1. The effect of experimental diabetes mellitus on testicular metabolism of mature rat was studied. Diabetes was induced by a single intraperitoneal injection of alloxan at a dose of 120 mg/kg body weight.

2. Alloxan treatment caused severe hyperglycemia and significant decrease in serum testosterone level.

3. Body weight and accessory sex organs' weight were significantly reduced whereas the testicular weight was not appreciably altered.

4. Among the glycolytic enzymes studied, pyruvate kinase activity was significantly decreased whereas glucose-6-phosphate dehydrogenase activity was markedly increased. Hexokinase, phosphofructokinase and lactate dehydrogenase activities were however, unaltered.

5. Diabetes caused a significant increase in activities of LDH₃ and LDH₅, without altering the activities of LDH₁, LDH₂ and LDH₄ isozymes. LDHₓ, which is a germ-cell specific LDH isozyme, registered a marked decrease.
6. The activities of Na\(^+\) - K\(^+\) and Mg\(^{2+}\) dependent ATPases were significantly decreased whereas that of Ca\(^{2+}\) dependent ATPase was unaltered.

7. To conclude it is suggested that the data obtained in the present study reflect the definite influence of diabetic state on testicular glycolytic enzymes and ATPases. Further, diabetes induced decrease in serum testosterone and the testicular LDH\(_X\) activity, which is specific to germ cells are indicative of the deleterious effect of diabetes on testicular functions.