Technical Issues in Calculating Calories: Introductory Comments

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This session deals with questions related to the prediction of the energy value of foods. An accelerated interest in dietary fiber is associated with the increased emphasis on the relationships between foods and health. The introduction of many new ingredients which contribute to food taste, texture or structure introduces uncertainty to the applicability of analytical methods. As methodology evolves to more accurately describe the indigestible components of foods, newer and more precise methods of prediction of the energy values of foods will be introduced. In the meantime, incremental changes in the manner in which the food factors are used to predict energy value will maintain the accuracy and usefulness of the databases. The traditional methods of predicting the energy value of foods (Merrill and Watt, 1973; Allison and Senti, 1983) are sound and can be used quite successfully while the means to apply the newer chemical techniques are developed.

During a time of gradual change in methods used to predict the metabolizable energy (ME) value of foods, it is comforting to know that there is little question that ME is the most appropriate term to describe the potential energy value of foods for humans. Although periodic questions are raised about the applicability of ME as the appropriate expression of energy value, these questions are nearly all based on studies with rapidly growing farm animals or rats and have little applicability to foods for humans. Donato (1987), for example, described results of a study (Donato and Hegsted, 1985) with growing rats which showed the efficiency of growth from added fat was greater that from added sucrose. They suggested that if the usual values are assigned to sucrose, the value assigned to fat should be about 11 kcal/g. That suggestion was most unfortunate, because it is both misleading and irrelevant for human foods. It is misleading because the actual ME is far lower than that, and the net energy value, lower still. It is irrelevant because the human uses less than 2% of lifetime energy intake for growth and in excess of 98% for maintenance.

It is well known that ME is used with widely varying efficiency during rapid growth, and systems accounting for this variation in the efficiency of use of ME in producing farm animals have been used successfully for nearly a century. Studies with both animals and man also show only negligible variation in efficiency of energy use for maintenance. There is thus little reason to lack confidence that the ME value of foods adequately describes the energy potentially available from the human food supply. Questions remain about the effects of food composition on body composition and energy use. The magnitude of variation, however, is likely very small. In this session we will hear discussions of current research on energy metabolism of humans

and also discussions of specific examples of the use of Atwater's factors in computation of energy value and of the need to develop new procedures in response to of the increased use of methods for the direct determination of carbohydrate in foods.

References

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