

New Bioactive Natural Compounds Regulate Lipid Accumulation and Metabolism in Non-Alcoholic Fatty Liver Disease

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Abstract:

Non-alcoholic fatty liver disease (NAFLD) is a complex metabolic disease defined by an excessive lipid accumulation in the liver. NAFLD can develop from liver fibrosis and inflammation (non-alcoholic steatohepatitis, NASH) to liver cirrhosis. The early stages of the pathology are reversible, thus studying and promoting the early treatment of hepatic steatosis is ideal for preventing progression to more severe and irreversible stages of this liver disease (1).

In recent years, the discovery of new molecules from natural matrices is defining a new approach for identifying new compounds with different applications in medicine, cosmetics and food industry. This work is focused on the study of the potential activity of different natural metabolites isolated from plants and fungi (obtained from the Italian National Research Council (CNR)) in regulating the lipid and cellular metabolism of hepatic cells by using NAFLD models. For this reason, we are going to set up a system in which human hepatoma cell lines are incubated in a medium containing oleic acid and palmitic acid (2:1 ratio) to mimic steatosis and induce fat overloading and lipid droplets (LDs) accumulation (2).

In this model, we are evaluating the ability of different natural compounds to active the AMP-activated protein kinase (AMPK), the central regulator of lipid metabolism, to reduce LD number and size in this steatotic in vitro model. The ability of regulating lipid metabolism by some of these molecules is important to identify bioactive molecules that can be used in the reversible stages of the progression of this hepatic disease in combination with healthy dietary habits (3).

References:

1. doi: 10.7759/cureus.50159.
2. doi: 10.1016/j.cbi.2006.11.004.
3. doi: 10.3389/fendo.2022.1087260.