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1. Biological value of protein

Biological value of protein is the direct measures of the proportion of the food protein which can be utilized by animals for synthesizing body tissues and compounds, and may be defined as proportion of absorbed nitrogen which is retained by the body.

Biological value of protein is the measure of the proportion of absorbed protein from a food which becomes incorporated into the proteins of the organism's body. It captures how readily the digested protein can be used in protein synthesis in the cells of the organism.

It has been also define as the percentage of absorbed nitrogen, as protein is a main source of nitrogen, and complete evaluation of the dietary protein includes measurement of the biological value and digestibility. Karl Thomas was the first to use this term 'biological value'. The assessment is conducted in which nitrogen intake and urinary, and fecal excretions of nitrogen are measured along endogenous fractions in these two materials.

2. Methods of accessing protein quality

- a. Net protein utilization
- b. Protein efficiency ratio
- c. Net dietary protein energy ratio
- d. Net protein ratio
- e. Biological value
- f. Microbiological assays

Net protein utilization: it is the proportion of food nitrogen that is retained in the body under standard conditions. It is the product of digestibility coefficient and biological value divided by 100. Like biological value, net protein utilization estimates nitrogen retention but in this case by determining the difference between the body nitrogen content of animals fed no protein and those fed a test protein. This value divided by the amount of protein consumed is the net protein utilization which is defined as the percentage of the dietary protein retained. Since both net protein utilization and biological value are based upon estimates of retained nitrogen, they should measure same thing except that in the calculation of net protein utilization the denominator is the total protein eaten whereas for biological value, it is the amount absorbed.

Protein efficiency ratio: it was the first method adopted for routine assessment of the protein quality of foods. It is assessed by taking the weight gain of the test subject and divide it by the test subject's intake of a particular protein during the testing period. This method was first developed by Osborne Mendel and Ferry in 1919. It is defined as weight gain per gram of protein intake.

Net dietary protein: this method is a modification of protein efficiency ratio. It was developed to express the protein content of food in terms of percentage of energy provided by the protein. This method accounts for the maintenance need of the animals

Net protein ratio: this method of testing was introduced by Bender and Doell in 1957. It is an allowance made for the protein requirements and also for maintenance. It is calculated by adding the loss in weight of the test group and dividing the total weight quantity of protein in grams consumed by the test groups

Microbial assays: these methods were first used to assay amino acids after acid hydrolysis of the protein, but they have also been used for determination of available amino acids and for assay of protein quality. The most common used microbes for assessing protein quality are streptococcus zymogens, Tetrabymena pyriformis.

References

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