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SOLAVETIVONE, FROM *NICOTIANA TABACUM* CV XANTHI-NC INFECTED WITH TOBACCO MOSAIC VIRUS

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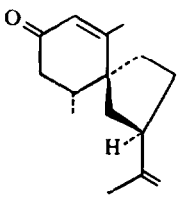
During recent years, many sesquiterpenes have been isolated as stress compounds from members of the Solanaceae [1]. In the case of potatoes, ten sesquiterpenes such as rishitin and lubimin have been found in the tuber infected with microorganisms. Two bicyclic sesquiterpenes have been isolated as stress compounds of leaves of *Nicotiana* species. One of them is glutinosone which was isolated from *N. glutinosa* infected with tobacco mosaic virus (TMV) [2]; the other, capsidiol, was isolated from *N. tabacum* cv White Burley and *N. clevelandii* infected with tobacco necrosis virus [3].

In this paper we report the occurrence of a vetispirane sesquiterpene ketone, solavetivone (**1**), in leaves of *N. tabacum* cv Xanthi-nc which had been inoculated with TMV and formed necrotic local lesions. Solavetivone was originally isolated as a phytoalexin from potato tubers infected with *Erwinia carotovora* or *Phytophthora infestans*.



1 Solavetivone

EXPERIMENTAL

Six to eight fully expanded leaves of tobacco plants (*N. tabacum* cv Xanthi-nc, 8 weeks old) were inoculated with TMV (0.3 μg/ml in 0.1 M phosphate buffer). Carborundum was used as an abrasive. When brown lesions had been produced (7 days), the leaves (410 g fr. wt) were harvested. The lesions (*ca* 3 mm dia) were excised with a cork borer (6 mm dia). The obtained disks (8.71 g) were frozen at −20° for 2 days, freeze-dried (1.37 g) and then extracted with CH_2Cl_2 (2 l.). The solvent was removed from the crude extract which was then placed onto a centrifugal liquid chromatograph (Hitachi model CLC-5) using silicic acid (150 Å) and eluted successively with 1:9, 1:4 and 1:1 mixtures of Et_2O and *n*-hexane. A compound showing the highest peak in GLC (5% OV-101, 2 m, programming from 80° to 240° at 10°/min, R_t 13.5 min) of crude extract was obtained in the Et_2O–hexane (1:1) fraction and was further purified by GLC (5% OV-101, 1 m, programming from 150° to 240° at 10°/min, R_t 4.4 min). Concn of the compound was estimated to be 1.06 mg per g dry wt of the disks by the mass fragmentography procedure (2% OV-1, 1 m, 190°) using multiple ion detection and monitoring mass numbers 218 (M^+), 203, and 190. The isolated compound was identified as solavetivone by comparison of MS (*m/e* 218 (M^+), 203, 190, 137, 133, 108 (100%), 93, 79, 68, 67, 41), ^1H NMR ((100 MHz, $CDCl_3$): δ 0.98 (*d*, J = 7.0 Hz, 3H), 1.75 (*s*(*br*), 3H), 1.93 (*d*, J = 1.2 Hz, 3H), 4.71 (*s*(*br*), 2H), 5.72 (*s*(*br*), 1H)) and IR (ν_{max}^{KBr} cm^{-1}: 3090, 1669, 1650, 1618, 893) and by direct comparison (TLC and GLC) with an authentic specimen. It was homogeneous on TLC (SiO_2), having R_f 0.32 with Me_2CO–*n*-hexane (1:3) and on GLC, having R_t 13.5 min on 5% OV-101 (2 m, programming from 80° to 240° at 10°/min). Solavetivone was not detected in extracts of uninoculated leaves (240 g fr. wt) by GLC and mass fragmentography procedures.

As reported previously, solavetivone was isolated in very small amount (10 mg per 370 kg dry wt) from uninoculated *N. tabacum* cv Burley [4], but there is as now shown a striking increase in solavetivone production in tobacco plants in response to virus infection.

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