Effect of Chronic Vitamin D Enriched Mushroom Intake on Anthropometric Measures and Quality of Life in Older Men and Women

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Abstract

Vitamin D intake has been shown to be beneficial in weight management and quality of life. To determine the effect of chronic vitamin D enriched Portobella mushroom intake on anthropometric measures and quality of life in older men and women, seventeen subjects, six men and eleven women between 36 and 66, were screened for vitamin D levels and general health. They were randomized to take either 2 large vitamin D enriched Portobella mushroom caps with approximately 14,000 IU D2 (Vit D) or 2 unenriched Portobella mushroom caps (control) a week for twelve weeks. Anthropometric measures (weight, BMI, LBM) and quality of life surveys (Yale Physical Activity survey, SF36v2-general health survey, CES depression survey, and a 3 day diet record) were taken at baseline and again after 12 weeks. The group taking enriched mushrooms lost an average of 1.7 kg in body weight (p=0.02) primarily due to a 1.5 kg body fat loss with no change in lean muscle mass. Quality of life measurements did not change throughout the duration of the study. We conclude chronic mushroom intake may lead to reduced body weight and body fat.

Background

Vitamin D, known for bone health, has a role in the prevention/relief of chronic diseases (cancer, diabetes, heart disease). There are two isomers of vitamin D; D2 and D3. D3 is made by skin exposure to ultraviolet B light (from an animal sterol, cholesterol.) D3 is also obtained from supplements, a limited number of foods (e.g., fish, eggs), and fortified foods (e.g., milk and milk products, beverages, margarine, cereals). D2 is derived from ergosterol by exposure to UV B light with mushrooms being the main non-animal source. D2 content varies widely between mushroom preparations from 8 IUg in sunured Portobella to 461 IUg UV B in Portobella. Serum 25-hydroxyvitamin D (25(OH)D) is the preferred biomarker for D status. About 90% of circulating 25(OH)D is from D3 (6) and is reduced at latitudes as far north as Buffalo (~43ºN latitude) with little synthesized from November to April. Aside from being an excellent vehicle for dietary vitamin D intake, mushrooms are low in calories, fat-free, cholesterol-free, and very low in sodium. They provide important nutrients, including selenium, potassium, riboflavin, and niacin. Recent research has also shown that increasing intake of low-energy-density foods (meaning few calories given the volume of food), specifically mushrooms, in place of high-energy-density foods, like lean ground beef, may be an effective method for reducing daily energy and fat intake while still feeling full and satiated after the meal.

Methods

Study participants, consisting of older (36-66yrs) generally healthy males and females of various ethnic backgrounds were screened for vitamin D levels and general health. Vitamin D insufficient (< 30ng/mL 25 (OH) D) participants were randomized into either a control group who consumed “placebo,” unenriched Portobella mushroom caps or an experimental group who consumed enriched Portobella mushroom caps with approximately 14,000 IU D2 (Vit D). Each participant received 2 large mushroom caps a week over the course of twelve weeks. Body composition, circulating 25(OH)D levels and overall health measures were evaluated at the initial screening visit and at the completion of the study (12 weeks). Anthropometric measures were taken at baseline and again after 12 weeks. The group taking enriched mushrooms lost an average of 1.7 kg in body weight (p=0.02) primarily due to a 1.5 kg body fat loss with no change in lean muscle mass. Quality of life measures included questionnaires on skin type, sun exposure, Food Frequency Questionnaire, and physical activity (Yale Physical Activity Survey, YPAS.) YPAS will allow for energy expenditure estimation and activity type determination. Quality of life was assessed using the 36 question SF-36 survey which is a previously validated health survey which provides functional health status and well-being with physical and mental summaries. The CES depression survey was also given to measure the subjects’ general depression levels.

Results

1. To determine if consumption of vitamin D enriched mushrooms improves vitamin D status.
2. To determine if consumption of vitamin D enriched mushrooms alters body composition and quality of life measures.
3. The purpose of this study was to determine if chronic vitamin D enriched mushroom intake improves vitamin D status.
4. Consumption of vitamin D enriched mushrooms for 12 weeks will improve vitamin D status.
5. Consumption of vitamin D enriched mushrooms for 12 weeks will improve body composition and quality of life measures.

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