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Effects of microencapsulated and non-encapsulated aronia extract on serum lipid profile and liver histology in Sprague-Dawley rats fed a high fat diet

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Abstract

The aim of this study was to determine the biofunctional effects of aronia extract and its micro-encapsulated form on lipid metabolism and liver tissue in rats fed a high-fat diet. In the study, 42 male Sprague-Dawley rats aged 10 weeks were used. The rats were divided into 6 groups, with 7 animals in each experimental group. The experimental groups were as follows: 1 – Standard diet control (CON), 2 – High fat diet control (HF), 3 – HF + 400 mg/kg aronia extract (HF400E), 4 – HF + 200 mg/kg aronia extract (HF200E), 5 – HF + 400 mg/kg aronia encapsulated (HF400C), and 6 – HF + 200 mg/kg aronia encapsulated (HF200C). From the 10th week to 20th week, rats were fed with HF diet for 10 weeks except (CON). At the end of the 20th week, rats fed HF were administered aronia extract and its encapsulated form (200-400 mg/kg) by oral gavage for 6 weeks. After six weeks of treatment, biochemical analyses were performed in blood and tissue samples of the rats. Liver histology was evaluated. As a result of the study, it was determined that the high-fat diet significantly increased serum ALT, AST, TC, TG and LDL-C levels and hepatic MDA levels, whereas administration of HF400E to hyperlipidaemic rats caused a significant decrease in the levels of these parameters. Furthermore, histopathological analysis of liver sections revealed that the HF400E treatment also protected against liver injury. These results indicated that HF400E improved lipid profiles, inhibited lipid peroxidation and played a protective role against liver injury in hyperlipidaemic rats. The lack of a significant effect of the encapsulation of aronia may be due to the short duration of treatment. Thus, future studies should be carried out for longer periods (>6 weeks) and at higher doses.

Keywords: aronia, high fat diet, microencapsulated, Sprague-Dawley

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