

## *Crocus sativus* by-products as sources of bioactive extracts: pharmacological and toxicological focus on anthers

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### Abstract

Multiple studies revealed the potential application of high quality saffron byproducts as cheap sources of bioactive compounds endowed with antioxidant activity. In the present study, we analyzed the total fatty acids of the anthers, and explored the pharmacological and toxicological potential of anthers, by evaluating genotoxic and protective effects in multiple cell lines, brine shrimps and isolated rat tissues.

The phytochemical analyses showed that anthers are rich in long chain fatty acids most of which are unsaturated (80.51%). Particularly, anther water extract revealed to be well tolerated by multiple cell lines, and able to modulate reactive oxygen species (ROS) levels, without exerting either genotoxic or cytotoxic effects. The same extract was also able to blunt lipopolysaccharide (LPS)-induced nitrite and malondialdehyde (MDA) in isolated rat tissues. On the other hand, considering the concomitant null effect on HCT116 cell migration, in wound healing experimental paradigm, our findings suggest the efficacy of water anther extract as protective agent without any direct reverting effects on lesioned tissues.

Concluding, the promising results, deriving from the pharmacological and toxicological evaluations, support the valorization of saffron anthers as a strategy to optimize and develop the productive chain of Abruzzo saffron (Italy).

1996 Degree in Pharmacy "summa cum laude" at "G. d'Annunzio" University of Chieti-Pescara, Italy.

1996-2000 PhD. Program in Pharmacological Therapy and Pharmacological Vigilance in the School of Medicine of the "G. d'Annunzio" University.

2000 PhD. Degree in the School of Medicine of the "G. d'Annunzio" University. 2002 Postdoctoral fellowship Program in Pharmacological Therapy and Pharmacological Vigilance at the "G. d'Annunzio" University.

2002-2011 Assistant Professor in Pharmacology in the School of Pharmacy of the "G. d'Annunzio" University.

2011 Associate Professor Pharmacology in the School of Pharmacy of the "G. d'Annunzio" University.

2003-2009 member of the Board of Governors representing Researchers of the "G. d'Annunzio" University.

Department of Biology of Seluck University (Konya, Turkey): In collaboration with Professor Gokhan Zengin, we are studying the mechanism of action of herbal extracts from Turkey flora, with particular regards to potential protective effects against inflammatory and degenerative disorders.

-Department of Pharmacognosy, Faculty of Pharmacy and Biochemistry, Zagreb University (Zagreb, Croatia): In collaboration with Professor Sanda Vladimir-Knezevic, we are performing comparative studies of endemisms of Croatian and Middle Italy flora with particular regards to differences in phytochemical composition and potential protective effects against inflammatory and degenerative disorders.

-From 2017 to date: Review Editor of the journal "Frontiers in Pharmacology-Section Inflammation".

-Reviewer of many journals including: European Journal of Pharmacology, Phytotherapy Research, Phytomedicine, Molecules, International Journal in Molecular Sciences, Nutrients, Physiology and Behavior, Neurochemistry International, Food and Chemical Toxicology, Industrial Crops and Products.

### RESEARCH ACTIVITY

The pharmacological research activity of Prof. G. Orlando is focused on the following main research fields:

-Role of endogenous peptides on food intake and energy expenditure control;

-Protective effects of medicinal plants and extracts, with particular regards to inflammatory and neurodegenerative diseases.

-Pharmacology of central monoaminergic system.



### Biography:

#### EDUCATION AND WORK EXPERIENCE

Prof. Giustino Orlando was born in Villamagna (CH) Italy, on April 24, 1969.

1993-1996 intern student in the Laboratories of Pharmacology and Pharmacognosy in the School of Pharmacy of the "G. d'Annunzio" University, headed by Prof. Michele Vacca.

-Optimization of preclinical pharmacological models for the study of the mechanism of action of drugs.

#### *Speaker Publications:*

1. “Antiinflammatory, antioxidant, and behavioral effects induced by administration of growth hormone-releasing hormone analogs in mice”; *Scientific Reports /Volume 10/Issue 1*
2. “Antimicrobial, Antioxidant, and Antiproliferative Effects of *Coronilla minima*: An Unexplored Botanical Species”; *Antibiotics /Volume 9/Issue 9*
3. “Network analysis, chemical characterization, antioxidant and enzyme inhibitory effects of foxglove (*Digitalis cariensis* Boiss. ex Jaub. & Spach): A novel raw material for pharmaceutical applications”; *Journal of pharmaceutical and biomedical analysis /Volume 191*
4. “Pharmacological Properties and Chemical Profiles of *Passiflora foetida* L. Extracts: Novel Insights for Pharmaceuticals and Nutraceuticals”; *Processes /Volume 8/Issue 9*
5. “Evaluation of Antioxidant, Antimicrobial and Tyrosinase Inhibitory Activities of Extracts from *Tricholysurus goniopodium*, an Edible Wild Mushroom”; *Antibiotics*

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