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File: ■ Licorice (*Glycyrrhiza glabra*, Fabaceae)
■ Mobility Functions
■ Body Composition

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RE: Effects of Licorice Flavonoid Oil on Body Composition and Balance in Healthy Japanese Women

Kinoshita T, Maruyama K, Yamamoto N, Saito I. The effects of dietary licorice flavonoid oil supplementation on body balance control in healthy middle-aged and older Japanese women undergoing a physical exercise intervention: a randomized, double-blind, placebo-controlled trial. [published online March 11, 2020]. *Aging Clin Exp Res*. doi: 10.1007/s40520-020-01513-3.

Licorice (*Glycyrrhiza glabra*, Fabaceae) flavonoid oil (LFO) has emerged as a functional food that may support muscle growth through its ability to activate adenosine monophosphate-activated protein kinase (AMPK) and Sirtuin 1 (SIRT1) in muscle cells. Clinical trials have also suggested LFO can help reduce body fat and visceral fat accumulation. For these reasons, LFO may work synergistically with daily exercise to promote healthy aging by preventing muscle mass loss and improving mobility. The purpose of this randomized, double-blind, placebo-controlled trial was to evaluate the effects of LFO supplementation with daily physical training on mobility functions and body composition in middle-aged and older Japanese residents.

Participants aged 40 years or older were recruited from a health promotion club in Ehime Prefecture, Japan, from October to November 2017. Those who were pregnant, breastfeeding, or with an allergy to licorice were excluded from the study. The study physician determined whether participants were able to participate in the study. Seventy-six participants (three men and 73 women, age 59-85 years) were randomly assigned to receive LFO (n = 38) or placebo (n = 38) daily for 16 weeks. The LFO was prepared with 300 mg of licorice extracted oil, and the placebo capsule with 0 mg of the oil (Kaneka Glavonoid™; Kaneka Corporation; Osaka, Japan). The LFO intervention material was prepared by obtaining an ethanol extract of licorice root and then mixing it with medium-chain triglycerides. The concentration of glabridin, the marker compound in LFO, was adjusted to 3.0% by weight.

The whole-body resistance training program consisted of eight exercises: squats, a thigh exercise, a back-muscle exercise, a back and buttocks exercise, two abdominal muscle exercises, an arm exercise, and a calf exercise. Participants completed the training

program twice per week according to their maximum individual capacity. Additionally, participants were instructed to increase their daily step count by 1,000 and record the number obtained from a physical activity monitor. The primary outcome was 10-m walking speed with obstructions that were 20 centimeters tall and laid every two meters. Also measured were participants' 10-m walking speed, one-leg standing time with eyes open, handgrip strength, and isometric knee extension strength. Measures of body composition, including body mass index (BMI), body fat percentage, muscle mass, and visceral fat level were also evaluated. Blood samples were collected and evaluated safety, such as biomarkers of kidney and liver function, at baseline and after the 16-week treatment period. Statistical analyses were performed for each measurement at week 0 (baseline), week 8, and week 16.

Nine participants (LFO [n = 5], placebo [n = 4]) dropped out for reasons not stated. The three male participants were removed from the statistical analysis since most of the participants were women, leaving 64 (n=32 both groups) participants for analysis. For all measurements, there were no significant differences between the groups at baseline. For the 10-m walking speed with obstruction, there was an increase in mean speed for both groups, but the difference was insignificant. Mean times increased for both groups with respect to the one-leg standing, with a significant increase observed with LFO supplementation (P = 0.03). No significant differences were found between LFO and placebo for the other mobility functions. For body composition, LFO demonstrated a significant decrease in BMI (P = 0.01) and body fat percentage in total body (P = 0.03) and trunk (P = 0.04). No significant differences in muscle mass and visceral fat levels were found. Participants reported no serious side effects from LFO supplementation. The blood values on safety biomarkers were not reported.

The authors conclude LFO supplementation combined with exercise training can improve body balance control by prolonging one-leg standing time, which may reduce fall risk. The authors speculate their findings may have resulted from the observed decrease in BMI arising from a decrease in body fat rather than muscle mass. LFO is thought to modulate the expression of genes involved in lipid metabolism, glucose metabolism, and the activation of AMPK. The authors cite limitations related to their study population being comprised of trained women. They call for further, four-arm clinical trials to study the effects of LFO with and without physical exercise as well as with and without placebo among various populations.

This study received financial support from Kaneka Corporation, the manufacturer of the LFO supplement.

–Gavin Van De Walle, MS, RD

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