M/200,000 adenosine triphosphate, one hesitates, in view of the well-known difficulty of eliminating co-enzyme completely from the enzyme system, to accept the evidence for esterification without coenzymic intervention which has so far been provided.

L. P. KENDAL. L. H. STICKLAND.

Department of Experimental Pathology and Cancer Research, School of Medicine, Leeds. July 28.

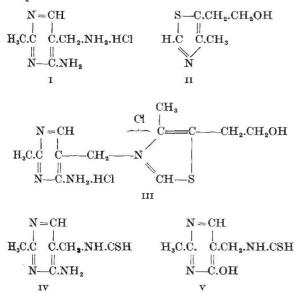
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Growth Factors for Phycomyces

DURING the last three years, Schopfer has published several papers¹ showing that vitamin B_1 is a growth factor for *Phycomyces*. This mould can now be grown on a synthetic medium composed of glucose, asparagine, inorganic salts and the vitamin. During the last two years, he has described² an alternative growth factor ('MP') which differs from the vitamin in being resistant to heat (128° C. for 20 hours causes only 75 per cent loss of activity) and resistant to alkali; it is oxidized by hydrogen peroxide.

Knight^{3,4} has shown that his growth factor for Staphylococcus consists of three parts, two being the pyrimidine (1) and thiazole (11) components of vitamin B_1 (11), and the third being nicotinic acid or its amide. Very recently Schopfer and Jung⁵ have stated that vitamin B_1 can be replaced as a growth factor for Phycomyces by the pyrimidine and thiazole components.



Through the kindness of Dr. Todd, I had also been able to test four synthetic compounds (I, II, IV and v) as growth factors for Phycomyces. On a medium composed of glucose, asparagine and inorganic salts, no growth is obtained when these four compounds are added singly. But I and II together give a very large growth (cf. Schopfer and Jung), IV and II a fair growth, while v and II give no growth. Further, a neutral solution of vitamin B_1 , autoclaved for two hours at 125° C., still acts as growth factor for Phycomyces, although the compound is destroyed. The activity of compounds I and IV is not destroyed by this treatment, even in presence of N/10 NaOH; hydrogen peroxide, however, destroys the activity. This supports Schopfer's suggestion that his factor 'MP' consists of degradation products of vitamin B₁. There is no doubt that vitamin B₁ itself, as well as its constituents, is a growth factor, since a solution sterilized by filtration through glass instead of by autoclaving remains active. Vitamin B1 diphosphate ("co-carboxylase" of Lohmann), which was kindly supplied by Prof. Lohmann, is about as active as the vitamin itself.

H. M. SINCLAIR.

Department of Biochemistry, Oxford. June 29.

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Constituents of Vitamin E Concentrates from Riceand Wheat-Germ Oils

THE pioneer work of Evans and his collaborators on the anti-sterility factor (vitamin E) has culminated in the isolation from the unsaponifiable fraction of wheat-germ¹ and cotton-seed² oils of three apparently isomeric oily alcohols α -, β - and γ -tocopherol of approximate formula $C_{29}H_{50}O_2$, all of which show high vitamin E activity. The use of the unsaponifiable fraction of rice-germ oil as a source of vitamin E was advocated by Kimm³, who later⁴ prepared from a purified concentrate a β -naphthoate, m.p. 156°, which yielded on hydrolysis a product alleged to have very high vitamin E activity.

By acylation of purified concentrates from the unsaponifiable portion of rice-germ oil with p-nitrobenzoyl chloride or β-naphthoyl chloride we obtained a complex mixture of oily and crystalline esters. The crystalline esters on separation and hydrolysis yielded three apparently homogeneous crystalline isomeric alcohols of formula $C_{30}H_{50}O$, (a) m.p. 121°-122°, (b) m.p. 113°-114° and (c) m.p. 119°-120°. The alcohol (c) yields a β -naphthoate corresponding in its properties to that of Kimm's active material; but like (a) and (b) it is devoid of vitamin E activity. Of these alcohols, (a) may be polyterpenoid in nature but (b) and (c) are certainly akin to the sterols, being similar in their properties to the tritisterols obtained by Karrer and Salomon⁵ from wheat-germ oil concentrates. In a parallel investigation of wheat-germ oil we isolated in similar fashion β -amyrin and two isomeric alcohols $C_{30}H_{50}O$ of the tritisterol type, (d) m.p. $113^{\circ}-114^{\circ}$ and (e) m.p. 175° ; of these (d) was also obtained by Karrer and Salomon. Neither (d)nor (e) possessed vitamin E activity.

The purified oils remaining after removal of these crystalline alcohols from both rice and wheat concentrates had a high biological activity, and gave, on thermal decomposition, considerable quantities of durohydroquinone C10H14O2, which Fernholz⁶ obtained by similar treatment of pure α -tocopherol. On treating the oil from the wheat concentrate with cyanic acid in benzene, a mixture of allophanates