(above 100° C.) applied to red squill powder, the less toxic it becomes.

3. The amount of moisture in a red squill bait has little relationship to the toxicity of the bait.

4. Large percentages of protein (casein) or carbohydrate (cornstarch) in squill baits do not affect the toxicity of the baits. Considerable fat in red squill baits results in a slight decrease in the toxicity of the bait. The more pectin in a red squill bait, the less toxic will the bait be to rats.

5. Low protein diets containing (1) high fat and (2) high carbohydrate when fed to rats for 30 days, seem to have no marked effect on the toxicity of red squill. However, a high protein (casein), low carbohydrate (cornstarch) diet has a rather definite effect in decreasing the toxicity of red squill baits.

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Svante August Arrhenius (1859–1927) was awarded the Nobel Prize for chemistry in 1903 in view of the special value of his theory of electrolytic dissociation in the interest of the development of chemistry.

Pyrethrin Content of Pyrethrum Grown in India

*By J. K. Lahiri, S. Ghosh and R. N. Chopra**

Pyrethrum flowers imported into India are from *Chrysanthemum cinerariæfolium*, which is the only species that is commercially important. The product imported is either the powdered flowers or their extracts or various preparations made from either of these. They are widely used as household insecticides, livestock sprays and horticultural dusts and sprays. Large quantities of pyrethrum or its preparations are now being used in India, where the control of disease due to insects is an acute problem, and in view of the vast economic possibilities for pyrethrum, attempts are being made to cultivate the plant in India. The experimental cultivation of pyrethrum flowers has been tried in Kashmir, Muree Hills, Kulu Valley, North Western Frontier Province, Kurrum Valley, United Provinces and other places, and it has been found that the plant grows well at altitudes of 5000–6000 ft. Very recently, however, pyrethrum has been grown successfully by Mr. S. N. Bal, Curator, Calcutta Museum, in the Mayurbhanj State (Orissa) at altitudes of 3400–3600 ft., and we are grateful to him for sending us two of these samples for our analyses. We are also thankful to Mr. R. L. Badhwar for securing samples of pyrethrum, grown in Kashmir and Murree Hills, from time to time for the present work.

The chemical assay of pyrethrum flowers depends upon the estimation of the insecticidal principles, pyrethrin I and pyrethrin II, which are the esters of the ketone-alcohol pyrethrolone with the two acids chrysanthemum monocarboxylic acid and chrysanthemum dicarboxylic acid methyl ester, respectively. The content of pyrethrin of the Dalmatian flowers ranges from 0.38% to 0.58%, the Japanese flowers from 0.58% to 1.21%, the Kenya flowers from 0.90% to 1.48%, the Californian flowers about 1.10%, the Spanish flowers about 0.57%,

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Table I.—Pyrethrin Content of Pyrethrum Flowers

Species	Source	Crop Year	Grade	Pyrethrins Per Cent
C. cinerariæfolium	Kashmir	1938	Open	0.702
C. cinerariæfolium	Kashmir	1939	Open	0.741
C. cinerariæfolium	Murree	1939	Open	1.300
C. cinerariæfolium	Murree	1939	Half-open	1.030
C. roseum	Murree	1939	Open	0.247
C. cinerariæfolium (Kenya seeds)	Mayurbhanj	1940	Open	1.154
C. cinerariæfolium (Harpenden seeds)	Mayurbhanj	1940	Open	1.138
C. cinerariæfolium	Kashmir (Tangmarg)	1940	Open	0.962
C. cinerariæfolium	Kashmir (Baramulla)	1940	Open	0.904
C. cinerariæfolium	Palampur	1940	Open	0.904
C. cinerariæfolium	Palampur	1940	Half-open	0.834
C. cinerariæfolium	Palampur	1940	Closed	0.491
C. cinerariæfolium	Kulu	1940	Open	0.702
C. cinerariæfolium	Kulu	1940	Half-open	0.734

and the Russian flowers about 0.24% (1). The method followed in these assays was that of Gnadinger and Corl (2) and the same method has also been used by us with very slight modifications to suit our laboratory conditions.

EXPERIMENTAL

Ten to thirty-five grams of pyrethrum flowers, powdered and passed through a 40-mesh sieve, were extracted for five hours with petroleum ether (B. P. 40–60° C.) in a Soxhlet extraction apparatus. The petroleum ether extract, which was less than 100 cc., was allowed to stand over night at room temperature. The solvent was then driven off at a temperature not exceeding 75° C. and the residue was immediately transferred with five portions of boiling aldehyde-free alcohol to a 100-cc. volumetric flask, using sufficient boiling alcohol to make the volume 80–85 cc. To the hot solution, 15 cc. of basic lead acetate were added and the flask shaken vigorously for a few minutes. After allowing it to cool, the solution was made up to the mark with alcohol. It was filtered through a Büchner funnel and anhydrous sodium carbonate (2 Gm.) was added to the filtrate. The flask was shaken frequently and was allowed to stand for ten minutes. After filtration, 10 cc. of the clear filtrate were taken in a Folin tube and 6 cc. of alkaline copper solution added. In another Folin tube 10 cc. of a standard dextrose solution (2 mg. of dextrose) were taken and 6 cc. of the same alkaline copper solution added. The tubes were placed upright for 45 minutes in a constant temperature water bath, set at 78° C. and controlled within 0.5°. After removal of the tubes from the water bath and cooling, 10 cc. of Folin reagent were added to each. After shaking, the contents were transferred separately to 100-cc. volumetric flasks and the solutions were made up to the mark with water. The solution from the pyrethrum extract was filtered through a Gooch crucible fitted with a heavy asbestos pad. The solutions were compared in a Klett colorimeter and from the readings the percentage of the pyrethrins was calculated in the usual way.

CONCLUSIONS

The samples of the commercial variety (*C. cinerariæfolium*) grown in India show a high content of the active constituents compared to imported and foreign samples.

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The Effect of Alkalinity or Acidity on the Stability of Ether*

By A. W. Berry and E. S. Herlong†

The United States Pharmacopœia requires that anesthetic ether be free from aldehyde and peroxide when tested by tests of high sensitivity, thus justly limiting the possible presence of these substances to extremely minute amounts. Consequently ether cannot develop more than minute traces of these impurities upon aging, if the ether is to remain in compliance with pharmacopœial specifications.

A copper-lined can has been shown to be effective in preventing deterioration of ether (1). Notwithstanding this fact, it seemed worth while to determine whether or not very mild alkalinity or acidity would have any bearing on the stability of ether and perhaps provide still other means of

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