reaction. However, this seems to be of little consequence in the present discussion. Acetaldehyde accumulation (in either event) must be due to the inhibited utilization of pyruvate or one of the products in equilibrium with pyruvate (acetaldehyde, the postulated 2 carbon intermediate, or others). The inhibition would be either one that blocked the entry of pyruvate into the tricarboxylic acid cycle or it would be among all the other reactions that involve pyruvate. The former of these two general possibilities is the more appealing because several auxin effects appear to be due to diminished tricarboxylic acid cycle activity.

Work with respiratory poisons (*5*) suggests that energy released in the metabolism of the organic acids is used in salt accumulation. Inhibition of salt accumulation by indole-3-acetic acid, naphthalene acetic acid (*10*), and 2,4-D (*7*) may well be the result of diminished activity of the tricarboxylic acid cycle. Reversal of the 2,4-D inhibition of salt accumulation by citrate lends support to this idea.

Concentrations of growth substance that affect growth (*6*), and salt accumulation (*7*), do not appreciably influence respiration. This circumstance clearly indicates a qualitative change in the metabolism of the tissues. According to the present proposal, this lack of respiratory effect at low auxin concentrations is possible because

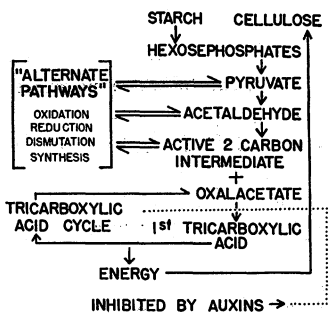

FIG. 1.

oxidations of the alternate pathways can consume all pyruvate (and its derivatives) blocked out of the tricarboxylic acid cycle. At higher levels of growth substance more pyruvate is available than the alternate pathways can utilize, so that there is an accumulation of acetaldehyde and an inhibition of oxygen consumption.

It is possible, by a somewhat less obvious argument, to relate certain growth effects of the auxins to diminished activity of the tricarboxylic acid cycle. This cycle is considered to represent perhaps the most efficient cellular mechanism for the release of chemical energy from carbohydrate. Energy is required for synthesis of the polysaccharides of the secondary cell wall from soluble precursors. Reduced activity of the acid cycle could then be associated with a restriction of these syntheses, with consequent maintenance of cell wall extensibility and capacity for further cell elongation. Increases in the soluble carbohydrates of tissues treated with indole-3-acetic acid (*8*) may also be explained in terms of an insufficiency of the chemical energy required for the synthesis of starch and other reserve carbohydrates from simple sugars.

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Antimycin A, an Antibiotic with Insecticidal and Miticidal Properties

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Antimycin A is a crystalline antibiotic isolated from cultures of an unidentified species of *Streptomyces*. It appears to be an optically active, nitrogenous phenol of the molecular formula $C_{28}H_{40}O_9N_2$ (*1*). Leben and Keitt (*2*) demonstrated the antibiotic properties of antimycin against certain phytopathogens and found that it is an extremely potent fungicide, producing inhibitory effects against *Nigrospora sphaerica* (Sacc.) Mason, for example, at dilutions as high as 1: 800,000,000. The present paper reports preliminary tests designed to investigate the insecticidal and miticidal potentialities of this material.

The initial trials showed that the antibiotic caused mortality to insects which ingested the material rather than by the contact action of the substance on the exoskeleton. For example, the common housefly *Musca domestica* L., sprayed with 10 ppm of antimycin A, showed no adverse effects, whereas 38% of the flies allowed to feed on a ball of absorbent cotton saturated with 10 ppm of antimycin A dispersed in water were killed in 24 hr. Similar results were obtained with the large milkweed bug *Oncopeltus fasciatus* (Dall.). Specificity was indicated, however, since certain insects, e.g., the German cockroach, *Blatella germanica* (L.), were able to ingest 10 ppm of antimycin A dispersed in water and live as long as those feeding on water alone.

The specificity of action was very apparent in a preliminary trial when the standard test wool fabric was immersed in a water dispersion containing 10 ppm antimycin A and offered to larvae of the webbing clothes moth, *Tineola biselliella* (Hum.), and the black carpet beetle, *Attagenus piceus* (Oliv.). The larvae of the webbing clothes moth ate the test swatches with impunity, while duplicate test pieces inhibited the feeding of the black carpet beetle. Further tests were conducted with this beetle comparing antimycin A with sodium aluminum silicofluoride, which is widely used for fabric protection against insects. The standard wool fabric was

