the inactivation is less complete reaching a value of 80%. On the other hand, when no light of 260 mμ wavelength is transmitted there is no splitting of the molecule, as with filters 9700, 7740 and 5850.

From the results shown in Table I it is clear that the ultraviolet region responsible for the splitting of DPN and TPN lies between 210 and 280 mμ. This range could be actually narrowed down, because the filter 7910 has only 25% transmission at 230, and yet there is complete inactivation of DPN and TPN. Thus, it seems reasonable to conclude that the decomposition of DPN and TPN does not necessitate the far ultraviolet radiations. The same was shown to be true for several purines and pyrimidines[3], where the loss of the specific absorption spectrum resulted from the irradiation above 210 mμ, with the possible exception of adenine and adenylic acid.

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[1] M. W. SERAYDARIAN, A. I. COHEN AND H. Z. SABLE, *Am. J. Physiol.*, 177 (1955) 150.
[2] M. W. SERAYDARIAN, *Am. J. Physiol.*, 181 (1955) 291.
[3] A. CANZANELLI, R. GUILD AND D. RAPPORT, *Am. J. Physiol.*, 167 (1951) 364.
[4] E. J. RACKER, *J. Biol. Chem.*, 184 (1950) 313.

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3-Indoleacetic acid in human urine after muscular effort

It is well known that human urine inhibits the growth and germinative power of oats when added to the soil. However, KRÁL AND SCHMID[1] observed, that urine from sportsmen after muscular effort stimulates both properties.

This observation may be explained by the presence of a growth promoting substance in urine after physical effort or by the decrease of a growth inhibiting substance.

The aim of this study was to follow up the first of the two possibilities as it is well known, since the early work of KÖGL, that human urine contains a certain amount of the powerful growth stimulator 3-indoleacetic acid (IAA).

IAA was detected in urine by paper chromatography. Aromatic compounds from a 15 ml sample of urine acidified with acetic acid are adsorbed according to DECKER[2] on 400 mg of a mixture of equal parts of charcoal and silica. The adsorbed substances are extracted with 10 ml of the following mixture: *n*-butanol, water, ammonia, methanol (2:15:2:1). The extract is evaporated to dryness and the residue dissolved in 0.5 ml water. 25 μl of this solution is applied on paper and one-dimensional chromatograms are performed in butanol-ammonia mixture (*n*-butanol, ammonia, water 15:1:4). The spots were detected by spraying the paper with a solution of $FeCl_3$ in acetic acid (1:20), after which the IAA develops a bright red colour (R_F = 0.47). The spots before and after physical exertion were compared visually and the results expressed in terms of decrease, increase or no change.

Twenty-three samples (out of 28) of urine after muscular activity showed a more intensive spot lying in the position of IAA, 2 showed a spot of similar strength and 3 showed a weaker spot then in samples before muscular activity. Specific weight of the urines was the same before and after muscular activity.

From the above results it would seem that the factor stimulating the growth of oats, found in the experiments of KRÁL AND SCHMID[1] in urine after muscular activity is IAA.

The chromatograms of each urine show a greenish-blue spot of indigo blue (R_F = 0.54) resulting from urinary indican, not only after oxidation with $FeCl_3$, but also when the paper is exposed for several hours to air. However, the intensity of this spot seems to be greater before muscular activity than afterwards. The interesting correlation between the excretion of both substances is under investigation.

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[1] J. KRÁL AND L. SCHMID, *Medicina sportiva*, 2 (1955) 57.
[2] P. DECKER, *Z. inn. Med.*, 9 (1954) 966.

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