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Total Protein in Several Oat Varieties Grown in Iowa

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Abstract. The percentages of total protein in 14 varieties of hulled and dehulled (groats) oat kernels grown at Ames, Iowa, in 1957 were determined by the Kjeldahl method. The average total protein percentage was approximately 5 percent higher in the groats than in hulled oat kernels.

The kinds and amounts of proteins present are important criteria of quality in oats. The total protein content is influenced by environmental changes and may vary as much as 25 percent from year to year (Frey, 1952). The total protein content in the various parts of the mature oat plant also may vary with the variety and with the availability of nitrogen in the growth medium (Wiggans and Frey, unpublished data; 1958). Most of the nitrogen, when it is limiting in the growth medium, is taken up by the roots and translocated, first into the stem and leaves of the plant and then, at maturity, into the grain.

Materials and Methods

This study was designed to determine the total protein in mature hulled and dehulled oat kernels.[1] Nitrogen was determined by the Kjeldahl method (Official Methods of Analysis, 1950), and then converted to total nitrogen percentage by the factor, x 6.25.

Results and Discussion

The percentages of total protein in 14 varieties of hulled and dehulled (groats) oat kernels grown at Ames, Iowa, in 1957 are shown in Table 1. The average total protein percentage was approximately 5 percent higher in the groats than in the hulled oat kernels. In general, when the total protein percentage was high in the groats it also was high in the hulled kernels of the same varieties, such as Bonham, Cherokee, and Nemaha. Although Clintland oats had the highest total protein percentage in the hulled kernels, it was lower than Bonham, Cherokee, and Nemaha in total protein in the groats. Hulls of Clintland oats apparently retain a larger amount of total protein than do hulls of other varieties. Mo. 0-205 was the lowest of the 14 varieties in total protein percentage in both hulled and dehulled kernels, indicating a relatively lower feed value for the grain of this variety.

[1]Seed samples were provided through the courtesy of K. J. Frey, Iowa Agr. Expt. Sta., Ames, Iowa. Samples were dehulled with a dehuller furnished by the Quaker Oats Company, Chicago, Illinois.

Table 1

Percentage Total Protein in Hulled and Dehulled Oat Kernels Grown at Ames, Iowa in 1957

Variety	Percentage of Total Protein Hulled Oats	Dehulled Oats (Groats)
Bonham	15.06	20.38
Burnett	13.00	17.38
Cherokee	15.19	20.31
Clarion	12.50	17.50
Clintland	16.63	19.56
Clinton	11.81	17.75
Mo. 0-205	10.25	14.00
Nemaha	14.81	20.94
Newton	12.94	18.19
Putnam	12.88	18.06
Richland	11.38	16.31
Sauk	12.81	17.44
C.I. 5961	11.25	17.00
C.I. 7154	12.81	17.44
Average	13.09	18.02

Literature Cited

Association of Official Agricultural Chemists. Official Methods of Analysis. Seventh Edition, 1950.

Frey, K. J. 1952. Variations in the protein and amino acid contents of different oat varieties. Cereal Chem. 29:77-81.

Wiggans, S. C. and K. J. Frey. Unpublished data, Iowa Agr. Exp. Sta., Ames, Iowa.

———. 1958. The ratio of alcohol-soluble to total nitrogen in developing oat seeds. Cereal Chem. 35:235-239.

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