



## Title: The Effect of Long-Term High-Dose Coconut Oil Supplementation on Rat Liver and Serum Lipids

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### Abstract

We investigated the effect of long-term high-dose virgin coconut oil (VCO) supplementation on rat liver and serum lipid status. Animals were divided into two groups with 8 of them in each: normally fed (Control group) and the group fed with coconut oil at a concentration of 20% in food (VCO group). The experiment lasted for four months. On the last day of the experiment animals were killed, and blood and liver tissue were collected. In serum we measured the levels of total cholesterol (TC), high-density lipoproteins (HDL), non-HDL lipoproteins, triglycerides (TG), aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase (ALP). We also measured both liver and serum levels of high mobility group protein B1 (HMGB1) and haptoglobin (HP), as well as the liver level of NF- $\kappa$ B p65/ p-NF- $\kappa$ B p65 transcription factor, together with the histopathology analysis on liver slices and liver Comet assay. The results show that coconut oil do not change serum TC and HDL, but reduces non-HDL and TG levels (10% and 50%, respectively) comparing to control. As a result, atherogenic index of serum (AI) is strongly reduced in VCO group versus control. As for the liver status, results show that coconut supplementation increases AST, ALT and ALP levels in VCO group (50%, 30% and 60%, respectively) comparing to control. This effect is caused by the accumulation of coconut oil fat in liver, as confirmed by the histopathology showing signs of mild nonalcoholic steatohepatitis in VCO group, followed with the increased % of DNA in comet tail. The liver inflammation in VCO group is further demonstrated with the liver HP, HMGB1 and p-NF- $\kappa$ B p65 level increase, and increase in nuclear level of NF- $\kappa$ B p65, but not accompanying serum HP and HMGB1 increase. In conclusion, our results show that coconut oil supplementation, despite causing mild and localized steatohepatitis, also lowers serum atherogenic index, a predictor of cardiovascular risk.

### Biography

Dr. Sinisa Djurasevic (Ph.D. in Biology) is an associate professor at the Faculty of Biology University of Belgrade. He got his B.Sc., M.Sc., and Ph.D. in the field of animal physiology. He is the author of 30 bibliographic records in research areas of Nutrition, Stress, and Oxidative stress and antioxidative protection. He is a Member of the Serbian Higher Education Reform Experts team and Serbian Ethical Council for the use of laboratory animals. Currently, Dr. Sinisa Djurasevic works in the area of functional food (coconut oil and C60 fullerene).

### Note:

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