

ture is presented in the table. It is evident from these data that the major phospholipid classes of *N. polychromogenes* represent dynamic chemical constituents of the bacterial cell. They change independently in relative proportions, as well as in their actual percentage of the total cell mass, as a function of the growth stage. Quantitatively, major phospholipids of *N. polychromogenes* behave quite differently during growth. Phospholipids accumulate as the culture ages (figure) similar to that of *E. coli* when grown at 27°C¹¹. Phosphatidyl ethanolamine has been shown to decrease with age in mycobacteria⁸, *Streptomyces griseus*⁹ and *E. coli-B*¹⁰ as seen in *N. polychromogenes*. We have now observed an increase in Cardiolipin with age identical to *E. coli*¹⁰, whereas a decrease was observed in mycobacteria⁸ and *S. griseus*⁹. The increase in phosphoinositides is in accordance with our earlier observations^{8,9} with other microorganisms containing these phospholipids. To what extent these changes in phospholipids are related to the synthesis of

specific enzymes is at present unknown. More evidence is required at the enzyme level to interpret these changes in lipid metabolism.

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(Z)-9-Tetradecen-1-ol and (Z)-9-tetradecenyl acetate: A potent attractant system for male *Sesamia cretica* Led. (Lep., Noctuidae)¹

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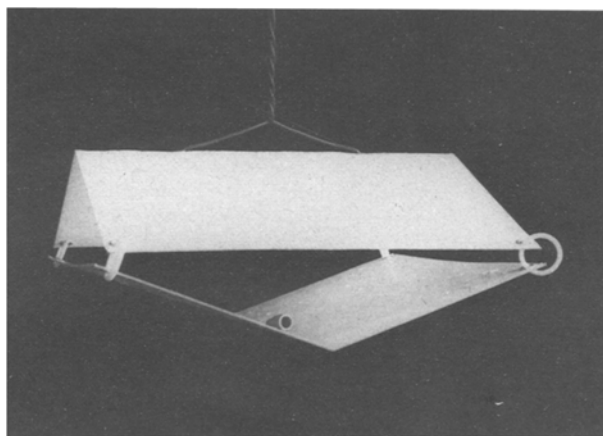
Montedison S. p. A., Istituto Ricerche G. Donegani, via G. Fauser 4, I-28100 Novara (Italy), 18 March 1977

Summary. Field studies have shown that a combination of (Z)-9-tetradecenol with (Z)-9-tetradecenyl acetate is an effective attractant for male *Sesamia cretica* Led., a pest of sorghum crops. These studies also indicated that the most effective composition is 75:25 (alcohol:acetate).

During a field study of compounds synthesized² to attract insect species of Sudan cotton crops, experiments were carried out to screen 22 compounds (mainly unsaturated long-chain alkyl acetates and their parent alcohols related to known insect sex-attractants). Initial evaluation indicated that among all compounds tested (Z)-9-tetradecen-1-ol (Z-9-TDOL) and (Z)-9-tetradecenyl acetate (Z-9-TDA) attracted males of a single insect species, the dura stem-borer *Sesamia cretica* Led. The range of distribution of this pest extends from Morocco in the west to northern Algeria, Libya, U.A.R. (Egypt) and the Near East. It is also found in southern Italy, Corsica, Yugoslavia, Bulgaria and Greece. In East Africa *S. cretica* is recorded from Ethiopia, Somalia and the Sudan. The pest mainly attacks sorghum, but also infests maize, sugarcane, wheat and pinnisetum.

Catches of *S. cretica* were so unusually high that we felt our trapping results would be of interest, particularly since Z-9-TDA is known to be the natural sex-pheromone or one of its components for many lepidopteran species such as *Adoxophyes orana*³, *A. fasciata*⁴, *Clepsis spectrana*⁵, *Cadra cautella*⁶, *Spodoptera eridania*⁷ and *S. littoralis*⁸. As far as we know, Z-9-TDOL has never been involved in the sex-pheromone systems of Lepidoptera. Z-9-TDOL and Z-9-TDA were 97% isomerically pure, the remaining 3% consisting of the opposite isomer (by GLC analysis on 25 m glass capillary column packed with Ucon 50 HB 5100).

