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Question
1. WHAT DO YOU UNDERSTAND BY THE TERM ''BIOLOGICAL VALUE OF PROTEINS"

2. LIST AND EXPLAIN THE VARIOUS METHODS OF ASSESSMENT OF PROTEIN QUALITY.

<u>**Answers**</u>
1.) I understand that the term "biological value of protein" refers to 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. Proteins are the major source of nitrogen in food.
Biological Value (BV) is a quantity used to evaluate certain foods in terms of the proportion of protein in the food that is both absorbed by the body and then retained for use in the body. Biological Value (BV) is a useful quantity when considering diets and dieting, e.g. for weight loss or muscle gain.

2.) Protein quality is assessed by comparison to a reference protein (egg protein). The following are methods of assessment of protein quality:
   A.) Amino Acid score
   B.) Net protein utilization
   C.) Protein Efficiency ratio (PER)
   D.) Biological Value (BV)

A.) Amino Acid Scoring (AAS): Amino acid scoring provides a way to predict how efficiently protein will meet a persons amino acid needs. This concept assumes that tissue protein synthesis is limited unless all required amino acids are available at the same time and in appropriate amounts at the site of tissue protein synthesis.
- **Chemical Score:** This is based on the chemical analysis of protein for composition of essential amino acids which is then compared with a reference protein (egg protein). The chemical score is defined as the ratio between the quality of the most limiting essential Amino acid in the test protein to the quality of the same amino acid in egg protein.
- $Chemical\ score = \frac{Mg\ of\ limiting\ amino\ acid\ (g\ test\ protein)}{Mg\ of\ same\ amino\ acid\ (g\ egg\ pro)}\ X\ 100$

B.) Net Protein Utilization (NPU): It is considered of more practical value because it is the product of biological value and digest ability coefficient divided by 100. In exact terms, it is the proportion of ingested protein that is retained in the body under specified conditions for the maintenance and growth of the tissues.
- In other words, NPU can be referred to as the product of digestibility coefficient and biological value divided by 100.
i.e $NPU = \frac{Nitrogen\ retained\ in\ the\ body\ X\ 100}{Nitrogen\ intake}$
- In calculating protein quality, 1g of protein is assumed to be equivalent to 6.25g of nitrogen.
- Total protein requirements varies with the NPU of dietary proteins.

C.) Protein Efficiency ratio (PER): it is the simplest method. It measures the weight gain of a growing animal with reference to its protein intake. A high PER (>2.5) assigned to proteins that are efficient at promoting growth e.g Animal protein.

- Major source of error in this method is the use of weight gain per se as sole criterion of protein value. It also does not include protein required for maintenance.
- $PER = \frac{Gain\ in\ body\ mass\ (g)}{Protein\ intake\ (g)}$

D.) Biological Value (BV): Biological value is defined as the percentage of absorbed Nitrogen retained by the body.

- $BV = \frac{Nitro\ retained}{Nitrogen\ absorbed}\ X\ 100$