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SOLANIDINE AND DIACETYLSEVEDINE FROM Korolkowia sewerzowii

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Continuing a study of the chemical composition of the epigeal part of the Korolkowia sewerzowii growing in the Fergana province, by chromatographing (separately) fractions 1 and 2 obtained in the separation of 60 g of total ether-soluble material [1, 2] on a column of alumina, from the first chloroform (eluates), we have isolated a base (I) with mp 215-217°C (ethanol), R_f 0.44 (Al_2O_3, chloroform) $[\alpha]_D^{20}$ − 25° (c 0.04; ethanol).

The IR spectrum (ν_{max}^{KBr}, cm^{-1}) showed the presence of hydroxy groups (3320), of methyl and methylene groups (2960-2830), and of a double bond (3040, 1665). The mass spectrum of compound (I) contained the peaks of ions with m/z (%): 397 (M^+, 57), 396(43), 383(12), 382(37), 341(5), 340(5), 204(83), 178(13), 164(8), 162(7), 151(33), 150(100), 112(10), 111(7), 98(20), 97(10). These results were identical with those of the mass-spectrometric fragmentation of solanidine [3, 4].

The high-resolution mass spectrum of compound (I) showed the elementary composition $C_{27}H_{43}NO$ (exp. 397.3322; theor. 397.3345). The elementary compositions of the main fragmentary ions – 150 (exp. 150.1285; theor. 150.1283), $C_{10}H_{16}N$, and 204 (exp. 204.1754; theor. 204.1752), $C_{14}H_{22}N$ – also coincided with the pattern of mass-spectrometric fragmentation of solanidine [4].

The hypothesis of the identity of base (I) and solanidine was confirmed by a comparison of R_f values in TLC, by the melting point of a mixed sample (no depression), and by their optical rotations and IR spectra.

When the mother liquor from solanidine was chromatographed on silica gel (with elution by chloroform–methanol (10:0.5), a compound (II) was isolated with mp 202-204°C (acetone–petroleum ether (1:5)), R_f 0.42 (Al_2O_3, chloroform). The IR spectra of (II) (ν_{max}^{KBr}, cm^{-1}) showed absorption bands of hydroxy groups (3500), of a trans-quinolizidine system (2770), and of an ester carbonyl group (1740, 1240).

The signals in the PMR spectrum of (II) (100 MHz, $CDCl_3$) were assigned in the following way: 0.94 93H, s, CH_3-19), 0.81 (6H, d, CH_3-21, CH_3-27), 1.97 (6H, s, $OCOCH_3$), 4.68 and 4.95 (m, H, HC–$OCOCH_3$). Mass spectrum of base (II) m/z (%): 515 (M^+, 31), 514(6), 500(13), 498(13), 456(8), 432(21), 431(40), 416(38), 178(15), 166(20), 164(23), 125(9), 112(13), 111(100), 98(17). The nature of the mass-spectral breakdown of base (II) (M^+ 515) was very close to the fragmentation of the alkaloids sevedine (M^+ 431) [5] and acetylsevedine (M^+ 473 [6].

The hypothesis made on the basis of the spectral characteristics that compound (II) was diacetylsevedine was confirmed by comparing the physicochemical constants of base (II) and of diacetylsevedine obtained by the acetylation of sevedine [4], and also by the saponification of base (II) in methanolic caustic potash solution, which led to the alkaloid sevedine (mixed melting point giving no depression, R_f, mass and IR spectra).

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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

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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

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