

Microencapsulated *Boswellia serrata* and Probiotic Bacteria Acted as Symbiotic in Metabolic Syndrome Rat Model

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Abstract : Metabolic syndrome (MeS) is a major health problem with a high incidence of obese individuals worldwide. Increased related morbidity of diabetes, hypertension and fatty liver disease, and complicated cardiovascular disease are inevitable. *Boswellia serrata* gum (Bos) is a promising traditional medicinal plant; it has several pharmacological properties, including anti-inflammatory, antioxidant, and antilipase activities. Probiotics (Bac) supplements have good benefits on health and MeS, whether it is supplemented in combination with prebiotics or alone. Microencapsulation helps to mask unpalatable taste and odor and deliver active ingredients to targeted organs. Methodology MeS rat model was produced by feeding rats with a high fat, high CHO diet (HFD). Bos was extracted, and both Bos and the probiotic were microencapsulated with a spray drier. Female rats were divided into 5 groups (N8). HFD control, control normal receiving basic diet, HFD treated, from the start of the experiment, either with encapsulated Bos, Bac and Bos or Bac only, all treatments were received for eight weeks (after approval from NRC animal ethical committee). Serum was collected to analyze lipid profile, blood sugar, liver and kidney functions, antioxidants, leptin, and progesterone. Rat's organs and body fat were weighed and collected for histopathology. Statistical analysis was done by use of one way Anova test in the SPSS program. Results showed control of elevated body weight, lipid profile, and glucose levels as well as decrease of body fat index and improvement of histopathology of liver and heart, especially in combination. Conclusion: We concluded that both microencapsulated Bos and probiotics have a controlling effect on MeS parameters.

Keywords : metabolic syndrome, *Boswellia serrata*, probiotic, micro-encapsulation, histopathology, liver steatosis

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