

Nitrogen Testing and Protein Factors

Crude Protein results in food products are generated from a Total Nitrogen analysis followed by a calculation to convert the nitrogen result to an estimate of the protein level.

At Hill Labs, Total Nitrogen is analysed via a Dumas Combustion Analyser. It is important to note this method will measure all forms of Nitrogen, unable to distinguish its source: proteins and free amino acids; preservatives (e.g. nitrite); and other chemicals and contaminants (e.g. urea, melamine).

The Protein Factor is a simple ratio based on an estimate of the typical amino acid profile in a given food type. Each type of amino acid contains a different proportion of nitrogen relative to an amino acid's total molecular mass (from 7% to 34% nitrogen).

By default, Hill Labs utilises a Protein Factor of 6.25. This value is the average of all food types, however this may not be the most appropriate factor for some food products such as dairy, oats or wheat. These may require a different Protein Factor to be used based on the food's specific amino acid profile. Please refer to a consultant for advice.

References

1. From **FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)**

2.1 ANALYTICAL METHODS FOR PROTEINS IN FOODS

A specific Jones factor for nitrogen content of the food being analysed should be used to convert nitrogen to protein when the specific factor is known. When the specific factor is not known, $N \times$ the general factor 6.25 should be used. Use of the general factor for individual foods that are major sources of protein in the diet introduces an error in protein content that is relative to the specific factors and ranges from -2 percent to +9 percent. Because protein contributes an average of about 15 percent of energy in most diets, the use of $N \times 6.25$ should introduce errors of no more than about 1 percent in estimations of energy content from protein in most diets $([-2 \text{ to } +9 \text{ percent}] \times 15)$.

[furthermore]...It is recommended that only amino acid analysis be used to determine protein in the following:

- foods used as the sole source of nourishment, such as infant formula;
- foods/formulas designed specifically for special dietary conditions;
- novel foods.

2. From **The Association of American Feed Control Officials (AAFCO)**

AAFCO's Laboratory Methods & Services Committee, Moisture Best Practices Working Group, July 31, 2018

FAO & AOCS – 6.25 for soy and vegetable protein products

Dairy industry – 6.38 for dairy products

Milk replacer if dairy based use 6.38; if soy based use 6.25

Wheat – 5.70

Other products – default factor of 6.25