



# HerbClip™

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**File: ■ Maca (*Lepidium meyenii*)**  
■ High Altitude  
■ Interleukin-6 (IL-6)

**HC 051413-504**

**Date: September 15, 2014**

**RE: Maca Consumption Improves Health Status and Reduces Serum IL-6 Levels at High Altitudes**

Gonzales GF, Gasco M, Lozada-Requena I. Role of maca (*Lepidium meyenii*) consumption on serum interleukin-6 levels and health status in populations living in the Peruvian Central Andes over 4000 m of altitude. *Plant Foods Hum Nutr.* 2013;68(4):347-351.

Maca (*Lepidium meyenii*) is a plant found in the high altitudes of the central Peruvian Andes. The hypocotyls (root-like stems) from the maca plant are a traditional food consumed in this region for nutritional and medicinal benefits. High altitudes can cause chronic mountain sickness (CMS: excessive production of red blood cells), high oxidative stress, high interleukin-6 (IL-6: a marker of inflammation and health problems), and may contribute to the aging process. The aim of this cross-sectional study was to investigate the effect that maca consumption has on health status, CMS, and serum levels of IL-6 in subjects living at a high elevation.

Subjects came from the district of Junín in Peru, a region in the Peruvian Andes that is 4,100 m above sea level. There were a total of 50 subjects (21 men and 29 women) in the age range of 35-69 years evaluated. Within this group of people, 27 were maca consumers that had been consuming this food for an average of  $25.8 \pm 3.2$  years (range 2-55 years). Moreover, 50% of these subjects consumed it within the 7 days and month prior to the study. Maca was prepared at the subject's home and generally consumed as a juice for its nutritional properties and to a lesser extent for its medicinal effects. Subjects were randomly recruited and determined as maca consumers or non-consumers based on a questionnaire.

Blood samples were obtained from all subjects, in addition to height and weight measurements. Health status was assessed with a health-related quality of life (HRQL) questionnaire. In particular, a short-form health survey (SF20) was used, which measures physical function, pain, general health, vitality, and emotional/mental health. This form was validated in populations from both high-altitude and sea-level residences. Lower limb strength was also assessed from a stand up from a chair and sit down (SUCSD) test. Hemoglobin and blood pressure were measured on site. Serum testosterone (T) levels (ng/ml) and estradiol (E2) levels, as well as serum IL-6 levels, were also measured from the blood samples. Subjects were further evaluated for CMS and given a CMS score based on any CMS symptoms the subjects experienced.

Age and sex ratios were similar between consumers and non-consumers of maca ( $P>0.05$ ). Compared to non-consumers, the maca consumers had lower values for systolic blood pressure ( $P<0.05$ ), serum T levels ( $P<0.05$ ), T/E2 ratio ( $P<0.05$ ), serum IL-6 ( $P<0.05$ ), and CMS scores ( $P<0.01$ ), as well as higher serum E2 levels ( $P<0.01$ ) and health scores ( $P<0.01$ ). In addition, more maca consumers (96.5%) successfully completed the SUCSD test compared to non-consumers (60.86%) ( $P<0.01$ ).

Subjects that were grouped together based on IL-6 values  $>10$  pg/ml had a significantly lower percentage of subjects that successfully completed the SUCSD test compared to subjects that were grouped with lower IL-6 values ( $<10$  pg/ml) ( $P<0.05$ ). Subjects with IL-6 values  $>10$  pg/ml also did not consume any maca, whereas subjects with the lowest IL-6 levels ( $\leq 5$  pg/ml) consumed maca in the greatest quantities and for the longest time. Multiple regression analysis indicated that maca consumption was inversely associated with serum IL-6 when controlling for chronological age, whereas health status scores were inversely related with age. Moreover, it was found that serum IL-6 levels were higher in men.

The average consumption of maca was  $41.68 \pm 8.49$  days per year. The serum IL-6 levels for those consuming maca during the week of the study were  $1.61 \pm 0.51$  pg/ml and for those consuming maca the month before the study were  $2.98 \pm 0.82$  pg/ml ( $P>0.05$ ). Additionally, a significant difference was found in the IL-6 levels of subjects that consumed maca within the week of the study compared with non-consumers ( $10.07 \pm 3.62$  pg/ml) ( $P<0.05$ ).

The results of this study are encouraging, although prospective studies would be necessary to show cause and effect. The authors conclude that maca consumption was associated with lower serum IL-6, better health scores, and lower CMS scores. Moreover, lower T and T/E2 ratios suggest beneficial effects (associated with lower CMS scores). A review on the ethnopharmacology of maca also reported similar results for high-altitude health scores and indicated that maca also reduced fractured bones, improved memory, protected against ultraviolet exposure, improved sexual function, and improved reproduction.<sup>1</sup> This suggests that maca has additional biological activities that could be evaluated in people living at high altitudes. This article lacks information about the preparation of the maca juice and the uniformity of the product that was actually consumed by the people in the trial. Also, since maca can be consumed as a soup or cooked as a vegetable, it is likely that it could have been consumed in either of these manners as well.

—Laura M. Bystrom, PhD

#### Reference

<sup>1</sup>Garner-Wizard M. Review of maca – a promising adaptogen. *HerbClip*. March 15, 2012 (No. 111143-444). Austin, TX: American Botanical Council. Ethnobiology and ethnopharmacology of *Lepidium meyenii* (maca), a plant from the Peruvian highlands by Gonzales GF. *Evid Based Complement Alternat Med*. 2012;2012:193496. doi: 10.1155/2012/193496.

The American Botanical Council has chosen not to include the original article.

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