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Antioxidant and hepatorenal protective effects of bee pollen fractions against propionic acid-induced autistic feature in rats

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Abstract

In the brain, propionic acid (PA) can cross cell membranes and accumulate within cells, leading to intracellular acidification, which may alter neurotransmitter release (NT), communication between neurons, and behavior. Such elevation in levels of PA constitutes a neurodevelopmental metabolic disorder called propionic acidemia, which could clinically manifest as autism. The purpose of this study was to investigate the protective effects of different fractions of bee pollen (BP) on PA-induced autism in rats, and to evaluate their effects on the expression of liver and renal biomarkers. Groups of rats received treatments of different fractions of BP at a dose of 250 mg/kg of body weight/day for a period of 1 month. Normal control group I and group II were orally administered with phosphate-buffered saline and propionic acid, respectively, for 3 days. BP contains various health-promoting phenolic components. Different fractions of BP administered pre- and post-treatment with PA showed significant reduction in the levels of liver and renal biomarkers ($p < .05$). Also, a significant enhancement in the levels of glutathione S-transferase (GST), catalase CAT, and ascorbic acid (VIT C) was observed. Supplementation with BP significantly reduced biochemical changes in the liver, kidneys, and brain of rats with PA-induced toxicity. It exhibited protective effects against oxidative damage and reactive oxygen species produced by PA-induced adverse reactions in rats. Taken together, our study shows that BP possesses protective effects in PA-induced liver and kidney damage.

Keywords

Author Keywords: antioxidants; bee pollen; hepatorenal biomarkers; phenolic compounds

KeyWords Plus: ANTIINFLAMMATORY ACTIVITIES; GUT MICROBIOTA; PROPOLIS; BLOOD; SERUM; BRAIN; EXTRACT; PRODUCT; STRESS; MODEL

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