

2. When all conditions were the same except the presence or absence of the adsorbent and the velocity of hydrolysis was relatively large, then the amount hydrolyzed in a given time was less in the presence of the adsorbent.

3. The decrease in rate appears to be due largely to the uneven distribution of the invertase in the reaction mixture, because by preventing the settling of the adsorbent combined with the enzyme the extent of the retardation was diminished.

4. When the velocity of hydrolysis is relatively small then it is practically the same irrespective of whether the enzyme is combined with aluminum hydroxide or not. As a tentative explanation it is suggested that under these conditions the rate of diffusion of the sucrose to and the invert sugar from the enzyme combined with the adsorbent is probably greater than the rate of hydrolysis of the sucrose.

5. No evidence has been obtained so far which indicates that the true activity of the invertase, as distinguished from the resultant rate of hydrolysis of the sucrose in the mixture, is influenced by the combination of the invertase with the adsorbent.

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[CONTRIBUTION FROM THE SCHOOL OF CHEMISTRY, UNIVERSITY OF PITTSBURGH.]

DERIVATIVES OF 2,4,6-TRINITRO-BENZALDEHYDE.¹ II.

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In the previous report,² the object of the research and references to the literature were given together with the theoretical phase of the subject.

The reactions investigated were all of the general type of condensations previously described³ for the preparation of modified "Schiff's bases."³ Condensations were carried out between 2,4,6-trinitro-benzaldehyde and the following substituted amines: *o*-anisidine, *p*-anisidine, *o*-phenetidine, *p*-phenetidine, *o*-chloro-aniline, *p*-chloro-aniline, and 2,4-dichloro-aniline.

Experimental Part.

Preparation of 2,4,6-Trinitro-benzaldehyde.—The method used in the preparation of this compound was essentially that described by Sachs

¹ This report represents an abstract of a thesis presented by Wilmer Baldwin in partial fulfilment of the requirements for the degree of Master of Science, June, 1921.

² THIS JOURNAL, **43**, 341 (1921).

³ *Ber.*, **35**, 984 (1902).

and Kempf and Everding.⁴ Certain modifications of this method worked out by Lowy and Balz⁵ in these laboratories were followed.

The table below contains an abstract of the results obtained.

Product.	M. p. ° C.	Color.	RESULTS.		Found. Analysis. %.	Calculated. % Cl.	Found. %.
			Crystallizing medium.	Calculated. % N.			
2,4,6-tri-nitrobenzal- <i>o</i> -phenetidine	178.5	yellow	alcohol	15.56	15.50 15.63		
2,4,6-tri-nitrobenzal- <i>p</i> -phenetidine	177	light orange	alcohol	15.56	15.60 15.45 15.30		
2,4,6-tri-nitrobenzal- <i>o</i> -anisidine	171.5	yellow	chloroform	16.19	16.04 16.10		
2,4,6-tri-nitrobenzal- <i>p</i> -anisidine	182	yellow	chloroform	16.19	16.01 16.24		
2,4,6-tri-nitrobenzal- <i>o</i> -chloro-aniline	187	yellow	acetone	15.98	15.94 15.80	10.11	10.00 9.98 9.82
2,4,6-tri-nitrobenzal- <i>p</i> -chloro-aniline	180	yellow	acetone	15.98	15.97 16.03	10.11	9.87 9.92 9.87
2,4,6-tri-nitrobenzal-2,4-dichloro-aniline	198	yellow	acetone	14.81	14.90 14.63	18.42	18.08 18.22 18.24

In the preparation of compounds listed above the ratio of one mole of 2,4,6-trinitro-benzaldehyde to one mole of the substituted amine was used in all cases. Glacial acetic acid or hot alcohol was used as condensing agent in all the above preparations. These products are soluble in acetone, chloroform and benzene and insoluble in water. On hydrolysis with 1:1 hydrochloric acid they yield 2,4,6-trinitro-benzaldehyde and the respective amines.

When the condensations of 2,4,6-trinitro-benzaldehyde and *o*-chloro-aniline, *p*-chloro-aniline, and 2,4-dichloro-aniline were carried out in hot glacial acetic acid solution, orange colored products were obtained, with melting points in all cases approximately 100° higher than those of the products prepared in the cold acetic acid solution. These compounds are insoluble in many solvents except glacial acetic acid. Preliminary work seems to indicate that they are dimolecular condensation products as exemplified by the following types. One molecule of 2,4,6-trinitro-benzaldehyde may be made to condense with 2 molecules of *tertiary* alkylated aromatic amines, substituted aromatic amines, or phenolic.

⁴ Sachs and Kempf, *Ber.*, **35**, 1236 (1902); Everding, *ibid.*, **36**, 960 (1903).

⁵ Lowy and Balz, *THIS JOURNAL*, **43**, 343 (1921).

bodies to produce derivatives of triphenyl methane. Danckwortt⁶ condensed *p*-nitrobenzaldehyde with phenolic bodies. Since these condensations present possibilities for the preparation of dyes they are now being investigated.

The above tabulated list of compounds like many other similar condensation products are affected to a considerable extent by the action of light. It was noted that the halogenated derivatives were particularly susceptible to light.

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NOTES.

The Enzymes of the Abdominal Adipose Tissue of the Common Turkey, *Meleagris Gallopavo*.—While the constants of turkey fat have been studied by several investigators, the enzymes, which occur in the adipose tissue (crude fat), have not been studied. Such a study, made upon samples of known history, is reported in this paper. The turkeys were hens, grown and killed in central Tennessee. They were marketed during the Christmas season. In trade parlance, they were dry picked, air chilled, well bled, undrawn (uneviscerated) birds. After slaughter, they were kept in a mechanically refrigerated chill room or cooler at a temperature of approximately 0° for 3 days, then were shipped to this city by express, two days being required for the journey. Upon arrival at Philadelphia, they were again placed in a mechanically refrigerated chill room, in which they were kept at a temperature of approximately 0° for from 3 to 7 days; they were then removed for study.

An aqueous extract of the abdominal adipose tissue (crude gizzard fat) was prepared as in the studies of chicken fat by Pennington and Hepburn.¹ The technic in the test for lipase, esterase, catalase, reductases, oxidase, and peroxidase was that used in the studies cited with the following modifications. Tributyrin was used as a substrate for lipase, and ethyl butyrate for esterase. In testing for catalase, 20 cc. of the aqueous extract was taken; and the volume of the evolved oxygen was recorded without correction. As reagents for oxidizing enzymes, use was made of α -naphthol, trikresol, and phenolphthalin; when phenolphthalin was the substrate, 0.1 *N* sodium hydroxide solution was added after incubation until the phenolphthalein present showed its maximum red color.

The proper control experiments were always made on the boiled aqueous extract in order to allow for all changes in the substrate not due to enzyme action. Trikresol was used as a bactericide at a concentration of 0.2% in the tests for lipase, esterase, simple reductase, and protease.

⁶ Danckwortt, *Ber.*, **42**, 4163 (1909).

¹ Pennington and Hepburn, *THIS JOURNAL*, **34**, 210 (1912); *Bur. Chemistry, Circ.*, **75**, 1 (1911); **103**, 6 (1912).