures accounted for 45% of total meat poultry and fish consumption; grain mixtures accounted for 30% of total grain consumption. The ability to provide data on the specific ingredients or agricultural commodities consumed in food mixtures is increasingly important. Using newly developed grouping capabilities, HNIS has disaggregated meat-based and grain-based mixtures into their ingredients, adjusted "recipe weights" to quantities of ingredients actually consumed, and reaggregated mixture ingredients into their respective food groups. Most of the ingredients from meat-based and grain-based mixtures are from one of these major groups: meat poultry and fish, grain, milk and milk products, and vegetables. Total consumption of each of these groups has been adjusted to include the contribution made by ingredients from meat-based and grain-based mixtures.

Estimation of U.S. Commodity Ingredient Consumption Using an Ingredient Analysis

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System: Poultry as an Example

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Nationwide Food Consumption Survey (NFCS) results can be used to estimate consumption of commodity ingredients consumed alone and to estimate total consumption of mixtures. However, consumption of commodity ingredients from mixtures cannot be directly estimated using NFCS results. We have developed detailed recipes for NFCS items to allow estimation of commodity ingredient consumption. Using NFCS results directly, the per capita consumption of poultry is 25.3 g/day and the mean consumption of poultry by poultry eaters is 122 g/day. Using our ingredient analysis system, we have estimated the per capita daily poultry consumption from all sources to be 32.40 g. Ingredient-based analysis of the NFCS allows development of important consumption estimates not obtainable by direct analysis of NFCS results.

Food Acculturation of Asian Indians at Oklahoma State University

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This study investigated the level of food acculturation of Asian Indians residing in Stillwater, Oklahoma. The objectives of the study were (a) determining the meal patterns and level of food acculturation; (b) determine the level of nutritional awareness; (c) changes in the consumption patterns; (d) identify the nutrition education needs for short- and long- term.

A questionnaire was administered to Asian Indians and faculty to determine to what extent food consumption patterns have changed during their residence in the U.S. From the 103 questionnaires administered, 36 (35%) usable surveys were tabulated. Data indicated that respondents were predominantly graduate students, over 50% were married and lived in the U.S. over three years. Approximately 50% of the respondents had children in grades K-12, and over 47% lived in the married student housing. Over 80% of the respondents were non-vegetarian, and over 45% consumed meat at least twice a week. Over half of the respondents indicated that they dined out at least once a week, while 83% preferred Italian and 75% preferred Mexican cuisine. Over 41% indicated that received nutrition information from newspapers and magazines, and over 52% dietary information from television.

There were significant changes in their meal patterns and consumption frequency of foods, namely converting from a vegetarian to non-vegetarian diets. Seventy five percent of the respondents were Hindus, and did not consume beef, pork, sea food or alcohol. A small group of respondents indicated that they consumed both beef and pork while in India and the U.S. The food habits, cultural influences, point of purchase information, friends, and general nutritional awareness strongly enhanced food acculturation. The married students indicated their meal patterns and food choices changed immediately when joined by their spouse and children.

Results of the chi-square analysis indicated an association between demographic profiles, e.g., age, gender, native states, marital, education of spouse, children and religion with meal and consumption patterns at $p < 0.05$ level of significance of the test.