

Effect of 2-6 Dinitrophenol on Yeast Respiration.*

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Undissociated 2-4 dinitrophenol (alpha-DNP) stimulates yeast respiration^{1, 2, 3} and fermentation.¹ We have undertaken a survey of the action of the isomers of this substance, the first studied being 2-6 dinitrophenol (beta-DNP). The experimental procedure has been described elsewhere.^{1, 2}

Beta-DNP resembles alpha-DNP in that only the undissociated acid affects yeast metabolism. The action is less intense, in that optimal doses of alpha-DNP cause approximately 100% increase in the rate of oxygen consumption, while the beta form raises the respiratory rate by about 50% in optimal doses. Similar relations have been demonstrated in the capacities of these substances to induce hyperthermia in the pigeon.⁴ The optimal concentration of beta-DNP at pH 5.4 and at pH 6.0 in glucose phosphate solutions is about 1.4 mg. of the undissociated acid per liter.

Like alpha-DNP, beta-DNP rapidly induces either stimulation or inhibition, depending upon concentration. The effect develops within 5 minutes.

Inhibition of respiration by beta-DNP is reversible, as is the similar inhibition by alpha-DNP.

A slight further increase over the beta-DNP optimum can be evoked by addition of alpha-DNP. Addition of optimal concentration of beta-DNP to yeast suspensions in which the alpha-DNP concentration is optimal causes a decrease in the alpha-DNP effect. Further studies on these interrelations are in progress.

Like alpha-DNP, the action of beta-DNP does not depend upon the presence of glucose, but unlike alpha-DNP the usual stimulation pattern in phosphate buffer at pH 5.4 is not obtained in acetate buffer at pH 5.4.

Studies on the action of other isomers are now in progress.

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¹ Field, J. 2nd, Martin, A. W., and Field, S. M., *PROC. SOC. EXP. BIOL. AND MED.*, 1933, **31**, 56.

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³ Ehrenfest, E., and Ronzoni, E., *PROC. SOC. EXP. BIOL. AND MED.*, 1933, **31**, 318.

⁴ Tainter, M. L., and Cutting, W. C., *J. Pharm.*, 1933, **49**, 187.