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Radicinin: a new pigment from stemphylium radicinum / D. D. Clarke F. F. Nord
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Radicinin: A New Pigment from *Stemphylium radicinum*

The occurrence and pathological effects of *Stemphylium radicinum* have been reported by Snyder (1) who also observed that this organism secretes a yellow pigment which crystallizes in the medium under certain conditions. Previous communications from this laboratory have shown that mold pigments, depending on their structure, are capable of influencing certain enzymatic reactions, particularly the rate of dehydrogenations and the mechanism of carbohydrate → fat conversion (2-5). Attempts are now being made to elucidate the structure of this new pigment with a view to correlating its constitution with its action on enzymatic systems.

The organism was grown on potato-dextrose medium at 28°C. in the dark, and the pigment was obtained from the medium by continuous ether extraction approximately 6 weeks after inoculation. The light-yellow crystals melt at 220°C. with decomposition and possess the empirical formula $C_{12}H_{12}O_5$ according to the following microanalyses:

\[
\text{Anal. Cacl. for } C_{12}H_{12}O_5: \quad \text{C, 61.01; H, 5.12; O, 33.87;} \quad 2\text{CH}_3(\text{C}), 12.7. \quad \text{Found:} \quad \text{C, 60.95; H, 5.38; O, 33.78; OCH}_3, 0.0; 2\text{CH}_3(\text{C}), 11.9.
\]

Preliminary x-ray data show $a_0 = 6.50$ Å, $b_0 = 8.07$ Å, $c_0 = 10.78$ Å, $\alpha = \beta = \gamma = 90^\circ$, and corroborate the above molecular formula. The space group $P2_12_12$ agrees with the fact that radicinin is optically active, $[\alpha]_D = -175.7^\circ$ (ethanol). The ultraviolet absorption curve has maxima at 340-42 μm ($E_{1%}^\text{cm.} = 2550$) and 270 μm ($E_{1%}^\text{cm.} = 850$). This intense absorption band at 340 μm is very unusual for carbonyl compounds. There are infrared absorption bands at 2.90 μm (−OH), 5.66 μm (−C=O), and 6.02 μm (−C=O). The pigment is insoluble in dilute acids and sodium bicarbonate but soluble in alkali to give a red solution which slowly absorbs oxygen from the atmosphere. It reduces Fehling’s solution and Tollens’ reagent and forms a diacetate and a mono-2,4-dinitrophenylhydrazone. From degradation studies and other available data the probable structure seems to be best represented by the formula:

\[
\begin{align*}
\text{O} & \quad \text{C} = \text{O} \\
\text{H} & \quad \text{H} \\
\text{O} & \quad \text{C} \quad \text{CH}_3 \\
\end{align*}
\]

Our interest was also directed to an understanding of its possible functions, and it was found that at a concentration of approximately $10^{-5} M$ this pigment appreciably increased the rate of dehydrogenation of isopropyl alcohol when incorporated in the medium of growing *Fusarium lini* Bolley (FIB). Contrary to the observations with the pigments solanione (4) and lycopersin (5), radicinin did not influence the growth of FIB on Raulin-Thom medium.

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\[1\] Snyder, W. C., private communication.
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References


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