MALATE DEHYDROGENASE

(L-Malate: NAD oxidoreductase E.C 1.1.1.37)

$$\textit{Oxaloacetate + NADH + H}^{+} \xrightarrow{\textit{malate dehydrogenase}} \textit{L-Malate + NAD}^{+}$$

Preparation and Specification

Appearance:	White amorphous powder
Specific activity:	70U/mg-solid or more
Source:	Microorganism
Storage temperature:	-20°C
Unit definition:	One unit causes the formation of one micromole of orange dye per minute at pH7.5 at 37°C.

Properties

Molecular weight:	34 kDa (SDS-PAGE)	
Isoelectric point:	pH 4.8$\pm$0.1	
Michaelis constant:	5.0 X 10^{-6}M (Oxaloacetate), 8.1 X 10^{-6}M (NADH)	
Optimum pH:	8.5	(Fig.1)
Optimum temperature:	40°C	(Fig.2)
pH Stability:	6.0 – 10.0 (25°C, 20hr)	(Fig.3)
Thermal stability:	Stable at 50°C and below (pH 7.5, 15min)	(Fig.4)
Effect of various chemicals:		(Table 1)

Table 1.

Effect of Various Chemicals on Malate dehydrogenase

(The enzyme solution dissolved in 0.1M K-phosphate buffer, pH 7.5 contg. 0.2% of BSA (20U/ml) was incubated with each chemical at 25°C for 1hr.)

Chemical	Concn.(mM)	Residual activity(%)
None	-	100
$CaCl_2$	2.0	93
$CoCl_2$	2.0	100
$FeCl_3$	2.0	101
$MnCl_2$	2.0	95
$ZnSO_4$	2.0	94
$NiCl_2$	2.0	99
$CuSO_4$	2.0	98
$MgSO_4$	2.0	104
Borate	2.0	96

Chemical	Concn.(mM)	Residual activity(%)
BME	2.0	90
NEM	2.0	106
EDTA	2.0	93
NaN_3	2.0	97
ProClin	0.045%	105
Na-cholate	0.10%	104
SDS	0.05%	117
Triton X-100	0.10%	92
Tween 20	0.10%	94

Fig.1. pH-Activity

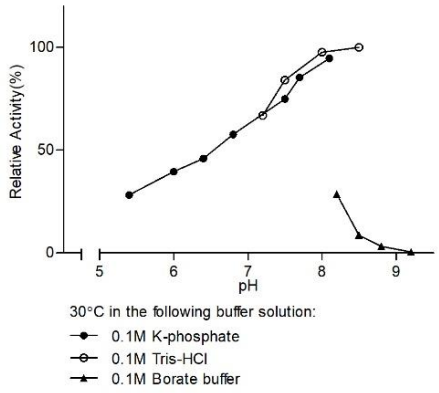

Fig.3. pH-Stability

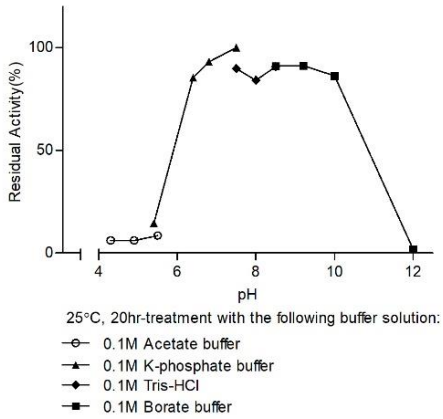

Fig.2. Temperature Activity

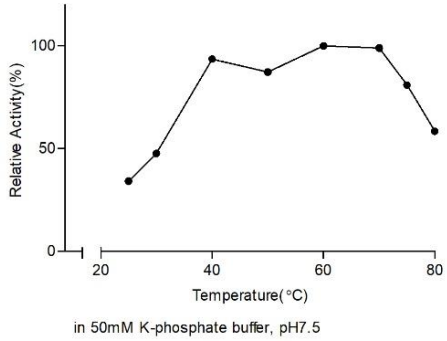

Fig.4. Thermal Stability