The amino acid composition of wheat flours of different quality and their protein fractions separated by an acetic acid fractionation method were determined. Flours milled from the following wheats were used: Jubilejnaja 50, Partizanka, GKF2, Rana 1, Száva. Three protein fractions were separated from the flours: proteins soluble in 1 M NaCl, proteins soluble in 0.1 M acetic acid, and proteins insoluble in 0.1 M acetic acid. The determination of the amino acid composition except tryptophan was carried out from the acidic hydrolysate of protein fractions and of the starting flours by means of a Chinoin Lys 75 type automated amino acid analyzer. Some characteristic differences were found in the amino acid composition of protein fractions in comparison with each other and with the composition of the starting flours. The salt-soluble protein fractions show the most considerable differences by their higher asparatic acid, glycine, alanine, leucine, lysine, arginine, and lower glutamic acid and proline values. The amino acid compositions of the acetic acid-soluble and acetic acid-insoluble protein fractions show more similarity, that is the content of basic amino acids is very low, while glutamic acid and proline are present in very high amounts in both. In the latter ones the proportion of glycine is also relatively higher. Similar characteristic differences were not found among the same types of protein fractions of different flours.

INTRODUCTION

The amino acid composition of wheat and wheat fractions has been studied for a long time. A number of works deal with the characteristics of the amino acid composition of wheat flour protein fractions too. A detailed review is given on this topic by Kasarda /1971/. Most of these studies, and the later ones too, are related to the protein fractions separated mainly by the classical fractionation method of Osborne /e.g. Khan, Bushuk 1979/, or to the botanical constituents of wheat /Jensen, Martens 1983/.
In this paper the amino acid composition of wheat flours of different quality and their protein fractions separated by an acetic acid fractionation method were determined. The aim of the work was to compare the amino acid composition of the protein fractions obtained by different solvents, and to investigate what kinds of differences are found among the amino acid composition of the same types of protein fractions of different flours.

MATERIALS AND METHODS

Flours milled from the following wheats were used: Jubilejnaja 50, Partizanka, GK-F2, Rana 1, Száva. The baking quality of these flours determined by the usual testing methods decreases in the order of their mentioning. Three protein fractions were separated from the flours by the method of Bushuk and Orth /1973/: proteins soluble in 1 M NaCl, proteins soluble in 0.1 M acetic acid, proteins insoluble in 0.1 M acetic acid. The protein fractions were purified by dialysis, then were lyophilized.

The determination of the amino acid composition - except tryptophan - was carried out from the 6 N hydrochloric acidic hydrolysate of the lyophilized protein fractions and of the starting flours by means of a Chinoin Lys 75 type automated amino acid analyzer according to Dévényi /1969/. Tryptophan was determined with p-DAB reaction, by spectrophotometrical method.

RESULTS

The results are summarized in tables 1-4.

CONCLUSIONS

On the basis of the data given in tables 1-4 some characteristic differences can be stated in the amino acid composition of protein fractions obtained by different solvents in comparison with each other and with the composition of the starting flours.

In comparison with the starting flours, the salt-soluble protein fractions have very high asparatic acid, glycine, alanine, leucine and arginine values. The increase of the proportion of threonine, serine, valine and lysine is also considerable, whereas the values of glutamic acid, proline and phenylalanine are lower.

The protein fractions soluble in 0.1 M acetic acid in comparison with the starting flours contain less aspartic acid, threonine, glycine, valine, methionine, lysine, arginine and tryptophan, while the amount of proline, leucine and in the fractions of some flours the amount of glutamic acid and isoleucine is higher.