

## ANTI-OBESITY ACTIVITY OF PU-ERH TEA IN MICE.

Maki Adachi<sup>1</sup>, Kunio Suzuki<sup>1</sup>, Shuichi Masuda<sup>2</sup> and Naohide Kinai<sup>2</sup>

1: Tealife Company, 118, Usio, Shimada, 428-8651, Japan, Tel: +81-547- 46-3989, Fax: +81-547-45-5855, adachi@tealife.co.jp

2: Laboratory of Food Hygiene, Department of Food and Nutritional Sciences, Graduate School of Nutritional and Environmental Sciences, University of Shizuoka, 52-1 Yada, Suruga-ku Shizuoka-shi, Shizuoka, 422-8526, Japan, Tel: +81-54-264-5526, Fax: +81-54-264-5528, masudas@u-shizuoka-ken.ac.jp

**Summary**

Nowadays, the induction of life-style diseases such as obesity, diabetes, hypertension, is serious problem in the world, and the number of the patients is increasing year and year. Therefore it is very important to prevent and to treat these lifestyle-related diseases by using several foodstuffs. For this purpose, many functional foods containing tea, vegetables and fruits have been studied and used. Our concern is to apply Pu-erh tea to these purposes.

Pu-erh tea is manufactured through fermentation by certain microorganisms, in china. In this experiment we examined the anti-obesity activity of Pu-erh tea in C57BL/6J mice by feeding high fat diet for 6 weeks, ad libitum.

As the results, body weight and epididymal fat in mice treated with 0.9% Pu-erh tea extract decreased significantly compared with those of the control group. We also found that total cholesterol in plasma of Pu-erh tea treated mice was also reduced significantly. On the other hand, there was no change in blood glucose levels compared with that of the control group.

These data demonstrated that Pu-erh tea exhibits anti-obesity activity and it may be a potent beverage to prevent several life-style diseases. Effective components in pu-erh tea are now under experiment.

Keywords: Pu-erh tea, high fat diet, anti-obesity, total cholesterol, mice

**Introduction**

Tea is one of the most popular beverage due to its pleasant taste and flavor in the world. Some scientists have reported that tea show several biological activities and health functions containing antioxidative<sup>1), 2)</sup> and hypocholesterolemic<sup>3)</sup> potency. According to the degree of fermentation, tea is classified into some categories<sup>4)</sup>. Pu-erh tea is manufactured through fermentation process by certain microorganisms, and belongs to the post-fermentation tea. Pu-erh tea changes to higher quality and better taste by the preservation for long period<sup>1)</sup>. Pu-erh tea is produced mainly in the Yunnan area of China, and is very popular beverage among the people. However, it is not still clear the bioactivities of Pu-erh tea so far. In this present study, we investigated to elucidate the anti-obesity effect of Pu-erh tea on high-fat administered mice.

## Material and method

### Preparation of tea extracts

Pu-erh tea was obtained from Tealife Co. (Shizuoka, Japan). A mixture of Pu-erh tea (10g) and distilled water (300ml) was heated and kept in boiling for 15min. The extract was filtrated and freeze-dried to powder.

### Feed and animals

Laboratory pellet diets (CE-2 and high-fat diet 32) were purchased from CLEA Japan. Male C57BL/6J mice (4 weeks old) were obtained from SLC Japan. Mice were housed for 1 week with a 12-h light-dark cycle in the temperature( $23^{\circ}\text{C} \pm 1^{\circ}\text{C}$ )- and humidity( $55 \pm 5\%$ )-controlled room. The animals were given food and water freely. After adaptation to the lighting conditions for 1 week, the healthy animals were used.

### Measurement of the weight of body, liver and epididymal fat

Mice were divided into four groups for long-term administration experiment of Pu-erh tea extract. The control group was administered CE-2 and water ad libitum. The other three groups were fed the high-fat diet 32 for 6 weeks ad libitum. Two groups were taken 0.45% or 0.9% Pu-erh tea extract solution for 6 weeks ad libitum. Food and water intake, and mice body weight were measured every other day. After overnight fasting, mice were dissected under anesthesia with diethyl ether, and liver and epididymal fat were quickly removed and weighed.

### Determination of Total Cholesterol and Glucose levels in plasma

The blood was collected from eyepit, abdominal aorta and heart. Plasma sample was obtained by centrifugation (3000rpm for 10 min) of blood. The levels of total cholesterol and glucose in plasma were determined using Total Cholesterol E-Test kits and Glucose CII- Test kits (Wako Pure Chemical, Osaka, Japan).

