Bacteriostatic Property of *Aloe vera*

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Freeze-dried juice obtained from *Aloe vera* and heated for 15 minutes at 80° inhibited several test microorganisms.

SPECIES OF *Aloe* have had a long history as drug plants. This was pointed out by Morton (1) in a recent comprehensive review of *Aloe* from the standpoint of folk use and commercial exploitation. Fly and Kiem (2) recently carried out an invesigation to ascertain whether *Aloe vera* exhibits antimicrobial activity. They reported that macerates of the central gelatinous portion, of the green vascular portion, and of the complete leaf of *A. vera* did not exhibit, within the limits of their experiment, antimicrobial effect against *Staphylococcus aureus* and *Escherichia coli*.

Since it has been established definitely in this laboratory that the fresh juice of *A. vera* L. contains a principle(s) which is inhibitory to certain microorganisms, the results are reported in this note.

EXPERIMENTAL

Leaves of *A. vera* L. were cut at the base and stood upright so that the juice could drain from the leaves into receptacles. If tested immediately, the fresh juice exhibited a marked zone of inhibition of *S. aureus* 209. However, the principle responsible for the inhibitory activity was found to be unstable. Preservatives as sodium bisulfite, sodium benzoate, and methyl paraben were ineffective; however, the principle could be temporarily preserved by refrigeration and preserved for an even longer period by heating the juice for 15 minutes at 80°. In all instances the juice would gradually turn dark. Once the juice became dark, the inhibitory property was lost. If the juice that had been heated for 15 minutes at 80° was freeze-dried, a buff-colored product resulted which was stable.

A solution of the freeze-dried juice (20 mg./ml. of distilled water) was tested by the agar diffusion technique for bacteriostatic activity against the following organisms: *S. auerus* 209, *E. coli*, *Streptococcus pyogenes*, *Corynebacterium xerose*, *Shigella paradysenteriae*, *Salmonella typhosa*, *Salmonella schottmuelleri*, and *Salmonella paratyphi*. After a period of incubation at 37° for 24 hours, significant inhibition of growth was evident on plates inoculated with *S. aureus* 209, *S. pyrogenes*, *C. xerose*, and *S. paratyphi*.

The whole leaf minus the juice, the leaf mesophyll, and the leaf epidermis were each separately freeze-dried and successively extracted with petroleum ether (b.p. 30–60°), ether, chloroform, ethanol, and distilled water. None of the extracts exhibited inhibitory activity against the test organisms.

Since the juice of *Aloe* is known to contain anthraquinone-type compounds, aloe-emodin, emodin, and chrysophanic acid were tested for inhibition of *S. aureus* 209. The results were negative.

CONCLUSIONS

While the freeze-dried whole leaf minus the juice, the leaf mesophyll, and the leaf epidermis of *A. vera* L. did not exhibit bacteriostatic properties, the freeze-dried juice previously heated for 15 minutes at 80° did inhibit *S. aureus* 209, *S. pyogenes*, *C. xerose*, and *S. paratyphi* using the agar diffusion test method.

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Communications

Determination of Isomeric Purity of Dextroamphetamine in Tablets and Capsules

Sir:

The tablet form of dextroamphetamine sulfate is widely used, has been official since the 15th revision of the "United States Pharmacopeia," and is produced by a large number of pharmaceutical companies. Enforcement work has brought to light several examples of adulterated products in which the *dextro* isomer has been replaced completely or in part by the less expensive racemate (1, 2). Nevertheless, the U.S.P. does not have a method to ascertain the isomeric purity of the drug present in the tablets. Because of the low specific rotation of dextroamphetamine sulfate (+23.5°) and the volatility of the base, certain derivatives are more suitable for determination of the optical activity. Acetylamphetamine has been particularly useful for this purpose. It can be prepared easily in good yield and its specific rotation (in chloroform) is about twice that of dextroamphetamine sulfate and of opposite sign (−44.0°). The main problem is the extraction and purification of the amine from the tablets prior to acetylation. Capsules of dextroamphetamine sulfate, especially those having sustained-release action, also present difficulties in the isolation of the base. In 1953, a procedure was de-