NOTE ON EXPERIMENTAL MILLING EVALUATION OF DURUM WHEAT[1]

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One purpose of experimentally milling durum wheat is to determine the potential extraction of milled products from the sample. The milling quality of durum wheat has traditionally been judged by the percentage extraction of semolina (1), which is a coarse separation of durum wheat endosperm used for making pasta products. Although the primary function of an experimental durum mill is to produce semolina, a considerable amount of durum wheat endosperm is either released as flour or lost in the purification process as dust or dregs (purifier tailings collected before purifier is fully loaded and after feed is shut off). We have developed a technique to calculate the total extraction of milled products from durum wheat, which includes semolina, flour, and usable semolina and flour recovered from the dust and dregs.

MATERIALS AND METHODS

Purifier dust and dregs used in the study were obtained from durum wheat milled on a Buhler mill specially flowed for semolina production. The 34 wheat samples used, which included both varieties and selections, were milled and purified according to Seyam *et al.* (2).

The dust material from each sample was passed through an experimental Buhler flour mill described by Shuey (3). The percentage of usable flour recovered from the dust was determined and used for calculation of adjusted-flour extraction and total extraction.

The purifier dregs were collected in the normal fashion from each sample and again passed through the purifier (2). The percentage of usable semolina recovered was determined and used for calculation of adjusted semolina extraction, percentage semolina, and total extraction. Adjusted semolina extraction was then correlated with the original semolina extraction, total extraction, and percentage semolina.

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RESULTS AND DISCUSSION

The value of semolina which could be recovered from the dregs was established at 87% based on three separate determinations: a) repurification of the dregs, b) sieving of the dregs, and c) grinding of the dregs into flour. The 0.87 coefficient was a conservative estimate of the percentage of semolina in the dregs, since 89.8% semolina was recovered on repurification of the dregs. The adjusted semolina extraction was the percentage recovered from the dregs (0.87 × dregs extraction), plus per cent original semolina extraction.

Purifier dust from the milling and purification of durum wheat was passed through an experimental Buhler flour mill. Eighty-three per cent of the dust was recovered as usable flour and could be included as part of the total extraction. The percentage of flour from the dust (0.83 × dust extraction) plus the percentage of flour actually produced during the milling was the adjusted flour extraction.

The sum of the adjusted extractions for semolina and flour equalled total extraction. Percentage semolina was the ratio of adjusted semolina extraction to total extraction. Table I shows the high, low, range, and mean values of the original and adjusted extraction for semolina and flour, the total extraction, and the percentage of semolina from the 34 durum wheat samples.

The correlation coefficients of adjusted semolina extraction *vs.* original semolina extraction, total extraction, and percentage semolina were 0.97, 0.75, and 0.78, respectively, for the 34 durum wheat samples. The scatter diagram and the regression lines for these statistical relations are given in Figs. 1–3. The adjusted semolina extraction was almost a straight-line function of the original semolina extraction (Fig. 1). Thus, either the adjusted or semolina extraction "as-is" is a good predictor of the potential semolina extraction of a wheat sample compared to a given standard. On the other hand, Figs. 2 and 3 suggest that semolina extraction was not as good a predictor of total extraction or percentage semolina, although highly correlated with both these parameters. The lower correlation coefficients demonstrate the necessity of determining total extraction, since the true milling potential cannot be estimated accurately for the per cent extraction of the semolina. A corollary would be that of trying to predict the total flour extraction from the per cent patent extraction value. These results

TABLE I
Statistical Values of the Original and Adjusted Extractions for Semolina and Flour, Total Extraction, and Percentage Semolina Obtained from 34 Durum Wheat Samples

	High %	Low %	Range %	Mean %
Semolina extraction	60.2	53.4	6.8	57.4
Semolina from dregs	3.5	2.0	1.5	2.5
Adjusted semolina extraction	62.3	55.9	6.4	59.9
Flour extraction	7.7	3.7	4.0	5.8
Flour from dust	11.2	9.0	2.2	9.8
Adjusted flour extraction	18.6	14.0	4.6	15.6
Total extraction	77.8	73.3	4.5	75.5
Percentage semolina	81.2	75.0	6.2	79.3

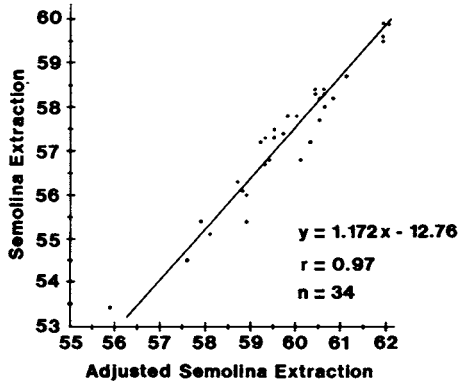

Fig. 1. Relation between adjusted semolina and semolina extraction.

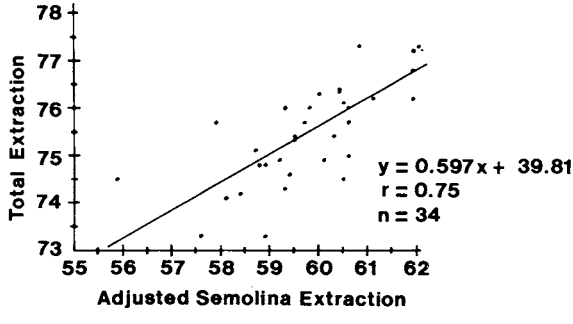

Fig. 2. Relation between adjusted semolina and total extraction.

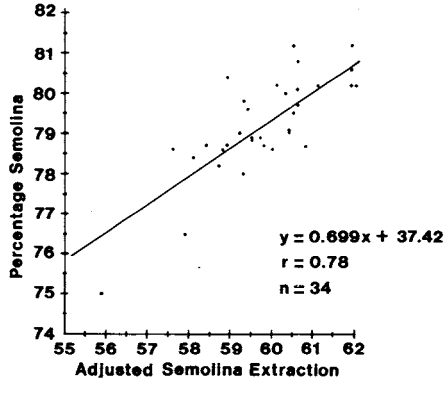

Fig. 3. Relation between adjusted semolina and percentage semolina.

suggest that a greater part of the variation in the total extraction of the durum samples tested was attributable to the flour extraction rather than the semolina extraction. Thus, it is important to determine the total extraction as well as the semolina extraction for evaluation of the potential milling value of durum wheat.

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