

VI. GREEN GUN POWDER TEA AS A SOURCE OF VITAMIN C

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The American Japanese Tea Company in 1928 reported that Murlin had found Japan green tea to be a satisfactory source of vitamin C, and therefore they recommended its use to travelers and others for this factor in the diet.

This was so at variance with what one should expect, since the antiscorbutic vitamin is very susceptible to heat, ageing, and drying, that our attention was directed toward further experimentation to determine the vitamin C value of green tea. In as much as several investigators, namely, Munsell, Kifer, Mitchell, and Andrew, all had failed to find evidence that Japan green tea contains vitamin C, the purpose of this experiment was to compare green gunpowder tea with Japan green teas as a source of vitamin C.

The method used in this study was the plan commonly followed in testing for vitamin C, and was essentially the same as that used by the other investigators of the vitamin C content of tea. Healthy growing guinea pigs, approximately one month old and weighing 200 to 400 grams each, were selected. Two guinea pigs were placed in each of several cages made of fine wire. The usual sanitary precautions were taken in their care. During a preliminary period of ten to fourteen days all animals were fed the basic diet plus cabbage ad libitum, in order that they would become adjusted to their new diet and surroundings and show a normal gain in weight.

Three trials of the experiment were made. In each trial the animals were divided into groups of two each. All were given the basic diet and a dietary supplement as follows: (1) positive controls, 5 c. c. of fresh orange juice; (2) negative controls, no addition; (3) 10 c. c. of tea; (4) 15 c. c. of tea; and, (5) 20 c. c. of tea.

The basic diet used was Sherman's diet. It was as follows:

Rolled oats	50%
Wheat brans	9%
Dried skimmed milk (Dryeo)	30%
Butter fat	8%
Cod liver oil	2%
Na Cl	1%

The milk was heated for twenty four hours at 110° C. with frequent stirring, to destroy any possible vitamin C content.

A good brand of green gunpowder tea was used in the first and third trial of the experiment. Japan green tea was used in the second trial. The tea was prepared three times a week by steeping one teaspoonful in one cup of water for three minutes.

The various symptoms noted in this experiment were: (1) loss of weight, soreness of joints, weakness; (2) loss of use of hind legs; (3) reduced activity, refusal of food; and (4) death from the eighteenth to the sixty-seventh day.

The positive controls developed normally and remained vigorous throughout the entire experiment, and at autopsy the organs appeared normally healthy.

The negative controls developed the above mentioned symptoms, and at death the autopsy findings were: (1) teeth easily broken; (2) hemorrhage in the skin and internal organs; (3) fragile, porous bones, especially the jaw.

and leg bones; (4) weak enlarged bloody joints; (5) gums soft and receding from the teeth; (6) hair loose; and (7) flesh fragile and delicate.

The experimental groups showed the same scurvy symptoms, and at death the same autopsy findings as the negative controls. All negative controls and experimental animals with the exception of one which died from accident, died from scurvy. There was no appreciable difference between the negative controls and those given different amounts of tea infusion.

The average survival period of the animals in the three trials of the experiment are given in the following table:

Trial	Positive controls	Negative controls	10 c. c. tea	15 c. c. tea	20 c. c. tea	Average of all given tea
	days	days	days	days	days	days
I*	40+	39.5	23	33	34	30
III°	67+	55.	59	44.5	67	56.8
II°	36+	32.	32.5	24.	27.5	28.

*In trials I and II green gunpowder tea was used.

°In trial III Japan green tea was used.

In every case any amount of tea given did not prevent death of the animals. However, the length of the survival period varied greatly, and in trial III five of the animals outlived the negative controls, those receiving the 20 c. c. of tea surviving the longest. The first animal to die in each trial was one fed a green tea infusion.

The weekly gain or loss of weight curve showed a greater contrast between those animals receiving tea and the controls, than did the survival period. One animal receiving 20 c. c. of green gunpowder tea gained weight for a time, then lost weight, and died weighing more than when the experiment began. A negative control showed a similar weight curve. Several of those receiving tea made slight gains for about two weeks; then decline began. But the average gain or loss of weight for each group of animals receiving the same dietary supplement showed that those receiving tea of either kind in any amount made poorer growth than did the negative controls.

In this experiment the amounts of green tea given either of the Japan or gunpowder variety did not prevent death of guinea pigs from scurvy.