**NAME:EKEH CHERECHI**

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1)- EXPLANATION OF THE TERM "BIOLOGICAL VALUE OF PROTEINS"

*Biological value (BV) is the most common measurement 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. Unlike other kinds of measurement the (BV) measurement takes place in the body of a human being. After the consumption of protein on an empty stomach the measurements take place to determine the amount or balance of nitrogen in the body which in other words is how much nitrogen remains in the body and how much is excreted, since protein is a producer or nitrogen .*

*The biological value can be calculated by determining the nitrogen of the food intake minus the urinary and fecal nitrogen excretions by the formula:*

***BV = Dietary N - ( Urinary N + Fecal N ) Dietary N - Fecal N × 100***

**2)-** EXPLANATION OF DIFFERENT ASSESSMENTS METHODS OF PROTEIN QUALITIES

*There are many ways of estimating protein qualities and they are:-*

* *Biological Value (BV)*
* *Net Protein Utilization (NPU)*
* *Amino Acid Score.*
* *Critique.*

*BIOLOGICAL VALUE*

* Biological Value (BV) :*Biological value, as defined by Thomas (4) and Mitchell (5,6) has long been considered the method of choice for estimating the nutritive value of proteins. 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 a nitrogen-free diet is fed. True digestibility is defined as the percentage of food nitrogen absorbed from the gut .*

*Amino Acid Score ;Block and Mitchell (17) originally proposed that since all amino acids must be present at the site of protein synthesis in adequate amounts if protein synthesis is to proceed, a comparable deficit of any amino acid would limit protein synthesis to the same degree. Thus, they suggested that if the composition of an "ideal protein" was known, i.e., 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.*

Critique**:**

As has been stated, the use of estimates of protein quality to calculate the amount of protein needed to meet requirements when different diets are consumed requires that the estimate of quality vary in some known fashion, preferably in linear fashion, from zero to 100% utilization. Actually, when Block and Mitchell (17) first proposed the use of Amino Acid Scores (Fig. 1), they found that Biological Value did not follow the predicted relationship with Amino Acid Score. Rather, the regression line relating BV and Amino Acid Score indicated that proteins completely lacking an essential amino acid and which would therefore have an Amino Acid Score of zero would apparently yield a BV of approximately 25% This would mean that the requirement could be met with such proteins if they were fed at a level providing four times the estimated minimal protein requirement. This presumably cannot be true since it would imply that the protein needs could be met without a supply of all of the essential amino acids. This apparent discrepancy between theoretical predictions and experimental data has been largely ignored. Indeed, the FAO Committee of 1955 simply assumed that the relationship must fit theoretical expectations. Figure 2 is taken from that publication. Obviously with the scatter of the data available on BVs and uncertainties as to the amino acid composition of the proteins actually tested for BV, the true relationship was difficult to ascertain. However, it now seems quite clear that the relationship proposed by Block and Mitchell is, in fact, substantially correct. The values presented in Table 1 are plotted in Fig. 3 to show the relationship between BV and Amino Acid Score. The regression line calculated indicates that a protein of zero score would be predicted to have a BV of 40%. If BV is to be accepted as the true measure of protein quality, then proteins of zero score should be capable of meeting protein needs if they are fed in amounts 2½ times greater than that required with egg protein. Comparison of NPU and Amino Acid Score values taken from Table 1 shows essentially the same relationship though with somewhat less deviation from expectation. According to this plot, a protein of zero score yields an NPU of approximately 25%. Thus, if NPU be accepted as the true measure of protein quality, protein needs can be met by feeding proteins of zero score at 4 times the minimal requirement.

Net Protein Utilization (NPU) ;

This is like the Biological Value, NPU estimates nitrogen retention but 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". Miller (12) proposed a procedure which involved replicate groups of 4 weanling rats housed in group cages which were fed either the "protein-free" or the "test" diet for 10 days. These conditions were chosen empirically and the particular merits of these conditions remain to be demonstrated. Since in young animals there is a high correlation between body nitrogen and body water content (13-16), the substitution of body water measurements for body nitrogen measurements has been widely used. Indeed, measurement of body water may be more accurate than measurement of body nitrogen because sampling errors are eliminated; it is much more convenient and less expensive.