This Week's Citation Classic

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Miller D S & Bender A E. The determination of the net utilisation of proteins by a shortened method. *Brit. J. Nutr.* **9**:382-8, 1955.

A biological method for evaluating the nutritive value of proteins is described to replace the tedious N balance technique (3 proteins assayed in 7 weeks) by one based on rat carcass analysis (7 proteins assayed in 1 week) which gave comparable results. Values are given for a wide range of proteins and an example is provided whereby the limiting amino acid of a protein may be established. [The *SCI*® indicates that this paper has been cited 165 times since 1961.]

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"This paper was written at a time when concern about the world food problem led to the belief that a protein shortage was by far the most important factor. We thought that a simple technique for measuring protein quality was essential to be able to prescribe diets for the newly described deficiency disease kwashiorkor. The food industry over the last 20 years has produced a range of new protein foods, many from novel sources, and our method has been used to evaluate the products. In addition the method was used to establish the relationship between amino acid composition and the efficiency of protein utilisation.

"However, it is now clear that it is of little practical value to study protein in isolation from the rest of the diet. The efficiency of utilisation of dietary protein is less influenced by its amino acid composition than by the energy value of the diet, and kwashiorkor is now realised to be due as much to energy deficiency as to protein deficiency. Thus an undernourished child in a developing country is katabolisihg protein because he is energy deprived; whereas a child in our affluent society is doing the same thing because he is eating a high protein diet. Adults in N equilibrium are by definition using all their protein for energy purposes. In none of these cases is the biological value of protein of much practical significance to the individual.

"Thus it may fairly be claimed that this paper contributed to the mythical concept of a world-wide protein gap and to the misplaced industrial effort of producing odourless, tasteless, amorphours powders of high nutritive value that no one wanted to eat.

Nevertheless the method is still the most theoretically sound way of assaying the nutritive value of proteins and has contributed to our understanding of the factors influencing N balance. Perhaps it was a necessary if agonising step to comprehend that in order to avoid malnutrition one needs simply to provide enough of a traditional diet. Food should also be good to eat since unconsumed diets have no nutritive value."