

Protective effect of thymoquinone against malathion induced disruption in isolated pancreatic islets of dog

S. Mostafalou^{1,*}, A. Nili-Ahmadabadi¹, N. Pourkhalili¹, A. Banani², M. Pakzad¹, S. Hassani¹, A. Mohammadirad¹, M. Baeeri¹, M. Abdollahi¹

¹Pharmaceutical Sciences Research Center, Tehran University of Medical Sciences, Tehran, Iran
²Department of Pharmacology, Faculty of pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran

Background and Aims: *Nigella sativa* seeds (known as black seed in Iran) have been used for thousands of years as a folk medicine for numerous disorders. Its main active component is thymoquinone (TQ) indicated to have a strong antioxidant activity. Furthermore, there is lots of evidence on disrupting effects of pesticides on pancreatic β cells through the process of oxidative stress. Since oxidative stress plays an important role in β cell failure, protective effects of TQ against malathion (MT) induced toxicity have been evaluated in isolated pancreatic islets of dog.

Methods: Pancreatic islets were isolated by collagenase perfusion, exposed to MT and TQ, and effective factors in transplantation procedure such as viability, insulin secretion, and reactive oxygen species (ROS) were examined.

Results: The LC50 of MT has been established 1 mM and three concentrations of TQ including 0.1, 1 and 10 mM were used in this experimental procedure. Viability of islets exposed to MT was significantly increased by TQ 10 mM. MT induced ROS formation was also decreased by TQ in a dose dependent manner. Moreover, the pattern of insulin secretion of islets in both basic and stimulated phases has been indicated to be improved in TQ treated groups.

Conclusions: The results of this study indicate that TQ as an antioxidant agent not only reduced MT induced ROS formation but also improved viability and function of isolated islets. Due to low antioxidant capacity of pancreatic β cells, oxidative stress has been found to play an important role in the reduction of viability and function of isolated islets. Hence, it seems that TQ as a natural antioxidant can be useful to prevent pesticide induced β cells dysfunction and is a valuable tool to find new approach in the management of metabolic disorders within the context of pancreatic failure.

Keywords: Thymoquinone; Antioxidant; Oxidative stress; Islet; Pesticide