
COMMUNICATIONS TO THE EDITOR

INFRARED ABSORPTION AS A MEASURE OF ENOLIZATION

Sir:

Hilbert, Wulf, Hendricks and Liddell [THIS JOURNAL, **58**, 548 (1936)] discovered the absence of the absorption band at 1.50μ , which is recognized as being characteristic of the hydroxyl group, in molecules where hydrogen bond formation is possible. Their results have been confirmed in this Laboratory [Buswell, Dietz and Rodebush, *J. Chem. Phys.*, **5**, 84, 501 (1937)], where it was also discovered that the fundamental of the hydroxyl group at 2.75μ is not missing but is shifted to the neighborhood of 3.0μ with increased intensity. In one case, however, which was studied by them, dibenzoylmethane, we find no absorption characteristic of the hydroxyl group anywhere in the region 2.75 – 3.0μ . We do not believe this to indicate hydrogen bond formation, but rather that the compound is not, as Wulf and his collaborators assumed, largely in the enolic form. A titration with bromine confirms the conclusion that dibenzoylmethane in carbon tetrachloride solution is almost entirely in the ketonic form. The effect of solvent upon enolization has been recognized for a long time but its importance has perhaps not been realized. We have evidence that the percentage of enolization is much greater for example in chloroform than in carbon tetrachloride.

CHEMICAL LABORATORY OF THE
UNIVERSITY OF ILLINOIS
URBANA, ILLINOIS

A. M. BUSWELL
W. H. RODEBUSH
M. F. ROY

RECEIVED AUGUST 13, 1937

RELATION OF NICOTINIC ACID AND NICOTINIC ACID AMIDE TO CANINE BLACK TONGUE

Sir:

During the progress of our studies on the isolation of the antipellagra factor two facts have become evident which we feel may have significant application in the treatment of human pellagra.

First, a commercial preparation of nicotinic acid is highly effective in curing canine black tongue. The method of feeding the dogs and testing the concentrates has been described pre-

viously [Koehn and Elvehjem, *J. Biol. Chem.*, **118**, 693 (1937)]. Consideration of the solubility relationships and chemical properties of highly active concentrates together with the observation that nicotinic acid had some growth stimulating effect on rats suggested that this compound be tried on dogs. A single dose of 30 mg. of Eastman Kodak Company nicotinic acid gave a phenomenal response in a dog suffering from black tongue. The appetite improved immediately, the animal showed a growth response similar to that obtained on the original liver extract, the diarrhea disappeared, and upon further additions of the nicotinic acid growth continued uninterrupted. Similar responses have now been obtained in four dogs. One dog on the basal ration has been fed 100 mg. of nicotinic acid per week for three weeks with no indication of recurring symptoms and the dog appears normal in every way. There seems to be no question about the activity of this sample, at least, in the cure of black tongue.

Second, nicotinic acid amide has been isolated from highly active concentrates. Considerable difficulty was encountered in attempts to obtain crystals from liver concentrates (prepared by Eli Lilly and Company). However after distillation of certain concentrates in a molecular still, crystallization of the distillate became very simple.

The distillate proved very active in the cure of black tongue. Upon precipitation with mercuric chloride and subsequent removal of mercury from the precipitate, definite crystals which amounted to about 60% of the total distillate were obtained. These crystals also showed high activity. Recrystallization of the material as the hydrochloride gave a product melting at 227 – 228° uncorrected. An elemental analysis made by Dr. K. P. Link and Mr. H. Campbell gave the following results: C, 45.8; H, 4.6; N, 17.05. The theoretical results for nicotinic acid amide hydrochloride are C, 45.5; H, 4.4; N, 17.67. The melting point of synthetic nicotinic acid amide hydrochloride was found to be 230° and the mixed melting point was 227 – 228° . The free base was also prepared from the above hydrochloride and found to melt at 126 – 127° either alone or when mixed with known nicotinic acid amide.