LETTERS TO THE EDITOR

An Interfering Glycoside in the Chemical Assay of Senna

SIR,—The chemical assay of senna by the method of Kussmaul and Becker (1947) and its modifications (Fairbairn and Michaels, 1950; Auterhoff, 1951) assumes that the sennosides are the only acidic anthracene glycosides present in significant amounts. The isolation by Fairbairn, Friedmann and Ryan (1958) of a primary glycoside of senna having a biological to chemical assay ratio of one and a half times that of the sennosides suggested the necessity for a re-appraisal of these assay procedures. An attempt was therefore made to develop an assay based on the fact that the primary glycoside is very soluble in water and the sennosides are almost insoluble.

During this work it was noted that alkaline solutions of aglycones obtained from a 70 per cent ethanol extract of senna pods were red-brown in colour, whereas those obtained from the sennosides were bright yellow. It was concluded that 70 per cent ethanol removes extraneous coloured material and in an attempt to eliminate this interference a 1 per cent sodium bicarbonate solution was used for the extraction of the total glycosides. Pure sennosides showed no decomposition when subjected to this treatment, but a reduction of from 10–20 per cent in the apparent sennoside contents of the pods examined was obtained. At the same time a marked increase in the apparent free anthraquinone content was noted and it was assumed that the reduction in apparent sennoside content was caused by decomposition of a glycoside present in the pod. Paris and David-Cuny (1955) have suggested the presence of significant amounts of anthraquinone glycosides in senna leaf, but their method of assay does not distinguish between acidic glycosides, which interfere in the Kussmaul and Becker assay and non-acidic glycosides, which are removed at the sodium bicarbonate extraction stage. Alexandrian senna pod was treated with a 1 per cent sodium bicarbonate solution and the liberated aglycone isolated. On recrystallisation from pyridine it gave orange-yellow needles of rhein; m.p. 326° (decomp.); acetyl derivative m.p. 246°; these were insoluble in water, but soluble in alkalis to give red coloured solutions; the infra-red spectrum and R_F values obtained by paper chromatography were similar to those of an authentic sample of rhein.

A small quantity of a rhein-containing glycoside has now been isolated from Alexandrian senna pod as dull-yellow micro-crystals, insoluble in ether, but soluble in water and in dilute alkalis, the latter giving orange-red solutions. It is hydrolysed by heating with 10N sulphuric acid to give rhein in 60 per cent yield by a colorimetric assay, a value in accordance with rhein monoglucoside. When 10 mg. doses of the glycoside were administered orally to mice of mean body weight 25 g., no purgative effect was produced.

A quantity of the glycoside is being isolated for further examination.

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