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A study of phloridzin and its derivatives. Part I.

By ALBERT A. EPSTEIN and EUGENIE HIRSCHBERG-MAECHLING.

[*From the Laboratory of Physiological Chemistry of Mt. Sinai Hospital, New York City.*]

The present work constitutes part of a study on the pharmacology of phloridzin and its derivatives. It is based on some earlier observations[1] concerning the influence of phloridzin on the formation of glycogen in the liver under certain experimental conditions. The results of the experiments referred to seemed to indicate that phloridzin possesses a two-fold action: namely, that of causing glycosuria, and that of stimulating the formation of glycogen in the liver. These experiments showed further that animals which had been rendered diabetic by pancreatectomy, and in which the glycosuria was interfered with by removal of the kidneys, the blood-sugar content was generally lower in those which had received phloridzin, than in those which had not received it.

It therefore seemed reasonable to suppose that if a means could be found by which phloridzin could be deprived of its glycosuric action, its effect on the formation of glycogen and the reduction of the blood-sugar would be made manifest.

Notwithstanding the importance of phloridzin in the study of certain problems of metabolism, little information is available concerning its derivatives.

In view of the object of our investigation the work is comprised of two phases: first, an examination of the pharmacological effects of known derivatives of phloridzin and second, the preparation and study of new compounds of this substance.

The purpose of the present communication is to state our problem and to record the new compounds which have been prepared and identified. The following is a list of the substances:

(1.) Tetrabenzoylphloridzin: This was obtained by the action of benzoyl chloride on phloridzin in pyridin. The sub-

[1] Epstein, A. A., and Baehr, G., *Jour. Biol. Chem.*, 1916, xxiv, 1.

stance is white, and of a starchy character. It melts at 94.5°-96° C. It is readily soluble in alcohol, acetone, pyridin, slightly soluble in ether, and is insoluble in ligroin, alkalies or water.

(2.) Tetra-para-nitro-benzoylphloridzin: This was obtained in a manner analogous to that of the preceding substance, by the reaction of para-nitro-benzoyl chloride on phloridzin in pyridin. This substance is amorphous in character, and of a greenish yellow color. Melting point is 122° C. It is readily soluble in pyridine, less so in boiling alcohol and acetone; slightly soluble in ether, and insoluble in ligroin alkalies and water.

(3.) Pentapalmitylphloridizin: Was prepared from phloridzin and palmitylchloride in pyridin solution. It forms a slightly yellowish amorphous product, melting sharply at 51.5° C; easily soluble in chloroform, alcohol, ether, acetone, pyridin and ligroin.

(4.) Sodium phloridzin-tris-azobenzene: Was prepared in an alkaline medium by the reaction of diazobenzene sulfate with phloridzin. The substance forms a bright red amorphous mass, which is readily soluble in ethyl alcohol, methyl alcohol, acetic acid, acetone and ether; it is insoluble in ligroin and water. Diute alkalies dissolve it with the formation of a dark red color. Concentrated sulfuric acid dissolves it, giving the solution a deep red color. This substance turns dark at 190° C. and at 405° C. it decomposes.

Three other new compounds have been prepared; their chemical constitution, however, has not as yet been definite established: (1) phloridzin-sulfanildiazotate, (2) phloridzin-diazoorthotoluene, (3) phloridzin-diazoparatoluene.

A complete report of the methods used in the preparation of the above substances, as well as their physical properties and chemical constitution will be presented in another place. The pharmacological action of these compounds will be reported later.

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