Thus, two alkaloids have been isolated from the epigeal part of Korolkowia sewerzowii by chromatographic separation: solanidine and diacetylsevedine. This is the first time that either of the bases has been isolated from this plant.

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VARIABILITY OF THE CHEMICAL COMPOSITION OF GRAIN FROM MAIZE PLANTS WITH DIFFERENT GENOTYPES

V. S. Fedenko

UDC 535.361.2+633.15

An improvement in the quality of maize grain by increasing the level of components responsible for its biological value is possible by using genetic means [1]. However, a change in the genotype, together with improving the nutrient properties of the grain, also has some adverse consequences connected with a fall in yield and in resistance to diseases. The necessity therefore arises for evaluating the balanced nature of the chemical composition of grain with different genotypes.

We have studied the dependence of the chemical composition of maize grain on the nature of the genotype. Maize grain of the initial (+/+) and of mutant forms with respect to opaque-2 gene (o2/o2) and the double mutants (o2/o2, Su2/Su2) were investigated. In view of the available information on the possibility of using reflection spectroscopy in the near infrared region for evaluating the quality of variety samples of grain crops with different genotypes [2, 3] we determined the protein, fat, starch, and cellulose contents by analyzing the ground grain in an Infrapid 61 express analyzer by the procedure described in [4].

It was established that the limits of the values of the chemical composition of the components of the grain that were analyzed were as follows, respectively. For the ordinary samples and for the opaque and double mutants (in % on the dry mass): protein: 11.9–12.9, 10.9–11.6, 12.1–12.5%; fats: 4.9–5.0, 3.8–4.0, 4.3–5.1%; starch: 67.8–71.4, 51.3–59.2, 67.9–71.1%; cellulose: 3.1–3.6, 2.3–2.5, 2.1–2.5%. The results obtained indicate a more balanced chemical composition of the grain of the double mutants as compared with the opaque forms, which corresponds to information on the increased nutrient value of grain with an improved structure of the endosperm as the result of a combination of the o2 and Su2 mutations. As the comparative index for evaluating the biological value of maize grain with different genotypes we used the ratio of the total amount of carbohydrate components (starch and cellulose) to the total amount of protein and fat (Table 1).

The usual analogues of maize are characterized by a range of values of the index of 4.16–4.35, while the introduction of the mutant gene opaque-2 into the genotype leads to a fall in this index (3.58–4.00). In comparison with the initial analogs, the opaque mutants are distinguished by a higher biological value of the grain, but the change in genotype is shown in a worsening of the structure of the endosperm and a fall in the yield of grain [1]. The double mutants have a value of the index (4.04–4.36) at the same level as the initial

Scientific-Research Institute of Biology of Dnepropetrovsk State University.

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TABLE 1

Maize genotype	Starch + protein / Protein + fat
A 204 +/+	4,35
W 155 +/+	4,22
W 64A +/+	4,16
Wf 9 +/+	4,17
A 204 o2/o2	4,00
W 155 o2 o2	3,62
W 64A o2/o2	3,70
Wf 9 o2/o2	3,58
A 632 o2 o2 Su2 Su2	4,04
A 619 o2 o2 Su2 Su2	4,25
Mk 302 o2/o2 Su2/Su2	4,17
oh 43 o2/o2 Su2/Su2	4,36
W 64A o2/o2 Su2/Su2	4,11
A 293 o2/o2 Su2/Su2	4,08

forms and the increased biological value of the grain coincides with an improvement in the consistency of the endosperm [1].

Thus, the proposed comparative index found as the result of a determination of the chemical composition can be used for selecting mutant forms of maize with improved grain quality.

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PHOTOMETRIC DETERMINATION OF AMINO ACIDS IN PLANT RAW MATERIAL

O. A. Esimova, G. Sh. Burasheva, M. M. Mukhamed'yarova, and M. S. Erzhanova

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The plant camel thorn, family Leguminosae, genus Alhagi, that we are studying is rich in polyflavans, carbohydrates, flavonoids, amino acids, and microelements.

Paper, ion-exchange, and column chromatographies and amino acid analyzers are used for the quantitative determination of amino acids [1-5]. The aim of the present work was the quantitative determination of amine nitrogen in 1-2 h by the ninhydrin reagent in the presence of polyflavans, carbohydrates, and flavonoids.

Construction of a Calibration Graph. As the standard we used artificially composed mixture of four known amino acids (phenylalanine, asparagine, proline, and glutamic acid), the violet color of this mixture corresponding to the color of an aqueous mixture of the material under investigation (raw material) with the ninhydrin reagent. The four amino acids (50 mg each) were dissolved in water in a 100-ml measuring flask.

For each analysis we took 10 ml of a standard solution, added 10 ml of ninhydrin reagent, heated the mixture at a bath temperature of 80-85°C for 15 min, and cooled it.

S. M. Kirov Kazakh State University, Alma-Ata.

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