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# Nutritional strategy for improve liver injury and oxidative stress in Metabolic Syndrome by modulating Nrf2 and Nf-kB expression

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Statement of the Problem: Liver damage and oxidative stress are closely related to alterations present in Metabolic Syndrome (MS). An adequate food and nutritional strategy are essential in its treatment. In this sense, the chia seed has gained great interest for possessing compounds with bioactive properties with potential benefits in the control of metabolic disorders caused by unhealthy diets.

The aim of this study was to analyze liver injury and oxidative stress in an experimental model of MS induced by chronic administration of a sucrose-rich diet (SRD) and to evaluate the effects of chia seed as therapeutic strategy.

Methodology: Male Wistar rats were fed a SRD for 3 months. Half of the animals continued with the SRD until month 6, the other half was fed a SRD in which the fat source, corn oil, was replaced by chia seed from month 3 to 6 (SRD+chia). Another group consumed a reference diet all the time. In liver tissue were determined: aspartate and alanine aminotransferase and alkaline phosphatase enzymes, antioxidant capacity, glutathione, antioxidant enzymes: catalase, superoxide dismutase, glutathione peroxidase and glutathione reductase. NrF2 and NF-κB p65 expressions were determined for Immunohistochemistry and western blot.

Findings: The study showed that lipid accumulation, liver injury, lipid peroxidation and oxidative stress were reversed when chia seed was administered to SRD-fed rats. In the liver tissue, NrF2 expression was normalized reaching reference values. NF-kB p65 expression was decreased and this was associated with a decrease in plasma levels of TNF-α.

Conclusion & Significance: Chia seed showed a decrease in metabolic disorders in the liver, mitigating liver damage and oxidative stress induced by a SRD. These effects could be related to the activation of the transcription factor Nrf2, concomitantly with the inactivation of NF-κB, mainly due to the components (18:3 n-3, antioxidants, among others) of chia seed, suggesting that chia seeds could serve as a functional food.

## Biography

Maria Eugenia Oliva. PhD in Biological Sciences. Researcher of National Council for Scientific and Technical Research (CONICET) and Associate Professor of Biological Chemistry. Faculty of Biochemistry and Biological Sciences, National University of Litoral. Santa Fe, Argentina. She has expertise in non-genetic animal models of metabolic syndrome induced by dietary manipulation. Prevention and reversal of metabolic abnormalities through the use of bioactive natural products (n-3 polyunsaturated fatty acids, chia seed, proteins of plant origin).

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