ISHAKA OGHENERO

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1. What do you understand by the term ‘biological value of proteins’

Biological value is a 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. Proteins are the major source of nitrogen in food. The biological value of protein is an expression of a number of the nutritional characteristics of the food. These include, the digestibility, the availability of the digested products, the presence of the various essential amino acids. The biological value can be calculated by determining the nitrogen of the food intake minus the urinary and fecal nitrogen excretions.

1. List and explains the various methods of assessment of protein quality

* Biological Value(BV): Biological value is defined as a method of choice for estimating the nutritive value of proteins. It has been defined as the ‘percentage of absorbed nitrogen retained in the body’ and a complete evaluation of the dietary protein includes measurement of the Biological Value and Digestibility. These values are obtained by measuring the fecal and urinary nitrogen when the test protein is fed and correcting for the amounts excreted when a nitrogen-free diet is fed. True digestibility is defined as the percentage of food nitrogen absorbed from the gut.
* Net Protein Utilization(NPU): Like Biological Value, NPU 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 NPU which is defined as the “percentage of the dietary protein retained”. Since both NPU and BV are based upon estimates of “retained nitrogen”, they should measure the same thing except that in the calculation of NPU the denominator is the total protein eaten whereas in the calculation of BV it is the amount absorbed. BV would be expected to be higher than NPU by the amount of nitrogen owing to lack of digestibility (lack of absorption)
* Amino Acid Score: It was originally proposed that since all amino acid must be present at the site of protein synthesis in adequate amounts if protein synthesis is to proceed, a comparable deficit of any amino acid would limit protein synthesis to the same degree. Thus, they suggested that if the composition of an ‘ideal protein’ was known i.e a protein which contained very essential amino acid in sufficient amounts to meet requirements without any excess, then it should be possible to compute the nutritive value of a protein by calculating the deficit of each essential amino acid in the test protein from the amount in the ‘ideal protein’. The most limiting amino acid, the one in greatest deficit, would probably determine the nutritive value.