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## Condensation of Vanillin Substitution Products with Methylene Derivatives

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the diet with synthetic products more or less closely related in chemical structure has led us to synthesize  $\beta$ -3-indoleacrylic acid and  $\alpha$ -oximino- $\beta$ -3-indolepropionic acid and feed them to rats in conjunction with a diet deficient in tryptophane. Reports in the literature on the availability of  $\beta$ -4-imidazoleacrylic acid in supplementing diets deficient in histidine are conflicting. No  $\alpha$ -oximino acid has been studied in this connection. The oxime of pyruvic acid, however, has been shown to undergo reduction, in the presence of vigorously fermenting yeast, to alanine.

The  $\beta$ -3-indoleacrylic acid was prepared by condensing  $\beta$ -3-indolealdehyde with malonic acid in the presence of pyridine and piperidine; the  $\alpha$ -oximino- $\beta$ -3-indolepropionic acid by condensing  $\beta$ -3-indolepyruvic acid with hydroxylamine. Neither product showed any capacity to replace tryptophane for purposes of growth under the experimental conditions employed.

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## CONDENSATION OF VANILLIN SUBSTITUTION PRODUCTS WITH METHYLENE DERIVATIVES

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Some compounds containing a methylene group adjacent to certain activating radicals will interact with the carbonyl radicals of aldehydes and ketones. These condensations seem to depend chiefly on (a) the nature of substituents in the starting materials, and (b) the character of the condensing agents.

The study of this reaction has been extended by the use of the vanillin substitution products that have been synthesized in this laboratory within the past few years. These aldehydes have been condensed with nitromethane, where it was found that ammonium acetate dissolved in glacial acetic acid is a suitable condensing agent. In order to learn the behavior of a methyl group attached to a cyclic structure, nitromethane was replaced by 2, 4-dinitrotoluene. Here piperidine was found to be the most suitable condensing agent. Further work is in progress.

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