

ABSTRACT

Natural products rich in health-promoting compounds could represent new potential therapy strategy in many diseases.

In the present study we focus our attention on *Capsicum annuum* L. cv Senise and *Solanum aethiopicum* L. cv Rotonda, two typical products of Basilicata region and source of health-promoting compounds. Particularly, we investigated molecular pathways involved in anti-obesity activity demonstrated in mice fed with high fat diet.

Firstly, antioxidant activity of samples was evaluated in HepG2 cell line. Cells were pre-treated with different doses of the extracts and ROS generation was measured by flow cytometry. Expression of several markers involved in antioxidant defence was evaluated by qRT-PCR in order to understand molecular mechanism responsible of the activity.

Oxidative stress characterized several pathology conditions. About obesity, prolonged exposure of excess of fat induced weight gain but also ROS and pro-inflammatory cytokines generation. Hypolipidemic, antioxidant and anti-inflammatory activity of the extracts were evaluated in HepG2 and Caco-2 cell line used as model. Lipid accumulation was morphologically evaluated by Oil red O staining and the expression of several markers involved in lipid metabolism, antioxidant defense and inflammatory status was measured by qRT-PCR. Both extracts reduced fat accumulation in OA-treated HepG2 cell line by reducing *de novo* lipogenesis and improved intestinal lipid absorption. Moreover, both extracts enhance the activity of antioxidant enzymes severely compromised in obesity.

Obesity is also associated with diabetes type 2 and cardiovascular risk. Senise pepper influenced the expression of some gene involved in insulin signalling pathway improving glucose uptake as demonstrated by 2-NBDG assay and ¹H-NMR analysis. In addition, Senise pepper demonstrated cardioprotective effect by improving endothelial dysfunction in obese mice (in collaboration with Universidad de Granada) due to inhibition of NADPH oxidase and antioxidant and anti-inflammatory activity demonstrated in OA-treated cells and splenocytes (in collaboration with Laboratory of Immunotherapy, Institute of Microbiology of the Academy of Science Czech in Prague).

Finally, LC-MS was performed in order to identify the specialized compounds responsible of biological activity of *C.annuum* L. cv Senise and *S. aethiopicum* L. cv Rotonda