

1. 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.

2. Four methods of assessment of protein quality are:

1. Chemical score or amino acid score
2. Net protein utilization (NPU)
3. Protein efficiency ratio (PER)
4. Biological value (BV).

1. Chemical score: It is a measure of the concentration of each essential amino acid in the test protein which is then compared with reference protein (usually egg protein). It is calculated by the formula:

Amino acid score =  $\frac{\text{number of mg of one amino acid per gm of test protein}}{\text{number of mg of the same amino acid per gm of egg protein}} \times 100$ .

2. Net protein utilization (NPU): It is a product of digestibility coefficient and biological value divided by 100. Biological measures of NPU gives a more complete expression (both absorption and retention) of protein quality than the amino acid score. It is calculated by the formula:

$$\text{NPU} = \frac{\text{nitrogen retained by the body}}{\text{nitrogen intake}} \times 100$$

The protein requirement varies with the NPU of dietary protein. If the NPU is low, the protein requirement is high and vice versa.

3. Protein efficiency ratio (PER): The overall quality, i.e. nutritive value of a food protein can be determined with laboratory animal like rat as follows. The gain in weight of young animals per gm of protein consumed is measured and the value obtained is used to determine the protein efficiency ratio (PER) as follow:

$$\text{PER} = \frac{\text{gain in body weight in gm}}{\text{protein ingested in gm}}$$

4. Biological value: Biological value of protein is defined as the percentage of absorbed nitrogen retained by the body and is calculated by:

$$\text{BV} = \frac{\text{nitrogen retained}}{\text{nitrogen absorbed}} \times 100$$

The amount of nitrogen in the diet eaten and in excreta of adult animals are measured and the percentage of nitrogen retained by animals from out of nitrogen absorbed from the diet is calculated. The value thus obtained is the biological value (BV) of the protein.