

**Effect of Gymnemic acid in combating skeletal muscle mitochondrial derangements in Type-2-Diabetic rats.**

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**ABSTRACT**

Diabetes mellitus is a chronic multifactorial disease characterized by hyperglycemia resulting from either a lack of insulin production or resistance to insulin. Skeletal muscle is the largest Insulin-sensitive organ in humans accounting for more than 80% of insulin stimulated glucose disposal. Muscle mitochondrial metabolism is a tightly controlled process that involves the coordination of signaling pathways and factors from both the nuclear and mitochondrial genomes. Gymnemic acid, a saponin of triterpene glycoside is contained in leaves of *Gymnema sylvestre* has potent anti-diabetic properties. In the present study animals were divided in to five groups where Group-I serves as control, Group-II serves as diabetic control, Group-III serves as diabetic control supplemented with Gymnemic acid, Group-IV serves as Metformin control and Group-V serves as drug control. The main goal of this study is to evaluate the influence of type 2 diabetes on mitochondrial oxidative stress and to prove the efficacy of Gymnemic acid in enhancing antioxidant status in skeletal muscle. And to evaluate the potency of Gymnemic acid on altered lipid levels and mitochondrial enzymes (marker enzymes, TCA cycle enzymes and respiratory chain complex enzymes in Type 2 Diabetes. Key proteins concerned with biogenesis like AMPK, PPAR- $\gamma$ , PGC1- $\alpha$ , NRF-1 levels were determined by immunoblotting and found to be boosted upon supplementation of Gymnemic acid in Group-III animals. Treatment with GA upregulated mitochondrial biogenesis and restores skeletal muscle integrity and its function.