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# Regulatory loophole results in protein spiking and incorrect declarations

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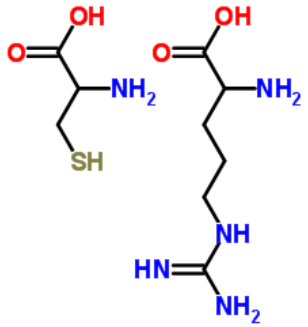
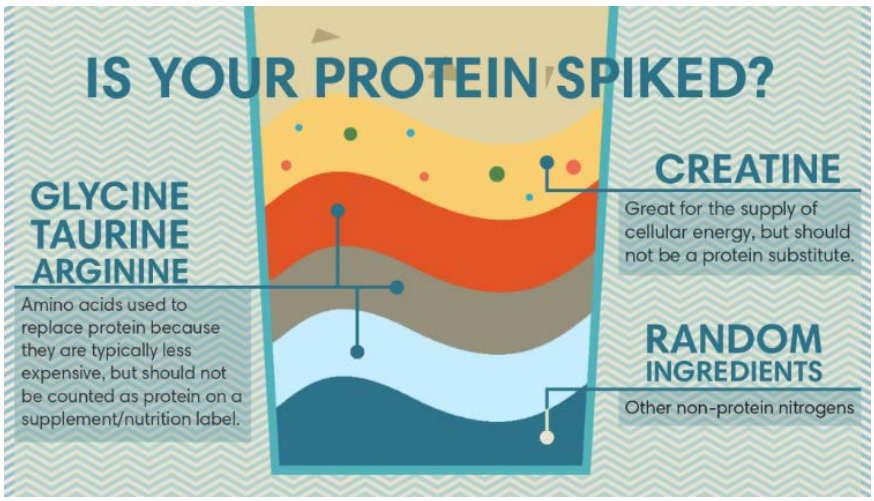
Determining the nutritional data for food labels is not as easy as a lay person might expect. The methods used to analyse and calculate the nutritional values are strictly regulated by the food authorities. The methods of analysis are prescribed for fat, protein and fibre, but not for carbohydrates. However, the carbohydrate content has to be calculated by subtracting the analysis values for fat, protein, fibres, ash (minerals) and water from the total. Because chemical analysis may have tolerances of up to +/-10% or more it becomes clear that nutrition facts cannot be looked upon as precisely as a cake cut into several pieces fitting accurately into one whole. It is rather like cutting pieces from several cakes and trying to put those together to form a new cake and only approximately fitting together as one whole.

Now, regarding the declaration of protein content in food, regulatory bodies demand that manufacturers must use the so-called Kjeldahl method to analyse nitrogen (N), because it can be assumed that protein is the main source of the nitrogen in organic substrate detected by this method. The conversion from nitrogen to protein depends on the type of protein and in particular on its amino acid composition because some amino acids contain more nitrogen than others. For example, cysteine contains only one N atom whereas arginine contains four N atoms (see picture). Typical conversion factors, known as N factors, for foods are around 6.38 for dairy, 6.25 for meat, eggs, and corn, 5.83 for most grains, 5.70 for wheat flour and 5.46 for peanuts. So far, so clear. However, the regulatory prescription dictates that a single factor of 6.25 for nitrogen to protein conversion be used regardless of the protein source! The rationale for this is based on the assumption of an average, varied and balanced diet having a mixed protein profile as typically recommended.




It is obvious that, using this assumption, the protein content on product labels of dairy is underestimated and that of plant proteins is overestimated. The situation is particularly irritating because in processed food, the precise protein content of the ingredients is mostly known, either by using accurate nitrogen conversion factors, or by means of other methods such as hydrolysis of a protein and analysis of its amino acid contents using accurate methods (e.g. HPLC). However, due to mentioned regulatory restrictions an obviously less accurate protein value has to be declared on the label!




Furthermore, the current method of determining protein content via nitrogen conversion results in a legal loophole because it does not specify what the source of nitrogen should be. The current situation allows protein content to be calculated from any source of nitrogen, including non-protein sources, such as creatine, glycine, taurine and other non-proteinogenic amino acids. Of course, as explained above, “spiking” protein powders with non-proteinogenic nitrogen sources results in higher protein values in the nutrition information table than is actually present. This is not an issue particular to the sports nutrition market, but affecting the food industry more broadly as protein consumption became mainstream, and using the EU-approved health claims for growth and maintenance of muscle mass is an attractive marketing argument.

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In conclusion, regulatory bodies should define that only proteinogenic nitrogen sources are authorised to be considered for analysis, and consequently for the calculation of protein content, in order to reflect true protein content. However, for the same reason it must also be possible to use specific known nitrogen conversion factors for particular protein sources. Referring to the formulation of a finished product should also be possible in order to, for example, take into account a higher or lower nitrogen content of added amino acids - as long as an amino acid is proteinogenic. Such measures would inhibit the emerging protein spiking fraud as recently seen in the US, as well as giving more correct nutritional information to consumers.


At SPONSER® we consider strictly the legally compulsory conversion factor of N x 6.25, and where applicable, add the weight of proteinogenic amino acids potentially added to the formulation, since this will not falsify the result due to various nitrogen content of a specific amino acid. All non-proteinogenic amino acids (e.g. arginine, ornithine, citrulline, beta-alanine) and other nitrogen sources (e.g. taurine, creatine), however, are not considered for protein calculation. This procedure reflects the most realistic protein content, though still within given biological and analytical variations like it is the case for any food label.