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'BIOLOGICAL VALUE OF PROTEINS;

The biological value (BV) of a protein is an expression of a number of the nutritional characteristics of the food. These include the digestibility, the availability of the digested products, and the presence and amounts of the various essential amino acids.

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 the 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 the intake of nitrogen is retained the protein will support growth if sufficient calories are available, with biological values of less than seventy , questionable growth occurs.

The BV of a food varies greatly, and depends on a wide variety of factors. In particular the BV value of a food varies depending on its preparation and the recent diet of the organism. This makes reliable determination of BV difficult and of limited use. BV provides a good measure of the usability of proteins in a diet and also plays a valuable role in detection of some metabolic diseases. BV is, however, a scientific variable determined under very strict and unnatural conditions.

2] EXPLAIN THE VARIOUS METHODS OF ASSESSMENT OF PROTEIN QUALITY.

1] Net Protein Utilization (NPU)

NPU estimates nitrogen retention but can also be applied 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 lost owing to lack of digestibility.

2] Amino Acid Score

A protein which contained every 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 presumably determine the nutritive value. Amino Acid Scores have been widely used since that time. Generally they have been calculated as the percentage of adequacy.

Since these three proteins differ substantially in amino acid composition, this suggestion has led to confusion in the calculation of Amino Acid Scores. They also suggested that the ratio of essential amino acid nitrogen to total nitrogen (E/T) was related to, and might be a determinant of, protein quality.

3] Protein Efficiency Ratio (PER)

Protein Efficiency Ratio (PER) has been the method most widely used because of its simplicity. It is known that the PER for any protein is dependent upon the amount of protein incorporated in the test diet. Standardized conditions have therefore been proposed. The PER is calculated as the average total weight gain divided by the average grams of protein consumed. Since PER in various laboratories was not constant for the same protein, it was recommended that a corrected value be calculated using an assumed PER of the standardized.

4] Net Protein Ration

A major criticism of the PER has been that it does not take into account the protein required for maintenance since only gain in weight is used in the calculation. Net Protein Ratio (NPR) was then calculated as the overall difference in gain (gain in weight of the test group plus loss in weight of the protein-free group) divided by the protein eaten. It is apparent that if body composition is constant, this procedure is identical to NPU except that it is expressed in arbitrary units which are less useful than the percentage of protein utilized.

5] Nitrogen Balance Index

Value is the slope of the regression line relating nitrogen balance and nitrogen intake and suggested that this might have certain advantages in practice over the usual method of determining BV. The concept of this index is rather similar to Relative Nutritive Value discussed above. Since it is becoming increasingly clear that nitrogen retention is not linearly related to nitrogen intake in the region of intake below maintenance, the validity of this index requires confirmation.