LETTERS TO THE EDITORS

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Psalliotin, the Antibiotic of *Psalliota xanthoderma*

The antibiotic activity of the edible mushroom *Psalliota xanthoderma* was first described in some detail by Atkinson[1] in Australia. Wilkins[2] in England also recorded this mushroom as being antibiotic. Atkinson gave a number of characteristics of the antibiotic substance and also a list of sensitive and insensitive bacterial species, but refrained from naming the substance as a new antibiotic. Its peculiar and haphazard lability defeated attempts to concentrate and purify it, and the work was temporarily abandoned as the mushroom supply ran out.

This year a good crop of *Psalliota xanthoderma* appeared in and around Adelaide and work on purification of the antibiotic was recommenced using paper chromatography of aqueous extracts of mushroom stipes. Erratic results were obtained, some papers showing a good antibiotic zone near the solvent front, others showing no zone. The amount of activity on the paper was shown to depend upon the extent of exposure to daylight during the preparation of the spot of mushroom extract (100 μl.) and during the running and subsequent handling of the chromatogram. Spots prepared in dim light, run in the dark and afterwards handled in dim light, invariably produced antibiotic zones near the solvent front.

The sensitivity of the antibiotic in crude extracts to different types of light was investigated by exposing dried spots of extract (100 μl.) for various times to the diffuse daylight (not direct sunlight) of the working bench under the window. At the same time, and in the same position, similar spots were exposed under various Wratten filters, and a control spot was kept in a light-proof box.

This box control spot tested after four hours and twenty-four hours on the bench at room temperature showed excellent activity comparable to that of a similar spot kept in the dark in the refrigerator. Thus no deterioration occurred in twenty-four hours at room temperature in the dark. Rapid deterioration occurred, however, in diffuse daylight, as little or no activity was detected in the spots exposed directly to daylight for one to four hours. Good activity similar to the box control was found in spots exposed up to four hours under Wratten filters *A*, *B*, *C*, *E*, *F*, *G*, *H* and *Kl*, which were thus protective. The *D* filter (dark violet) was not protective, however. Spots exposed under it for one to four hours showed reduced or barely detectable activity.

Exposure to short-wave ultra-violet also inactivated the antibiotic extract. With the lamp used at present, emitting mainly in the 250 mμ region, complete inactivation of dried spots occurred at 18 cm. distance in one hour, and considerable reduction of activity in twenty minutes. Long-wave ultra-violet was probably responsible to a large extent for the inactivation produced by daylight, as spots placed under glass, which blocked short-wave ultra-violet, showed little or no activity after exposure to daylight in the usual place on the bench for one to four hours.

As the yellow Wratten filters protected the antibiotic activity and gave good light transmission, a suitable source of yellow light was sought for use during experimental work on the antibiotic extracts. Of various sources tried, a Philips yellow dark-room globe was found most satisfactory. Spots exposed up to six hours under this light in a black box showed no reduction in activity. Thus work on this antibiotic mushroom may be safely carried out in this yellow light in an otherwise darkened room.

The conclusion arising from this work is that the main destructive agent for the *Psalliota* antibiotic in crude extracts is bright light. Success can only be achieved by continually protecting it from bright light. Earlier work must therefore be repeated under suitable lighting. Many earlier results have already been checked and purification procedures are being carried out either in the dark or in the yellow light.

Because of its light sensitivity in crude extracts, the antibiotic of *Psalliota xanthoderma* appears to be new and unique. Therefore it may justifiably and conveniently be given the new name psalliotin.

A detailed account of this work will be published elsewhere.

Nancy Atkinson

Department of Bacteriology,
University of Adelaide,
South Australia.
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[1] Atkinson, N., *Aust. J. Exp. Biol.*, **24**, 169 (1946); *Med. J. Aust.*, **1**, 605 (1949).
[2] Wilkins, W. H., *Ann. App. Biol.*, **33**, 188 (1946).

Antibiotic Production by Actinomycetes in Soil demonstrated by Morphological Changes induced in *Helminthosporium sativum*

It has often been suggested that the production of antibiotics in soil is at least partly responsible for the antagonistic relationships between actinomycetes and plant pathogenic fungi; but little direct evidence has been obtained to offset the fact that these substances have rarely been extracted from soil.

A number of soil actinomycetes were selected for their antibiotic activity towards *Helminthosporium sativum*. These actinomycetes were shown to reduce root-rot of wheat when inoculated simultaneously with the fungus into sterile soil. Reduction in disease incidence was correlated with the degree of antagonism exhibited by the actinomycetes *in vitro*, suggesting that antibiotics were responsible for the disease control. In these experiments we were unable to extract the active antibiotic from the soil, but the possibility remained that antibiotics were present in sufficient concentrations to cause localized effects in soil.

A number of workers have described morphological changes in fungi caused by antibiotics, and it appears that these substances affect the morphological development of a given fungus in a characteristic and reproducible manner[1-3].

In vitro experiments were carried out to determine the effects of the antibiotics produced by the selected actinomycetes on the spores and hyphæ of *H. sativum*. Inhibition of development and morphological changes of the fungus varied with the actinomycete, but the effects noted were quite characteristic. *H. sativum* spores either failed to germinate or were inhibited at a point just subsequent to germination. Antibiotic effects on the hyphæ of *H. sativum* were determined by germinating the fungal spores for twenty-four hours before placing them in the presence of the