

Effect of matcha on lipid digestion and absorption in rats

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Abstract

Green tea contains catechins, dietary fiber, and many other ingredients with health benefits. Sencha (green tea) contains water-soluble components, such as catechins and amino acids, while matcha contains not only catechins and amino acids, but also water-insoluble dietary fiber. In this study, we examined whether the dietary fiber in matcha is involved in inhibiting lipid absorption by measuring the lipid adsorption rate of matcha, the inhibition of pancreatic lipase activity, and the inhibition of lipid absorption in rats.

The lipid adsorption rate of a 10% matcha suspension was about 25%, whereas the lipid adsorption rate of a 6.4% cellulose suspension of matcha, which contained the equivalent amount of insoluble dietary fiber, was about 4%.

Furthermore, the effect of matcha or cellulose on lipid digestion and absorption was measured in rats with gastric catheterization and subclavian vein catheterization. The results showed that matcha had a suppressive effect on lipid digestion and absorption.

These results suggest that the lipid-suppressing effect of matcha is due to the action of catechins and dietary fibers other than cellulose in matcha, and that cellulose has little effect.

Keywords : matcha, lipid, digestion, absorption, rats

I Introduction

Matcha is a fine powdered green tea produced from tencha, tea leaves grown under the shade away from direct sunlight. Because of its unique taste and aroma, matcha is widely used not only as a beverage, but also as an ingredient in confectioneries and cooking. Green tea contains catechins, free amino acids, dietary fiber, and many other ingredients with health benefits. Sencha, which is made from tea extracts, contains catechins and free amino acids, while matcha contains not only catechins and free amino acids, but also dietary fiber; therefore, a wide range of health benefits can be expected from matcha.

The catechins contained in green tea are reported to have a variety of disease-preventing effects, such as the suppression of blood glucose increases^{1, 2)}, anti-obesity action³⁾, hypertension inhibition⁴⁾, suppression of arteriosclerosis⁵⁾, and suppression

of lipid absorption⁶⁾. Therefore, green tea is expected to be a functional ingredient for obesity prevention. Indeed, it is already used as a Food for Specified Health Use (FoSHU) as a "food for people with high cholesterol" and "food for people who are concerned about blood neutral fat and body fat".

Dietary fiber has also been reported to have health benefits, such as the suppression of blood glucose increases⁷⁾, lowering of serum cholesterol concentrations^{7, 8)}, lowering of serum triglyceride (TG) concentrations^{7, 8)}, improvement of bowel movements⁹⁾, and prebiotic effects¹⁰⁾, but the amount of dietary fiber is negligible in common green tea (sencha). In contrast, matcha contains dietary fiber. However, there have been no reports on the health effects of the dietary fiber in matcha.

In the present study, the effects of catechins and dietary fiber in matcha on lipid digestion and absorption were investigated in rats with gastric catheterization and subclavian vein catheterization.