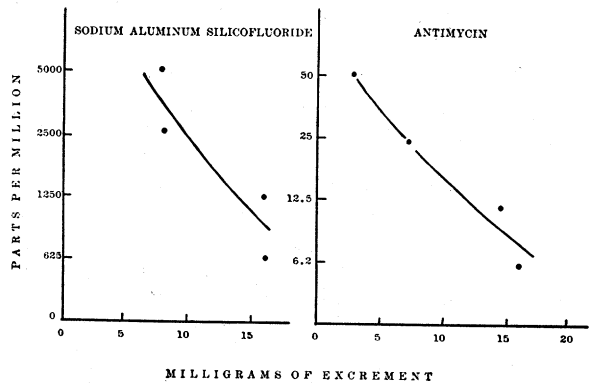

FIG. 1. Relative toxicity of antimycin A and sodium aluminum silicofluoride against larvae of the black carpet beetle. The amount of excrement produced by the larvae is related to the damage to fabric. A specimen is considered satisfactorily resistant to carpet beetles if the quantity of excrement is not over 6 mg.

immersed and saturated with the test subjects, aired, dried, and tested in accordance with the method set forth by the American Society for Testing Materials (ASTM D-582 45T). The data (Fig. 1) show that antimycin A will afford the same degree of fabric protection at 1/100 the concentration of sodium aluminum silicofluoride. The protective action appears to be of a repellent nature, as none of the larvae exposed to the antimycin-impregnated wool was dead at the end of the 28-day exposure period.

Specificity of action to Coleoptera and not to Lepidoptera was also indicated in tests with the Mexican bean beetle larvae, *Epilachna varivestis* Muls. and the Southern army worm, *Prodenia eridania* (Cram.). As in the case of the clothes moth larvae, the fourth instar Southern army worm ate treated Wood Prolific Lima-bean leaves with no ill effects. The results of the test with the second instar Mexican bean beetle larvae are shown in Table 1 and give the approximate relative potency of

TABLE 1

TOXICITY OF ANTIMYCIN TO SECOND INSTAR LARVAE OF MEXICAN BEAN BEETLE INGESTING SPRAYED WOOD PROLIFIC LIMA-BEAN LEAVES

Treatment	Ppm	Amount of leaf consumed	Avg % kill* in 48 hr
Antimycin	50	small	60
"	25	moderate	53
"	12.5	large	15
"	6.3	entire	0
Methoxychlor	500	moderate	43
Untreated	....	entire	0
Starvation	....	.....	0

* Avg of 4 replicates and total of 40 larvae.

antimycin A as compared with methoxychlor (1,1,1-trichloro-2,2-bis(*p*-methoxyphenyl)ethane), which is currently used for the control of this pest. Antimycin A used at the rate of 25 ppm compares favorably in toxicity with 500 ppm of methoxychlor.

The toxicity of antimycin A is apparently not confined

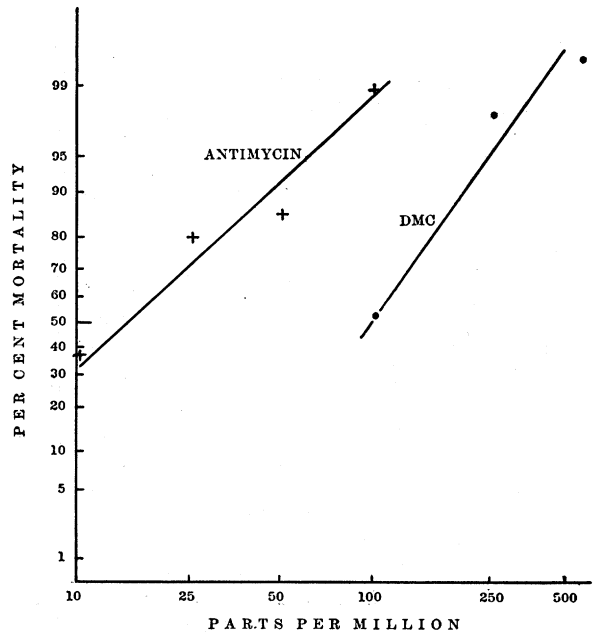

FIG. 2. Relative toxicity of antimycin A and di(*p*-chlorophenyl)methyl carbinol (DMC) against the red spider mite *Tetranychus* sp.

to members of the Insecta, as it shows efficacy for the control of the red spider mite, *Tetranychus* sp. Fig. 2 shows the relative toxicity of antimycin A as compared with di(*p*-chlorophenyl)methyl carbinol (DMC), which has demonstrated merit and is commercially available for mite control. The results of the test are shown graphically (Fig. 2). On the basis of LD_{50} readings, antimycin A appears to be about three or four times more effective than DMC.

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The Solubility of Fibrin Clots Produced by Thrombin and by Snake Venom

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It has been reported by Laki and Lóránd (*3*, *4*) that there are marked differences among fibrin clots with respect to their solubility. The authors reported that fibrin clots formed from a fibrinogen solution by the coagulating action of thrombin and in the absence of two factors, namely, a thermolabile serum factor and Ca ions, are soluble in a concentrated urea solution. The clots are soluble when either of these two factors is absent but insoluble when both are present. The purpose of the present experiments was to find out whether clots formed by