

Effects of Coffee-Derived Chlorogenic Acids on Postprandial Serum Triglyceride Levels - A Randomized, Double-blind, Placebo-controlled, Crossover Study -

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Introduction

In our previous study, single intake of chlorogenic acids (400 mg) suppressed the increase of the postprandial triglyceride (TG) levels induced by a high-fat diet in a clinical trial of 10 healthy men (unpublished). However, only limited research on the effect of chlorogenic acids on the postprandial TG levels in humans has been performed, and their efficacy in decreasing postprandial TG levels needs to be confirmed. This randomized, double-blind, placebo-controlled, crossover study aimed to evaluate the effects of coffee-derived chlorogenic acids on the postprandial TG levels in humans.

Materials and Methods

Twenty-four healthy participants (age, 20–65 years) with fasting serum TG levels of ≥ 100 mg/dL and ≤ 149 mg/dL were randomly divided into two groups. The participants received test food (containing 350 mg coffee-derived chlorogenic acids) or placebo food with a high-fat meal (lipid: 49 g). The serum TG levels were measured before and at 1, 2, 3, 4, and 6 hours after ingestion.

Conclusion/Perspectives

These results suggested that the ingestion of coffee-derived chlorogenic acids (350 mg) suppressed the elevation of postprandial serum TG levels in participants with relatively high postprandial serum TG levels ($C_{max} \geq 200$ mg/dL).

References:

- Narita, Y., Iwai, K., Fukunaga, T., Nakagiri, O. *Biosci Biotechnol Biochem.* **76**, 2329-2331(2012).
 Tanaka, A., Katsuyama, H., Iwai, K., Ariki, S., Morimoto, S., Nishihira, J. *Jpn Pharmacol Ther.* **50**, 721-731(2022).

Table 1 Participant information

| | All subjects | | | Subjects with high postprandial serum TG levels ($C_{max} > 200$ mg/dL) | | |
|---------------------------|-----------------------------------|-------------------------------------|---------|--------------------------------------------------------------------------|-------------------------------------|---------|
| | Group starting with placebo trial | Group starting with test food trial | P value | Group starting with placebo trial | Group starting with test food trial | P value |
| Number of subjects | 12 | 11 | | 6 | 7 | |
| Sex (Male/Female) | 3/9 | 2/9 | 1.0 | 2/4 | 2/5 | 1.0 |
| Age | 54.8 ± 7.7 | 56.3 ± 7.1 | 0.65 | 52.0 ± 8.9 | 54.0 ± 6.9 | 0.66 |
| Height (cm) | 161.2 ± 6.8 | 156.4 ± 9.7 | 0.19 | 160.7 ± 8.5 | 158.3 ± 8.7 | 0.64 |
| Body weight (kg) | 62.2 ± 8.8 | 65.4 ± 14.2 | 0.51 | 61.4 ± 10.0 | 69.6 ± 12.4 | 0.22 |
| Body fat ratio (%) | 31.9 ± 6.0 | 35.2 ± 7.1 | 0.24 | 30.8 ± 6.8 | 35.9 ± 6.7 | 0.2 |
| BMI (kg/cm ²) | 23.9 ± 2.3 | 26.5 ± 4.2 | 0.071 | 23.7 ± 2.1 | 27.6 ± 3.2 | 0.027 |
| TG-iAUC (mg·h/dL) | 127.9 ± 63.8 | 139.7 ± 75.6 | 0.69 | 134.7 ± 76.9 | 146.6 ± 86.4 | 0.88 |
| Fasting TG (mg/dL) | 114.8 ± 26.7 | 122.6 ± 20.0 | 0.44 | 132.8 ± 11.6 | 121.9 ± 19.1 | 0.25 |

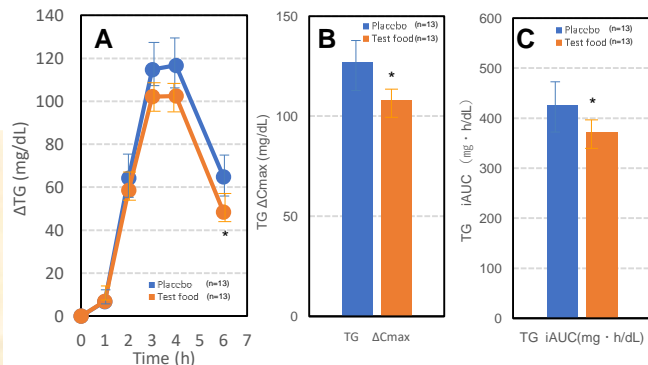


Fig. 1 . Changes in the TG levels in people with high postprandial TG ($C_{max} \geq 200$ mg/dL). A: Δ TG B: ΔC_{max} C: iAUC

Results/Discussion

Based on the analysis of all participants ($n = 23$), the postprandial serum TG levels did not show significant differences between the test and placebo foods. However, compared with the subgroup with a maximum serum concentration (C_{max}) of TG ≥ 200 mg/dL after the ingestion of placebo food ($n = 13$), the test food group showed a significantly lower Δ TG at 6 hours after ingestion and C_{max} of Δ TG (each having a P value of < 0.05). Moreover, the test food lowered the incremental area under the curve (iAUC) values of TG ($P < 0.10$). Regarding the mechanism of the suppression of postprandial TG elevation, nine chlorogenic acids appeared to inhibit the activity of pancreatic lipase in an in vitro study using porcine pancreatic lipase. Therefore, these findings are attributed to the suppression of fat breakdown and absorption in the gastrointestinal tract by the inhibition of the pancreatic lipase activity.

“Food with Functional Claims”

UCC Ueshima Coffee Co.,Ltd., has been selling “Food with Functional Claims” products since March 2023.



◀(Submitted Claim)

This product contains coffee derived chlorogenic acids, which have been proven to lower the postprandial blood TG in people with high postprandial TG.