EUVEPRO

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EUVEPRO comments on Item 2 of the CCMAS37 Agenda "Matters Referred by the CODEX ALIMENTARIUS COMMISSION and other Codex Committees" – issue of conversion factor

EUVEPRO is the European Vegetable Protein Association, representing the interests of manufacturers and distributors of vegetable proteins for human consumption (food) in the European Union.

As Codex Observer we would hereby like to submit comments on

- *the assessment of the appropriateness of the use of the conversion factor of 5.71 to determine protein content in soybean products in general*

- *the accuracy and appropriateness of 5.71 as the nitrogen factor for soy protein isolates used in formula for infants and young children and to take into account the amino acid profile of the isolate*

EUVEPRPO calls for the continued use of N x 6.25 for the determination of soy protein content. We are concerned that the proposed use of N x 5.71 as the nitrogen to protein conversion factor for soy instead of the widely accepted N x 6.25 factor represents a departure from:

1. Current Codex Standards 175-1989 Codex General Standard for Soy Protein Products, 174-1989 "Codex General Standard for Vegetable Protein Products, and CAC/GL 2-1985 "Guidelines on Nutrition Labelling" (as amended by the 29th Session of the Commission, 2006),
2. The guidance of globally recognised scientific organisations such as AOCS, AACC and ISO, and
3. Member country government regulations (for example, Argentina, Brazil, China, the European Union, India, Japan, Korea, and the United States).

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The change to N x 5.71 would have a significant negative impact on the perception of soy as a nutritious and high-quality protein: It results in an almost 10% reduction in the calculated protein content of soy products without any change to the composition of the product. This would have serious repercussions on isolated soy protein as a food ingredient – it would no longer meet certain product requirements, may disappear from ingredients lists, could result in expensive formula changes, and create significant extra costs to manufacturers due to the resulting changes to the food labels.

One example of a food category issue would be soy protein based infant and follow-on formulae, for babies and children that cannot tolerate mother's or cow's milk, which in the European Union can only be derived from soy protein isolates. With a change in protein conversion factor to 5.71, soy protein isolates will no longer meet the Codex Standard and as a result, this category of foods could no longer be produced.

Also, and very particularly, the choice of 5.71 as the conversion factor for soy proteins is based on old analytical data that (a) only recognizes some of the protein moieties that are actually present in soy beans, and (b) is based on Kjeldahl and combustion methods, rather than the more accurate analysis of amino acids that is currently recommended (FAO, 2003, for example).

The calculation of the amount of protein in foods is typically performed using the conversion factor N x 6.25 which allows for international harmonisation in the expression of protein levels. A move towards unique factors for dairy proteins and soy proteins would, for consistency, also require the definition and application of unique conversation factors for all dietary proteins – a burdensome, costly and, from a trade and regulatory angle, impractical exercise.

EUVEPRO appreciates the very detailed AOCS "Position on the Nitrogen Conversion Factor for Soy Protein" and the provision in this document of data on the use of amino acid contents as a basis for more accurate determinations of conversion factor for soy protein. EUVEPRO fully supports the comments made by AOCS in this paper.

<u>Annex:</u> Scientific and Regulatory Arguments + References

<u>Annex</u>

Scientific and Regulatory Arguments

<u>What is the origin of 6.25 ?</u>

The Kjeldahl method, the modified Kjeldahl method, and the combustion method (known as the Dumas method) are commonly used for analytical measurement of protein. These methods measure protein in foods indirectly by assessing the quantity of nitrogen that can be released from a protein and captured as ammonia. Nitrogen from all nitrogenous compounds, including proteins and non-protein material, are typically included in this total. In the early 1880s, when the Kjeldahl method was invented, proteins readily available for testing (serum albumin and globulin from blood, casein from milk) contained about 16% nitrogen. Dividing 100 by 16% gave a nitrogen conversion factor of 6.25 and it was believed that this factor applied to all proteins. Although it has since been discovered through further scientific research that few foods contain precisely 16% nitrogen, use of the 6.25 conversion factor for measurement of protein sources has been maintained to allow for a measure of international harmonization in the expression of protein levels.

