CROCUS SATIVUS BIOACTIVE PROPERTIES AND MODULATION OF GLYCO-OXIDATIVE STRESS

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Introduction

Phytochemicals exert bioactive properties and act on the human genome to alter specific gene expression, thereby influencing molecular mechanisms involved in development of human diseases. Diabetes is associated with glyco-oxidative stress due to hyperglycemia. Some polyphenolic phytochemicals influence expression of genes relevant for the development of type 2 diabetes.

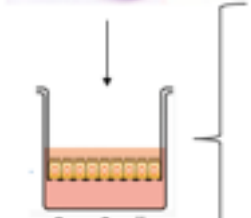
Aim of the study was to investigate the modulatory roles of Crocus sativus phytochemicals on glycoxidative stress and the cell signaling network implicated in pathogenesis of diabetes and inflammation-associated human diseases.

Experimental

Chemical profile of tepals and stigmas of *Crocus sativus* using ultra-high performance liquid chromatography-quadrupole time-of-flight mass spectrometry (UHPLC-QTOF).

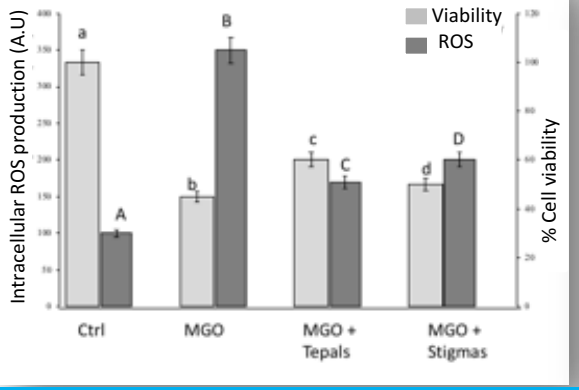
Effect on glucose absorption:
- Glucose transport assay
- GLUT2 and SGLT1 expression

Effect on glycoxidative damage induced by methylglyoxal (MGO):
- Intracellular ROS production by dichlorofluorescein probe (DCDFA)
- Cell viability by MTT assay
- Proinflammatory markers as NFkb and caspase3
- Epigenetic protein markers

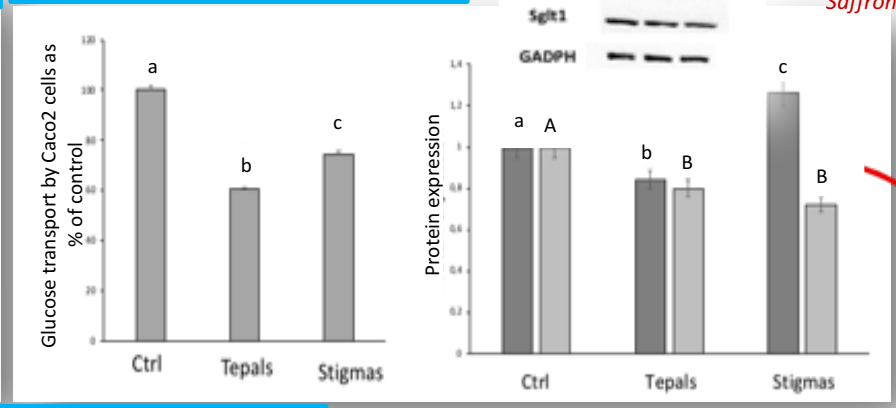


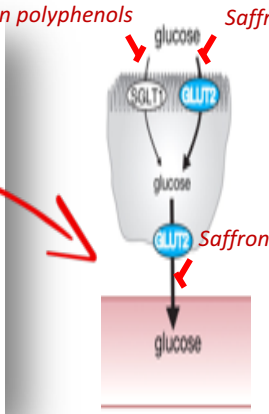
Results

Glycoxidative damage



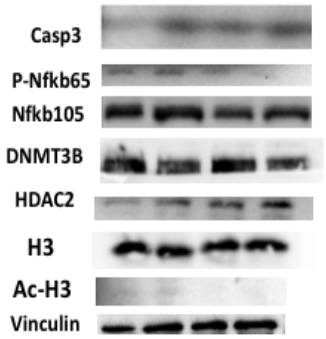
Glucose absorption

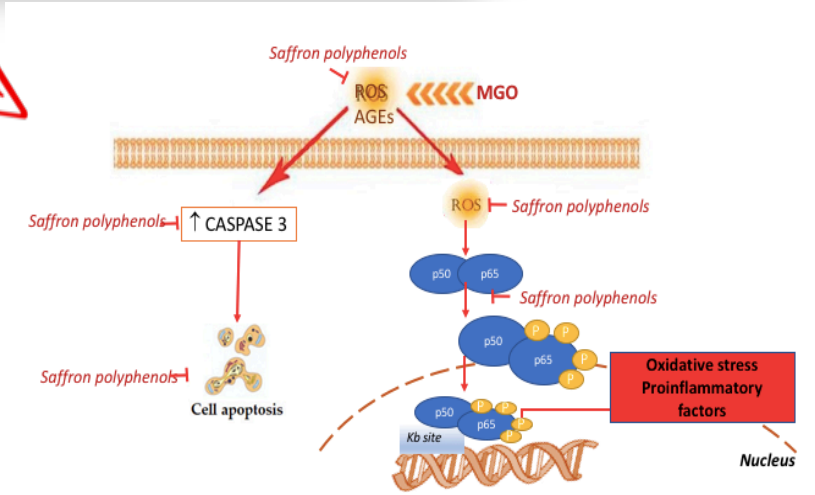




Proinflammatory and epigenetic marker proteins

Gene	Ctrl	MGO	MGO+ Tepals	MGO + Stigmas
Caspase 3	-	↑	↓	↓
P-Nfkb65	-	↑	↓	↓↓
Nfkb105	-	↑	↓	↑
DNMT3B	-	↓	↑	↓
HDAC2	-	↑	↑↑	↑↑
H3	-	-	-	-
AC-H3	-	↑	↓↓	↓↓





Conclusions

Crocus sativus stigma and tepals are rich in bioactive compounds (polyphenols and terpenoids) that possess antioxidant properties and anti-diabetic properties. Phytocompounds in *Crocus sativus* tepals and stigma modulate pro-inflammatory genes expression during glyco-oxidative stress. Epigenetic changes which include changes in DNA methylation and histone modifications seem to be involved.