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DEPT- MEDICAL LAB SCIENCE

MAT N0- 18/MHS06/004

COURSE- BCH 204

1. WHAT DO YOU UNDERSTAND BY THE TERM "BIOLOGICAL VALUE OF PROTEINS
2. LIST AND EXPLAIN THE VARIOUS METHODS OF ASSESSMENT OF PROTEIN QUALITY.

Biological value (BV) 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. BV assumes protein is the only source of nitrogen and measures the proportion of this nitrogen absorbed by the body which is then excreted. The remainder must have been incorporated into the proteins of the organisms body. A ratio of nitrogen incorporated into the body over nitrogen absorbed gives a measure of protein "usability" – the BV.

Protein efficiency ratio (PER)

Net protein ratio (NPR)

Net protein utilization (NPU)

Slope ratio assays

Protein efficiency ratio (PER)

Protein Efficiency ratio (PER) is the most accepted method which was standardized to provide casein control diet or test diet to weanling rats. Both diets contain 10% protein each and were provided for 4weeks. This technique required measuring weight gain in grams per grams of protein consumed (Schaafsma, G., 2005). The measured weight gain is compared to the standard value of casein. In humans the protein requirements are mainly dominated by maintenance requirements and not by growth. This method fails to measure the requirements for maintenance requirements. Also, there is an 50% growth requirement difference for sulphur containing amino acids between human and rats as rats requires more to develop fur

Net protein ratio (NPR)

Net protein ratio (NPR) was proposed to overcome limitation offered by PER assay. NPR was designed by Bender and Doell (1975) which included second group of animals on a protein free diet, requires 10-14 days to perform. They assumed that protein required preventing weight loss for animals on protein free diet is the amount/measure required as maintenance requirements for animals (Hoffman et al, 2004).

Net protein utilization (NPU)

Net Protein Utilisation (NPU) utilizes body nitrogen instead of body weight. This involves NPU equivalency to biological value and protein digestibility. It was recognised by many researchers such as Bodwell that using human bioassay to determine NPU was a good standard. Data collected from this method can be further compared to various rat assays. He concluded that when data from human (primary assay) and rat (secondary assay) on same proteins were compared, the results did not show a close relationship between protein qualities achieved from either of the two assays. More researches are required to supplement the lack of data incurred between the primary assay and secondary assay. Net protein utilisation is calculated from the amount of nitrogen ingested and measuring the retention of absorbed nitrogen.

Slope ratio assays

Slope ratio assay or the relative nutritive value (RNV) assay involves feeding test proteins to rats for approximate three weeks at three levels (each protein limiting) and a zero protein level. Lactalbumin is used as the control protein. Using regression lines analysis, body weight to protein intake are determined and compared to control protein. Protein quality is reported in percentage of the control lactalbumin. Many assays use micro-organisms and proteolytic enzymes to assess the protein quality