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Data Article

Data supporting the spectrophotometric method for the estimation of catalase activity

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ABSTRACT

Here we provide raw and processed data and methods for the estimation of catalase activities. The method for presenting a simple and accurate colorimetric assay for catalase activities is described. This method is based on the reaction of undecomposed hydrogen peroxide with ammonium molybdate to produce a yellowish color, which has a maximum absorbance at 374 nm. The method is characterized by adding a correction factor to exclude the interference that arises from the presence of amino acids and proteins in serum. The assay acts to keep out the interferences that arose from measurement of absorbance at unsuitable wavelengths.

Specifications table

Subject area	Biochemistry
More specific subject area	Enzymology
Type of data	Tables, text file, figure
How the data was acquired	Spectrophotometry, Shimadzu 1800 spectrophotometer was used in the study
Data format	Analyzed output data
Experimental factors	Serum of one volunteer used without any treatment

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Experimental features	Catalase activity was assessed by incubating the enzyme sample in 1.0 ml substrate (65 μmol/ml hydrogen peroxide in 60 mmol/l sodium–potassium phosphate buffer, pH 7.4) at 37 °C for three minutes. The reaction was stopped with ammonium molybdate.
Data source location	Hilla city, Babylon governorate, Iraq
Data accessibility	Data is with this paper

Value of the data

- The data presented method that characterizes by adding a correction factor to exclude the interference that arises from the presence of amino acids and proteins in serum.
- The data presented assay that acts to keep out the interferences that arose from measurement of absorbance at unsuitable wavelength.

1. Description of the actual data

The following data includes tables, text file and figure that help to measure catalase enzyme activity.

2. Experimental design

2.1. Principle

Catalase catalyzes the following reaction:

$$2H_2O_2 \xrightarrow{\text{Catalase}} 2H_2O + O_2$$

Catalase activity was assessed by incubating the enzyme sample in 1.0 ml substrate (65 μmol/ml hydrogen peroxide in 60 mmol/l sodium–potassium phosphate buffer, pH 7.4) at 37 °C for three minutes. The reaction was stopped with ammonium molybdate. Absorbance of the yellow complex of molybdate and hydrogen peroxide is measured at 374 nm against the blank.

Reagents

1. Sodium, potassium phosphate buffer (50 mM, pH 7.4): this buffer is prepared by dissolving 1.1 g of Na_2HPO_4 and 0.27 g of KH_2PO_4 in 100 ml distilled water.
2. H_2O_2 (20 mM) in 50 mmol/l sodium, potassium phosphate buffer: this solution is freshly diluted and standardized daily using a molar extinction coefficient of 43.6 M^{-1} cm^{-1} at 240 nm.
3. Ammonium molybdate (32.4 mmol/l).

Instrument:
Shimadzu 1800 spectrophotometer was used in the study.
Procedure: shown in Table 1.

3. Calculation

The rate constant of a first-order reaction (k) equation is used to determine catalase activity:

$$\text{Catalase Activity of test kU} = \frac{2.303}{t} * \left[\log \frac{S^{\circ}}{S - M}\right] * \frac{Vt}{Vs} \quad (1)$$

t: time.
S°: absorbance of standard tube.