



# HerbClip™

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**File: ■ Royal Jelly**  
**■ Lipid Profile**  
**■ Overweight**

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## **RE: Effect of Royal Jelly on Cardiovascular Risk Factors**

Petelin A, Kenig S, Kopinč R, Deželak M, Bizjac MČ, Pražnikar ZJ. Effects of royal jelly administration on lipid profile, satiety, inflammation, and antioxidant capacity in asymptomatic overweight adults. *Evid Based Complement Alternat Med*. June 13, 2019;2019:4969720. doi: 10.1155/2019/4969720.

Rising prevalence of overweight and obesity threatens public health, linked with higher risks of cardiovascular disease, diabetes type 2, cancer, and brain aging. Overweight and obesity are chronic disorders hallmarked by high oxidative status and chronic inflammation in peripheral tissues. Mechanisms of obesity-related disorders are not fully understood, but therapies that can reduce inflammation and oxidative stress are needed. Royal jelly (RJ), made in honeybee glands, is a unique natural product. Its content varies depending on the mix of plant pollens from which it is derived, and includes water, sugars, proteins, and lipids. ~90% of RJ lipids are free fatty acids, of which 10-hydroxy-2-decenoic acid (10-HDA), the best known, plays roles in oxidation and inflammation. In vitro, in vivo, and in a few human trials in specific groups, RJ shows wound healing, cell growth promoting, antibacterial, antifungal, antitumor, antihypertensive, vasodilatory, and hypocholesterolemic effects.

This randomized, double-blinded, placebo (PL)-controlled trial was conducted at the Faculty of Health Sciences, University of Primorska (Ljubljana, Slovenia) from April–July 2018. Sixty asymptomatic overweight adults aged 25-50 years were randomized, stratified by gender and age, to RG or PL (30 to each). Eligible participants had body mass indices (BMI) between 23-30, ≤3% change in body mass in the previous three months, no major diseases, were not taking drugs for lipid disorders or inflammation, were not pregnant/lactating, and did not use dietary supplements.

For eight weeks, participants took two capsules/d of either 333 mg lyophilized RJ or rice (*Oryza sativa*, Poaceae) starch. RJ and outwardly identical PL capsules were provided by Medex d.o.o. (Ljubljana). Each RJ capsule had ≥4% 10-HDA, corresponding to 1000 mg fresh RJ. Participants were asked not to alter usual diet or physical activity. There were no baseline (BL) between-group differences in energy or macronutrient intake; this did not change during the study. Participants returned unused capsules as a measure of adherence. In a two-week follow-up (F/U) period, no study agents were used. Anthropometric, appetite and mood measures, and fasting blood samples were taken at

BL, four and eight weeks, and F/U. There were no significant between-group BL differences in age, gender, body fat, BMI, serum total cholesterol (TC), or glucose.

In anthropometric measures, significant effects of treatment ( $P=0.010$ ) and time ( $P=0.041$ ) were found for phase angle, a ratio of bioelectrical impedance indicating cellular health and integrity. A significant effect of time ( $P=0.027$ ) was seen for % body fat; of treatment ( $P=0.008$ ), for BMI. At four weeks, the RJ group had significant improvements in % body fat and phase angle vs. BL. At eight weeks, only phase angle remained significantly higher vs. BL ( $P=0.48$ ). The change in BMI from BL to 10 weeks was significantly greater in the RJ group vs. PL ( $P<0.05$ ). Significant effects of treatment and time were seen, respectively, for TC ( $P=0.007$  [treatment],  $P<0.001$  [time]), and low-density lipoprotein (LDL) cholesterol ( $P=0.026$ ,  $P=0.001$ ). Significant effects of treatment were seen for total glucose ( $P=0.48$ ) and total triacylglycerols (TAG;  $P=0.033$ ). TC and TAG levels were significantly less than at BL in the RJ group at four weeks. There was no significant difference between groups in TAG levels at four weeks, and at eight weeks TAGs had returned to BL in the RJ group, but there was a significant difference between groups in TC ( $P=0.041$ ). At F/U, the RJ group had significantly lower TC and LDL levels vs. BL and vs. PL ( $P<0.05$  for all). Clinically, a 5-7% reduction in TC and LDL cholesterol with eight weeks RJ supplementation may be considered relevant.

In inflammatory markers and oxidative status, significant effects of treatment and time were seen, respectively, for adiponectin (AP;  $P=0.001$  [treatment],  $P=0.004$  [time]), bilirubin (BR;  $P=0.023$ ,  $P=0.034$ ), and C-reactive protein (CRP;  $P=0.016$ ,  $P=0.032$ ). AP and BR were "greatly enhanced" ( $P<0.05$ ) in the RJ group; CRP, significantly reduced. Their AP and CRP levels remained significantly better at F/U, but BR returned to BL. Total antioxidant capacity (TAC) was significantly higher for RJ vs. PL at eight weeks, but it is noted that BL TAC and BR differed significantly between groups. Levels of uric acid (UA) decreased in the PL group but were higher at BL vs. the RJ group. By week four, levels were similar in both groups and appear to have remained so in a table of results. However, the authors write that RJ saw "levels of... [UA]... increased significantly compared with..." PL, and later that RJ brought "remarkably higher" TAC, BR, and UA.

No changes were seen in four hormones measured except leptin, where significant effects of treatment ( $P=0.001$ ) and time ( $P=0.012$ ) occurred, with significant increases in leptin in the RJ group vs. PL at week eight ( $P=0.025$ ) and F/U ( $0.029$ ). Expression of four genes involved in oxidative stress and three in cholesterol metabolism was assessed. RJ significantly downregulated superoxide dismutase, hydroxymethylglutaryl-CoA reductase, and hydroxymethylglutaryl-CoA synthase vs. PL ( $P<0.05$  for all).

In mood and appetite measures, significant effects of treatment ( $P=0.001$ ) and time ( $P=0.026$ ) were seen only for self-reported appetite perceptions, with the RJ group reporting significantly less self-perceived appetite at four weeks and F/U ( $P<0.05$  for both). RJ's potential effect on satiety has not been previously reported. At eight weeks, negative mood was slightly reduced in the RJ group; no other mood effects were noted.

A questionnaire given at BL and at eight weeks documented adverse effects (AEs). No serious AEs were seen. More studies are needed of RJ's effects and to assess effective dose/duration of use for specific goals, and potential for triggering allergies.

—*Mariann Garner-Wizard*

Referenced article can be accessed at <https://www.hindawi.com/journals/ecam/2019/4969720/>.

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