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KINETIC AND THERMODYNAMIC STUDY OF GST AND RELATION WITH SOME BIOCHEMICAL VARIABLES IN HBV PATIENTS

Abdullah H. Abdullah[1], Susan J. Ali[2]* and Amir F. Dawood[1]

[1]Department of Chemistry, College of Science, University of Diyala, Iraq.
[2]Department of Chemistry, College of Education for pure Science, Tikrit University, Iraq.
*e-mail : susan.ali@tu.edu.iq

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ABSTRACT : This study was conducted to determine the activity of the Glutathione-S- transferase in serum of patients with acute Hepatitis B and to study its relationship with some biochemical variables such as (Total bilirubin, Alkaline phosphate, Aspartate amino transferase, Alanine aminotransferase, Urea, Creatinine, Albumin, Total protein and lipid profile). The study included total 62 blood samples of two groups, the first group included 31 blood samples of apparently healthy subjects as control group consisted of 14 male and 17 female, the second group was included 31 blood samples of Hepatitis B, which consisted of 15 male and 16 female. The results showed a significant increase ($p \leq 0.05$) in Glutathione-S-transferase activity in patients compared with control. The study also showed a positive correlation between Glutathione-S- transferase activity and Low density lipoprotein while a negative correlation was observed between Glutathione-S-transferase and Alanine aminotransferase and Aspartate amino transferase.

The results of the kinetic study showed that the optimum substrate concentration was 0.15M, optimum pH was 8.5, optimum temperature was 30°C and optimal incubation time at 7min. Michalis Menton constant was 0.37 mM and the maximum velocity was 208.33 $mM.min^{-1}L^{-1}$. The results of thermodynamic studies of the Glutathione-S-transferase showed that the activation energy was 6.37KJ / mol, the Enthalpy was 5.91KJ / mol, the Entropy was 9.89 KJ/mol.K and Gibbs energy was -301.7KJ/mol.

Key words : Kinetic, thermodynamic, GST, biochemical variables, HBV patients.

INTRODUCTION

Hepatitis means inflammation of the liver. There are many reasons for the liver to be inflamed by viral, toxic, metabolic, pharmacologic, or immune-mediated attack on the liver. Viral hepatitis is a major global health problem all over the world (Wang *et al*, 2006). The infection with chronic hepatitis B (HBV) and C (HCV) viruses and alcoholic and non-alcoholic fatty liver disease are the major etiologies (Mazzaferro *et al*, 1996).

Acute infection with hepatitis B virus (HBV) or hepatitis C virus (HCV) can result in chronic hepatitis if the infection persists for more than six months. The rate of spontaneous clearance varies according to the virus, the age of the patient at onset of infection and other factors (Papavramidou *et al*, 2007).

Hepatitis B virus (HBV) infection is a worldwide problem, two bilions people have been infected with hepatitis B virus (HBV) 360 million have chronic infection, and 600,000 die each year from HBV-related liver disease or hepatocellular carcinoma (HCC). Hepatitis B virus (HBV) belongs to the Hepadnaviridae family, Humans are the only known natural host. HBVenters the liver via the bloodstream and replication occurs only in liver tissue (Pashankar *et al*, 2001). HBV can be transmitted vertically from mother to children or horizontally through sexual or household contact or by unsafe injections, but chronic infections acquired during infancy or childhood account for a disproportionately large share of worldwide morbidity and mortality (Monaghan *et al*, 1996).

Glutathione-S-transferases (GSTs) are a group of enzymes that are important in the detox cations of many different xenobiotics in mammals. The enzymes protect cells against toxicants by conjugating the thiol group of the glutathione to electrophilic xenobiotics and thereby defend cells against the mutagenic, carcinogenic (Kaplan *et al*, 2005) and toxic effects of the compounds. GST present in most mammalian tissues, especially in the liver, which plays a key role in detoxification (Liebert *et al*, 2000).

When investigating the correlation between GST activity in acute HBV patients, positive association with transporting liver enzymes.