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1. What do you understand by the term “biological value of proteins” .
2. List and explain the various methods assessment of protein quality.

**ANSWER**

1. Biological value of protein is a measure of the proportion of absorbed protein from a food which becomes incorporated into the protein of the organism’s body. It captures how readily the digested protein can be used in protein synthesis in the cells of the organisms. Proteins are the major source of nitrogen in food. Biological value assumes protein is the only source of nitrogen and measures the proportion of this nitrogen absorbed by the body which is then excreted. A ratio of nitrogen incorporated into the body over nitrogen absorbed gives a measure of protein usability which is the biological value. Unlike some measures of protein usability, biological value does not take into account how readily the protein can be digested and absorbed. Biological value uses two similar scales which are;

* The true percentage utilization
* The percentage utilization relative to a readily utilizable protein source.

1. The methods of assessment of protein quality are;

* Net protein utilization
* Amino acid score
* Protein efficiency ratio
* Net protein ration
* Nitrogen balance index

1. **NET PROTEIN UTILIZATION** : This estimates nitrogen retention just like biological value but 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”.
2. **AMINO ACID SCORE** : Amino acid scores have been widely used. Generally they have been calculated as the “percentage of adequacy” rather as deficits. The FAO of 1957 recognizing that egg proteins might contain various essential amino acids in excess of the amounts required proposed that amino acid scores be calculated from an amino acid pattern that was based upon estimates of amino acid requirements in man.
3. **PROTEIN EFFICIENCY RATIO**(PER): PER is the most widely used method 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. 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 casein of 2.50. PER has been severaly criticized as a measure of protein quality. The most common critcisms have been that some dietary protein is required for the maintenance of the animal and this is not credited to the protein in the measurement of PER and that body composition may vary and not be an adequate measure of nitrogen retention. PER also has the disadvantage that even under standardized conditions it is reproducible in different laboratories. Corrected PER values showed larger differences between laboratories than the uncorrected values indicating that this correction was not appropriate and of no advantage.
4. **NET PROTEIN RATION(NPR)** : 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 Ration was then calculated as the overall difference in gain 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 unit which is less useful than the percentage of protein utilized.
5. **NITROGEN BALANCE INDEX :** Biological 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 biological value.