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EFFECT OF CAFFEIC AND CHLOROGENIC ACID IN THE MODULATION OF LIPID ACCUMULATION IN THP-1-DERIVED MACROPHAGES

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The differentiation of monocytes into macrophages is a fundamental step for the development of atherogenesis and atherosclerosis. Macrophages participate in lipoprotein accumulation giving rise to foam cells filled with lipid droplets. Several studies seem to suggest an atheroprotective effect of phenolic compounds through a modulation of lipid metabolism. The objective of the present study is to evaluate the role of caffeic acid (CA) and chlorogenic acid (CGA) in counteracting lipid accumulation in a model of monocytes (THP-1) differentiated to macrophages. THP-1-derived macrophages were incubated for 24 h with fatty acids (500 $\mu\text{mol/L}$ oleic/palmitic acid, 2:1 ratio) and phenolic acids (CA and CGA, as single compounds or mix) at different concentrations (0.03, 0.3 and 3 μmolL^{-1}). Lipid accumulation was quantified with the fluorescent dye Nile red. The fluorescence (excitation: 544 nm, emission: 590 nm) was measured in a fluorescence spectrophotometer and the fold increase compared to the control (without fatty acids) was calculated. Data were analysed by one way ANOVA. ANOVA revealed a significant increased lipid accumulation following the fatty acids exposure ($p < 0.0001$). The mix of CA+CGA significantly reduced lipid accumulation at all concentrations tested (-27.5%, -32.0%, -23.4%, respectively at 0.03, 0.3 and 3 μmolL^{-1} ; $p < 0.01$). Conversely, no effect was observed following the incubation with the single compounds. Although preliminary, the results seem to indicate a potential effect of CA+CGA, but not of the single phenolics, in counteracting lipids accumulation in THP-1-derived macrophages. The effects were observed at physiological relevant concentrations. Ongoing experiments will be useful to confirm the results obtained and to clarify the potentials mechanisms of action involved in the prevention of the atherogenesis process.

Biography

Cristian Del Bo has completed his PhD in Experimental and Clinical Nutrition and Postdoctoral studies in Human Nutrition from the University of Milan. He has completed an Internship at the Antioxidants Research Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University (Boston, MA), at the Department of Food Science and Human Nutrition of the University of Maine (Orono, ME) and at the Department of Public Health of the University of Copenhagen. He is a Research Fellow in Human Nutrition at the University of Milan. He has published more than 30 papers in peer-reviewed journals. He is on the Editorial Board of the *International Journal of Food Sciences and Nutrition* and Guest Editor of the Special Issue "Dietary Bioactives and Human Health" for the journal *Nutrients*.

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