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AZADIRACHTIN IN THE FRUIT OF *MELIA AZEDARACH*

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Key Word Index—*Melia azedarach*; Meliaceae; azadirachtin; feeding inhibitor; triterpenoid.

Abstract—Azadirachtin, a triterpenoid of *Azadirachta indica* with feeding and growth disruptive effects on certain insects, has been found in *Melia azedarach*.

AZADIRACHTIN, m.p. 154–158° ($C_{35}H_{44}O_{16}$) was isolated by Butterworth and Morgan[1,2] from *Azadirachta indica* A. Juss (Meliaceae) using a feeding inhibition test for the desert locust (*Schistocerca gregaria*). When pure, the substance causes 100% inhibition of feeding by the desert locust, under the test conditions, at a concentration of 40 μg/l. or 10^{-8} M. Azadirachtin has also been shown to have a systemic effect through plants,[3] and to affect the growth and development of other classes of insects.[4] Though the complete structure is not yet known, evidence has been given[5] to show that the compound belongs to a new class of hexanortriterpenoid substances related to nimbin and salanin.[6] It is therefore noteworthy that this interesting substance has also been found in the related species *Melia azedarach* L. (Chinaberry or Persian lilac).

The leaves and seeds of *M. azedarach* have long been known to display feeding inhibition for locusts.[7] Lavie *et al.* isolated the substance meliantriol[8] from the fresh fruit of *M. azedarach* and showed it inhibited feeding of the desert locust in a test similar to the one we used, at a limiting concentration of 8 μg/cm^2 (azadirachtin, expressed in the same terms has a limit at approx. 1 ng/cm^2). McMillan *et al.* found the leaves of *M. azedarach* contained an unidentified feeding deterrent and growth retardant for two insect species.[9] This effect may be due to the presence of azadirachtin.

EXPERIMENTAL

The crushed dried fruit of *M. azedarach* (1 kg) were extracted with EtOH. After solvent partitions and chromatography on Floridin earth as described by Butterworth and Morgan,[2] fractions were monitored for azadirachtin by TLC in three solvent systems. Two successive PLC's of appropriate fractions in Et_2O–acetone (17:3) and $CHCl_3$–acetone (7:3) each eluted 2×, gave 26 bands, 13 of which were similar to azadirachtin in 3 solvent systems. Of these, 8 were active in the locust feeding test at 1 mg/l. Feeding tests at increasing dilution showed three fractions contained most of the activity. These were combined and converted to bis(trimethylsilyl)azadirachtin,[5] and after preparative TLC in Et_2O–acetone (9:1) R_f 0·62, gave a single

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band shown to be identical with an authentic specimen by TLC in three solvent systems and to have an identical MS to that of a specimen prepared from azadirachtin from *A. indica* (M^+ 864, $C_{41}H_{60}O_{16}Si_2$).

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