Newly designed insect traps were used in all tests. They are made of weatherproof cardboard, lined with an adhesive substance, 21 cm long × 23 cm wide × ca. 11 cm high (figure). Traps were charged with test chemicals placed on rubber septa (5 × 9 mm rubber-stoppers, sleeve-type, Angelo Ascenso, Milano). They were hung approximately 1–1.5 m above the ground and distributed upwind within the periphery of cotton fields near sorghum and sugar-cane crops, at a density of 2 traps per hectare.



A baited trap.

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Catches of male *Sesamia cretica* Led. in traps baited with Z-9-TDOL and Z-9-TDA at 3 locations in Gezira

Bait (μ g) Z-9-TDOL	Z-9-TDA	Mean No. males/trap*
1000	0	4
750	250	48
500	500	15
250	750	8
0	1000	2

*4 replicates.

In the experiments conducted in Gezira region, the traps were placed in the field on 16 November and collected on 20 December. During this time they were inspected at 2-day-intervals. In all experiments each lure was tested in 4 replicates.

To point out the effect of the combination of the 2 compounds, various mixtures of Z-9-TDAL and Z-9-TDA were field tested. The table shows the average numbers of males *S. cretica* captured per trap during the period of the experiment.

It is evident from the results that the mixture Z-9-TDOL and Z-9-TDA is a potent attractant for male dura stem-borer. More field trials with various release rates, compounds of greater purity, and different ratios of the 2 components are needed to optimize male attractancy.

The role of oxygen diffusivity in biochemical reactions

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Summary. It has been shown that increasing protein concentrations can decrease oxygen diffusion in 3 in vitro systems. We postulate that it is possible, and in some circumstances probable, that diffusion might be a rate limiting step in both in vitro and in vivo biological systems.

In almost every biological system, substances which react inside a cell must first diffuse to and then into that cell. Diffusion, the process by which molecules move through quiescent liquids or boundary layers is a very slow process. It may be the controlling factor in any diffusion plus reaction sequence unless the reaction rate is extremely slow. The diffusion step is generally ignored in determining the rate of metabolism in biological systems. This is done by assuming that the thickness of any quiescent liquid film or boundary layer surrounding the cell is quite thin and thus offers negligible resistance to transport. Although such boundary layers may be quite thin, the transport rate across them may govern the rate of cell division⁴.

In this study we have attempted to determine the role of diffusion across the boundary layer in the metabolism of L1210 mouse leukemia cells. Specifically we have examined the effect of altering diffusion rates on the supply of oxygen available for aerobic metabolism. Diffusion rates can be altered by adding many types of compounds to the liquid medium^{5,6}. A substance which appears to have a substantial effect on the rate of diffusion is protein⁷. As the protein level increases, even over physiological ranges, the diffusivity of oxygen decreases.

Materials and methods. The effect of protein levels on the availability of oxygen was studied for L1210 cells. The rate of oxygen consumption by L1210 cells was determined as a function of protein concentration. The cells were grown in a medium consisting of RPMI 1640 plus 10% fetal calf serum. They were then harvested and resuspended in 3 ml of the growth medium in a final concentration of 9×10^5 cells/ml. This suspension was then placed in the chamber of an oxygen electrode (maintained at 37°C by a constant temperature bath) which was connected to an oxygen monitor (Yellow Spring Instruments) and a strip chart recorder. The suspension was continuously stirred by means of a magnetic stirring bar.

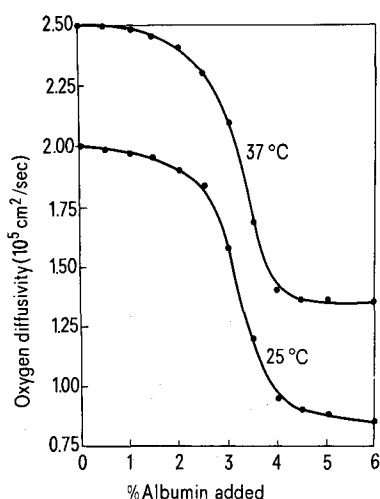


Fig. 1. Variation of oxygen diffusivity with albumin concentration in plasma.

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