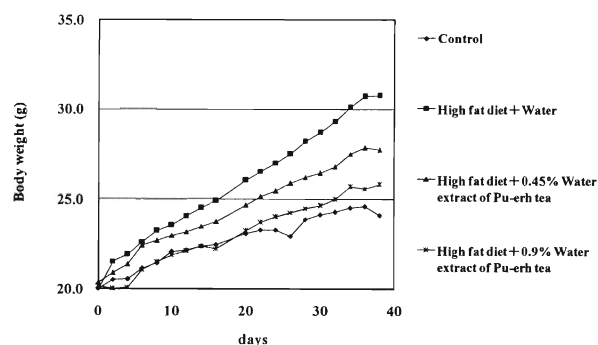


Fig.1 Effect of Pu-erh tea extract on body weight in mice.

## Result and Discussion

In the first experiment, we examined the effect of Pu-erh tea extract on the weight of body, liver and epididymal fat of mice feeding high-fat diet. Feeding of the high-fat diet for 6 week caused significant increase in body and epididymal fat weight of mice

compared with those of the control group (non-fat diet group). Intake of Pu-erh tea did not show any decrease of liver weight of mice consumed high-fat diet. However, the weights of body and epididymal fat were significantly reduced by treatment with Pu-erh tea extract compared with water-treated group. The group administered 0.9% Pu-erh tea extract caused a severe decrease in those weights. These results suggested that Pu-erh tea can prevent high-fat diet-induced obesity (Fig.1 and Fig. 2). Next, we studied the effect of Pu-erh tea extract on plasma total cholesterol and blood glucose level. Feeding of the high-fat diet for 6 week caused significant increase in plasma total cholesterol compared with the control group. Blood glucose level of mice fed the high-fat diet was slightly higher than that of the control. Total cholesterol in plasma of mice treated Pu-erh tea was significantly reduced compared with water group (Fig. 3). However Pu-erh tea did not decrease blood glucose level (Fig. 4).

In the present study, we elucidated that Pu-erh tea extract exhibits anti-obesity activity. Therefore, Pu-erh tea may be a potent beverage to prevent several life-style related diseases.

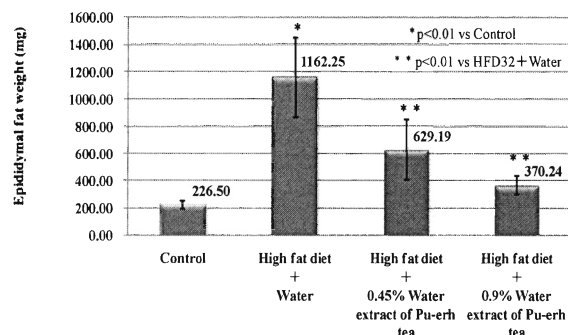


Fig.2 Effect of Pu-erh tea extract on epididymal fat in mice.

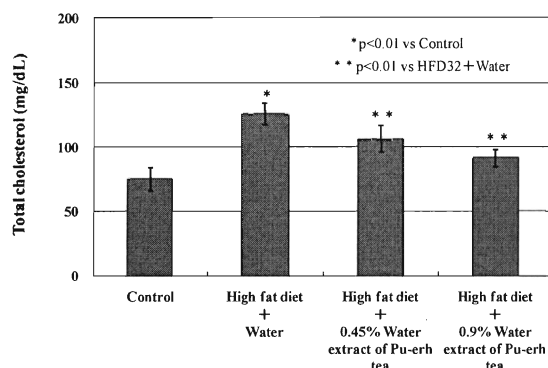


Fig.3 Effect of Pu-erh tea extract on plasma total cholesterol level in mice.

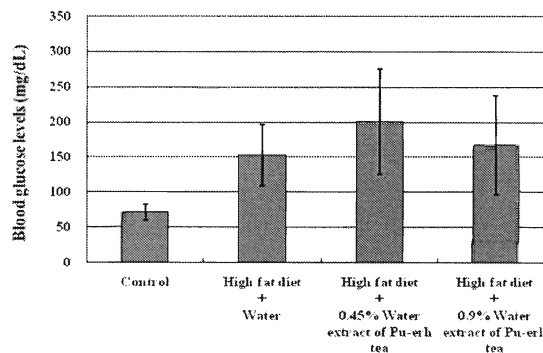


Fig.4 Effect of Pu-erh tea extract on plasma blood glucose level in mice.

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