Journal of Innovations in Pharmaceutical and Biological Sciences (JIPBS)
ISSN: 2349-2759
Available online at www.jipbs.com

Research article

Biochemical isolation and characterization of glucose-6-phosphate dehydrogenase, 6-Phosphogluconate dehydrogenase and glutathione reductase enzymes from camel kidney

Mohamed M. Abdel-Monsef*, Doaa A. Darwish, Mahmoud A. Ibrahim

Molecular Biology Department, National Research Centre, Postal code: 12622, El-Tahrir st., Dokki, Giza, Egypt.

Key words: 6-phosphogluconate dehydrogenase, Camel kidney, Glucose-6-phosphate dehydrogenase, Glutathione reductase.

***Corresponding Author: Mohamed M. Abdel-Monsef,** Molecular Biology Department, National Research Centre, Postal code: 12622, El-Tahrir st., Dokki, Giza, Egypt.

Abstract

A rapid and simple purification method of glucose-6-phosphate dehydrogenase (G6PD), 6-phosphogluconate dehydrogenase (6PGD) and glutathione reductase (GR) from camel kidney with a high yield was carried out. Camel kidney enzymes (G6PD, 6PGD, and GR) were purified homogeneously by one chromatographic step on 2′, 5′ ADP Sepharose 4B affinity column. After chromatography, the specific activity of G6PD was increased to 19.5 units/mg protein with 65.4% yield and 300-fold purification, while the specific activity of 6PGD was increased to 42.4 units/mg protein with 75.8% yield and 557.9-fold purification and the specific activity of GR was increased to 35.5 units/mg protein with 68.9% yield and 710-fold purification. G6PD, 6PGD and GR enzymes are appeared homogeneous on both native and 12% SDS-PAGE, with molecular weights of 60 kDa, 58 kDa and 65 kDa respectively. They displayed their optimum activity at pH 8.0, 8.2 and 7.8 respectively. The divalent cations $MgCl_2$ and $MnCl_2$ increased G6PD and 6PGD activity, while $FeCl_2$, $CuCl_2$ and $ZnCl_2$ inhibited them. $CuCl_2$, $ZnCl_2$ and $NiCl_2$ increased GR activity, while $FeCl_2$ and $MgCl_2$ inhibited it. NADPH inhibited G6PD and 6PGD activity while NADP inhibited GR activity. This study is the first report on the purification of G6PD, 6PGD, and GR from the camel kidney. A task for the future is the production of these enzymes for industrial medical applications.