

## LITERATURE CITED

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## AMOUNTS OF PHOSPHOLIPIDS AND PHYTIN IN THE SEEDS OF VARIOUS PLANTS. II

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UDC 547.953:665.37

Continuing an investigation of the seeds of various plants for their phospholipid and phytin contents [1, 2] we have studied the seeds of twenty plants belonging to three families. The combined phospholipids were isolated and freed from carbohydrates and their qualitative composition was determined as described in the preceding communication [1], and the amount of phytin in the meal was determined as described previously [2] (Table 1).

The crude combined phospholipids always contained considerable amounts of neutral lipids as impurities, and they were freed from these by treatment with acetone. However, depending on the content of neutral lipids, in some cases on purification a considerable amount of phospholipids passed into the acetone, which interfered with the determination of the true amount of combined phospholipids. Consequently, to purify the total phospholipids from neutral lipids we investigated column chromatography on silica gel. The neutral lipids were eluted from the column with chloroform.

TABLE 1. Total Phospholipids and Phytin in Seeds

| Plant                                                  | Total phospholipids, % | Number of components in the total | Yield of phytin, % |
|--------------------------------------------------------|------------------------|-----------------------------------|--------------------|
| Leguminosae                                            |                        |                                   |                    |
| <i>Sophora japonica</i> L.                             | 1.1                    | 10                                | 1.5                |
| <i>Psoralea drupacea</i> Bge.                          | 1.0                    | 8                                 | 1.3                |
| <i>Gleditschia triacantos</i> L.                       | 0.8                    | 8                                 | 2.2                |
| <i>Glycyrrhiza glabra</i> L.                           | 0.8                    | 9                                 | 0.5                |
| <i>Amorpha fruticosa</i> L.                            | 1.3                    | 9                                 | 3.8                |
| <i>Lens culinaris</i> Medic.                           | 1.6                    | 7                                 | 1.2                |
| <i>Phaseolus vulgaris</i> L. (variety "Altyn")         | 1.6                    | 7                                 | 1.6                |
| <i>Phaseolus aureus</i> Roxb. (variety "Angelika")     | 1.4                    | 8                                 | 1.7                |
| <i>Phaseolus aureus</i> Roxb. (variety "Pobeda")       | 1.3                    | 8                                 | 1.8                |
| <i>Albizia julibrissin</i> Durazz.                     | 1.3                    | 7                                 | 1.4                |
| <i>Pisum sativum</i> L. (variety "Vostok-55")          | 1.1                    | 8                                 | 2.1                |
| <i>Glycine hispida</i> Maxim. (variety "Uzbekskaya-2") | 1.5                    | 8                                 | 2.3                |
| Rosaceae                                               |                        |                                   |                    |
| <i>Amygdalus bucharica</i> Korsh.                      | 1.1                    | 9                                 | 3.7                |
| <i>Amygdalus petunnikowii</i> Litv.                    | 0.7                    | 5                                 | 3.5                |
| <i>Poterium polygamum</i> Waldst. et Kit.              | 0.2                    | 6                                 | 2.0                |
| <i>Cerasus mahaleb</i> (L.) Mill.                      | 1.1                    | 6                                 | 2.2                |
| <i>Chaenomeles japonica</i> Lindl.                     | 0.5                    | 6                                 | 1.4                |
| Boraginaceae                                           |                        |                                   |                    |
| <i>Echium italicum</i> L.                              | 0.2                    | 5                                 | 2.8                |
| <i>Cynoglossum creticum</i> Mill.                      | 1.1                    | 5                                 | 2.5                |
| <i>Heliotropium olgae</i> Bge.                         | 1.0                    | 7                                 | 2.0                |

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As can be seen from the figures in Table 1, seeds of plants of the family Leguminosae attract attention by the amount of combined phospholipids that they contain and their qualitative composition.

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#### COUMARINS AND FUROCOUMARINS OF THE ROOTS OF *Hippomarathrum microcarpum*

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UDC 577.15/17;582.89

The present paper gives the results of an investigation of the coumarin compounds [1-3] from the roots of *Hippomarathrum microcarpum* collected at the beginning of July in the mountains of the Shushinskii region of the Azerbaidzhan SSR.

Extraction with chloroform (steeping method) [2] of 1.171 kg of comminuted plant roots yielded 99 g of a resin (8.45% of the air-dry weight of the roots). The resin isolated in this way was dissolved in 40 ml of chloroform and chromatographed on a column of inactive  $Al_2O_3$ . The ratio of  $Al_2O_3$  to resin was 6.4:1. The substances were eluted with petroleum ether (fractions 1-15) and chloroform (fractions 16-32). The volume of each fraction was 200 ml. Fractions 1-15, after the eluate had been distilled off, yielded a crystalline residue from which, by recrystallization from ethanol, we isolated osthole (0.19%), ( $\pm$ )-oxypeucedanin (0.4%), and ( $\pm$ )-oxypeucedanin hydrate (3%). Fractions 16-32 contained ( $\pm$ )-prangenin or ( $\pm$ )-heraclenin (0.01%). This is the first time that ( $\pm$ )-prangenin has been isolated from plants of the genus *Hippomarathrum* [4]. The substances isolated were identified by comparison with known compounds of the coumarin series by means of their IR spectra and melting points [3].

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