

A STUDY ON PROTEIN NITROGEN AND TOTAL NITROGEN VALUES OF VARIOUS FOOD EXTRACTS

NAOMI P. AUMAN, B.S., AND A. E. O. MENZEL, PH.D., NEW YORK, N. Y.

IN ACCORDANCE with the standardization procedure proposed by Cooke and Stull^{1, 2} for pollen extracts, all pollen and inhalant extracts prepared in this laboratory are standardized on their protein nitrogen basis.* In the case of food extracts, it was formerly believed that protein represented as a rule at least 90 per cent of the total nitrogen value and, therefore, the standardization of food extracts was practiced in previous years on the basis of total nitrogen, because of the greater convenience of this procedure. Doubts as to the validity of this belief arose; when 143 food extracts were analyzed for both protein nitrogen and total nitrogen, these doubts were confirmed.

The results of these 143 analyses are included in a mimeographed list for the benefit of laboratories that may desire to perform protein nitrogen determinations in standardizing food extracts.†

Although the protein nitrogen values of some 30 extracts fell within the range of 90 per cent of their total nitrogen values,‡ this was not the case in the vast majority, where the ratios of these two values were found in a lower range, even as low as 17.9 per cent (rhubarb). Moreover, in some instances, these ratios varied considerably in different preparations of the same extract. Examples in this regard together with some other representative results are given in Table I. Considering such significant variations, which do not allow any constant correlation of the two nitrogen values, it seems quite possible that even other extracts, which in this study appeared to adhere to the "rule of 90 per cent," would fail to do so with any degree of regularity.

CONCLUSION

1. No regular correlation exists between protein nitrogen and total nitrogen values for food extracts and considerable variations in the ratios of these values may even occur in different preparations of the same extract.

2. Food extracts should be standardized on a protein nitrogen basis in the same manner as pollen and inhalant extracts.

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*The term "protein nitrogen" signifies the nitrogen present in the precipitate obtained from an extract sample with the aid of phosphotungstic acid under specified conditions.¹⁻³ Likewise the term "total nitrogen" signifies the entire nitrogen present in an extract sample. The values obtained in either instance are always calculated to the nitrogen content in 1.00 ml. of sample. All determinations of this study were performed in duplicate by a micro-Kjeldahl method based upon Stover and Sandin's⁴ procedure (use of boric acid containing methyl red and methylene blue for the titration step) as recommended by Kabat and Mayer.⁵

†Obtainable upon request from The Institute of Allergy, Roosevelt Hospital, New York 19, N. Y.

‡Among these were barley, lima and navy beans, several fish and shellfish, egg white (but not egg yolk), liver, mustard, rice, turkey, veal, and white wheat extracts.

TABLE I. EXAMPLES OF SOME PROTEIN NITROGEN-TOTAL NITROGEN RATIOS AND EXAMPLES OF VARIANCE OF THIS RATIO IN DIFFERENT PREPARATIONS OF THE SAME EXTRACTS

EXTRACTS	PROTEIN NITROGEN (MILLIGRAMS PER MILLILITER)	TOTAL NITROGEN (MILLIGRAMS PER MILLILITER)	PROTEIN NITROGEN (PER CENT OF TOTAL NITROGEN)
Apple 51*	0.051	0.117	43.6
Apple 54	0.041	0.053	77.4
Apricot 53	0.028	0.110	25.5
Banana 51	0.088	0.103	85.4
Bass 51	0.967	1.607	60.2
String bean 50	0.071	0.134	53.0
String bean 53	0.373	1.110	33.6
Beef 50	0.832	1.094	76.1
Beef 51	0.865	0.939	92.1
Broccoli 52	0.085	0.247	34.4
Cantaloupe 50	0.147	0.202	72.8
Cantaloupe 54	0.075	0.132	56.8
Carrot 50	0.132	0.215	61.4
Carrot 52	0.150	0.314	47.8
Chicken 50	0.824	1.317	62.6
Chicken 53	0.582	0.615	94.6
Chocolate 51	0.342	0.524	65.3
Eel 49	0.384	0.589	65.2
Eel 51	0.561	0.565	99.3
Lobster 52	0.339	0.455	74.5
Cow Milk Whey 53	0.952	1.103	86.3
Cow Milk Whey 54	1.167	1.290	90.5
Onion 50	0.389	0.910	42.7
Orange 50	0.199	0.320	62.2
Pork 51	0.450	0.556	80.9
Sardine 49	0.237	0.819	28.9
Strawberry 52	0.035	0.083	42.2
Tomato 50	0.108	0.201	53.7
English Walnut 51	0.116	0.187	62.0
Whole Wheat 52	0.424	0.475	89.3

*The number following the extract indicates the laboratory number of the preparation.

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