<u>What is the origin of 5.71?</u>

In 1931 (revised in 1941), USDA scientist D.B. Jones published a report ("Circular 183")[1] which proposed establishing unique nitrogen to protein conversion factors for several foods. Jones reported 5.71 as a more "precise" factor for soy protein. In this Circular[1], Jones hypothesized that not all nitrogen in foodstuffs was protein nitrogen and not all proteins contained 16% nitrogen; therefore, a universal conversion factor of 6.25 was not always appropriate. In support of his theory, Jones reported nitrogen contents for several plant and animal proteins from a variety of sources. Jones justified the 5.71 factor for soybeans by stating, **<u>incorrectly</u>**, that the major protein in soybeans is glycinin, a globulin composed of 17.5% nitrogen. From these data, he designated a conversion factor for soy protein of 5.71 (100 divided by 17.5 results in a factor of 5.71).

Glycinin (11S), however, represents only about 31-52% of the total protein in soybeans[2-4]. There are many other proteins in soybeans, including beta-conglycinin (7S), which represents about 35% of the total protein[2-4]. **<u>If one considered only the 7S protein, the nitrogen to protein conversion factor for soy would be as high as 6.45</u>**[3,4]. The ratios of 11S to 7S in soybeans will vary significantly, depending on the soybean variety and differences in seasonal growing conditions[2-4].

<u>What is the Support for 6.25</u>

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The 6.25 nitrogen conversion factor is recognized by Codex Alimentarius as the appropriate conversion factor for determining the protein content of a soy product per the following Codex Standards:

- Codex Standard 175-1989 Codex General Standard for Soy Protein Products[5]
- Codex CAC/GL 2-1985 Guidelines on Nutrition Labelling (as amended by the 29th Session of the Commission, 2006)[6]
- Codex Standard 234-1999 Recommended Methods of Analysis and Sampling (as amended by the 30th Session of the Commission, 2007)[7]

Although an exhaustive list of regulations from around the globe was not assessed, the nutrition labeling regulations or regulatory product composition standards for the following countries representing a significant portion of the world's population list 6.25 as the N conversion factor for soy protein:

- Select National and Regional Government Nutrition Labeling Regulations
  - Argentina[8]
  - Brazil[9]
  - China[10] (for soy protein ingredients, isolated soy protein & soy protein concentrate)
  - European Union[11]
  - India[12]
  - Japan[13]
  - Korea[14]
  - Malaysia[15]
  - Mexico[16]
  - South Africa[17]
  - United States[18]

The following globally recognized analytical sciences associations identify 6.25 as an appropriate nitrogen conversion factor for soy in their current official analytical methods:

- American Oil Chemists Society (AOCS)[19-22]
- AOAC[23]
- AACC International (AACC)[24-27]
- International Organization for Standardization (ISO)[28]

Soy is a Source of High-Quality Protein

In addition, soy is a source of high quality plant protein, comparable to meat, milk, and eggs. Numerous nitrogen balance studies found soy protein is comparable to milk and meat in its ability to support N balance[29-34]. The 6.25 nitrogen to protein conversion factor was used by researchers to calculate gram amount for **both** soy and animal-based protein fed to study subjects. Rand, et al., 2003[35] conducted a meta-analysis of nitrogen balance studies that was used to estimate protein requirements for healthy adults and found soy protein is comparable to milk and meat in its ability to support nitrogen balance. Rand et al. stated, "These original soy studies showed clearly that the well-processed soy proteins were equivalent to animal protein, whereas wheat proteins were used with lower efficiency than were animal protein (beef)"[35].

The Protein Digestibility-Corrected Amino Acid Score (PDCAAS) is the currently accepted and validated method for protein quality measurement based on the principle that the nutritive value of a protein depends on its ability to provide amino acids in adequate amounts to meet the requirements of children and adults[36]. The PDCAAS for isolated soy protein and soy protein concentrate is equal to 1.0, comparable to milk and egg proteins[37,38].

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