STUDIES IN BLISTER BLIGHT CONTROL

IX. THE EFFECT OF SPRAY RESIDUES ON THE QUALITY OF MANUFACTURED TEA

By

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Work in the biochemistry section of the Institute has shown that the fermentation of tea is due, primarily, to an enzyme which is a compound of protein and copper. Long before blister blight arrived in Ceylon, it was shown that the injection of copper into tea bushes increased the rate of fermentation. It was also possible to demonstrate on one of the clonal rows[1] that absorption of copper compounds through the leaves of the tea bush occurred in certain circumstances.

All this work had to be taken into account when choosing suitable fungicides for use against blister blight. Highly insoluble forms of copper such as cuprous oxide and copper oxychloride are recommended.

The question arises, do these insoluble copper compounds affect fermentation and quality when used as fungicides ? Mr. Keegel gives all the available information in the following article.

The Loss of Crop Experiment carried out on No. 8 field of St. Coombs estate provided leaf with which to investigate the possible effect, upon quality of liquor, of fungicidal sprays containing copper.

The experimental area of six acres was divided into three plots, each of two acres.

Plot A. was left unsprayed through the experiment.

Plot B. Spraying began after the first pluck and continued until the twenty-sixth pluck. The plot was again sprayed a day after the thirty-second pluck, and spraying continued till the end of the experiment. (Both monsoons).

Plot C. Spraying began after the first pluck and continued until the fifteenth pluck, after which it was not sprayed until the next South West monsoon period.

To all intents and purposes the plots in question were as comparable as possible, and the standard of plucking of the leaf taken for manufacture rigidly controlled.

Owing to the different treatments given to B and C, it is found necessary to treat the results of the experiment under certain well defined groups. In this way the effect of cessation of spraying in the treated plots may be studied as well.

Group 1.	—	2nd–16th pluck (May–September 1950). Both B & C sprayed.
Group 2.	—	17th–22nd pluck (September–November 1950). B sprayed. C not sprayed. C was not manufactured after the 22nd pluck.
Group 3.	—	2nd–22nd pluck (May–November 1950). Comparison of B and C with A for the whole of the period during which C was manufactured.

Group 4. — 2nd–26th pluck (May–December 1950).
Comparison of B with A for the period during which the former was sprayed.
(Note—27th pluck not manufactured).

Group 5. — 28th–32nd pluck (January–February 1951).
This group represents the period during which B was not sprayed.

Group 6. — 33rd–41st pluck (February–May 1951).
Comparison of B with A when spraying of the former was resumed. (Note—36th pluck not manufactured)

Group 7. — 2nd–41st pluck (May 1950–May 1951).
Comparison of B with A for the whole period of the experiment.

Results

The three main grades, B. O. P., F. P., and Fannings, which represent over 75% of the leaf, of each manufacture were examined by three Colombo Tasters and the results are set out below :—

Group 1. Comparison of Control A and plots B and C (both B and C sprayed)

No. of manufactures .. 15
Average copper content .. A—31 parts per million
" " " .. B—49 " " "
" " " .. C—52 " " "

Table 1. Comparative Valuations (A taken as standard.)

Grade	Sample	Appea-rance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	e	e	e	— 2
	C	e	e	e	e	— 3
F.P.	B	e	e	e	e	— 2
	C	e	e	e	e	— 2
Fannings	B	e	e	e	e	— 1
	C	e	e	e	e	— 3

Note : e—equal.

A resulted in higher values than B or C on 9 occasions
B " " " " " A or C " 4 "
C " " " " " A or B " 2 "

Infusion—Up to the 6th manufacture all tasters agreed on the infusion of the standard (A) having been duller than the other two. From the 7th manufacture, however, the infusion of A was consistently considered to be the best till the 13th manufacture, after which the treated samples were given preference.

Group 2. Comparison of A, B and C during the period C was not sprayed.

No. of manufactures .. 6
Average copper content .. A—28 parts per million
" " " .. B—57 " " "
" " " .. C—28 " " "

Table 2. Comparative valuations (A taken as standard.)

Grade	Sample	Appearance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	e	e	e	+ 1
	C	e	e	e	s.b.	+ 7
F.P.	B	e	s.b.	e	e	0
	C	e	e	e	s.b.	+ 6
Fannings	B	e	s.b.	e	e	+ 3
	C	e	e	s.b.	s.b.	+ 7

Note : s.b.—slightly better.

C resulted in higher values than A or B on all six occasions

Infusion.—C was distinctly better and brighter than the other two.

Group 3. Comparison of B and C with A for the whole of the period during which C was manufactured.

Results in Groups 1 and 2 combined.

No. of manufactures .. 21

Valuations .. No difference in appearance, colour, strength and quality.

Average value of A 1 cent higher than B, but equal to that of C.

A resulted in higher values than B or C on 9 occasions
B „ „ „ „ „ A or C „ 4 „
C „ „ „ „ „ A or B „ 8 „

Group 4. Comparison of B with A for the period during which the former was sprayed.

No. of manufactures .. 25

Average copper content .. A—30 parts per million
„ „ „ .. B—53 „ „ „

Valuations—No difference

A resulted in higher values than B on 12 occasions
B „ „ „ „ „ A on 13 „

Infusion—B better for first six plucks.
A better from the seventh to the thirteenth pluck.
B brighter again from the fourteenth pluck, improving with each successive manufacture.

Group 5. Comparison of B with A, when spraying of B was stopped (Dry weather period)

No. of manufactures .. 5

Average copper content .. A—30 parts per million
„ „ „ .. B—33 „ „ „

Table 3. Comparative valuations (A taken as standard.)

Grade	Sample	Appearance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	s.b.	e	s.b.	+15
F.P.	B	e	e	e	s.b.	+14
Fannings	B	e	e	e	s.b.	+10

B resulted in higher values than A on all 5 occasions.

Infusion—B was distinctly brighter and more coppery. A was inclined to be greenish.

Group 6. Comparison of B with A when spraying of the former was resumed.

No. of manufactures .. 8
Average copper content .. A—29 parts per million
" " " .. B—57 " " "

Table 4. Comparative valuations (A taken as standard.)

Grade	Sample	Appearance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	e	e	e	+ 5
F.P.	B	e	e	e	e	+ 3
Fannings	B	e	e	e	e	+ 4

A resulted in higher values than B on 2 occasions
B " " " " " A on 6 "

Infusion—On the whole B was better coloured and brighter.

Group 7. Comparison of B with A for the whole period of the experiment.

Total number of manufactures .. 38
Average valuations .. No difference in appearance, colour, strength and quality. Average value of B 3 cents higher than A.

A resulted in higher values than B on 14 occasions
B " " " " " A on 24 "

Conclusions

It must be mentioned that the control (unsprayed) plot suffered severely from blister blight attack on only a few occasions during the South West monsoon period of 1950. The damage throughout this period was not sufficiently great to give rise to brownish flake in the tea. In consequence the appearance of the made tea from the unprotected plot was not noticeably affected. It must be remembered, however, that badly blistered leaf brings about a considerable amount of flake, which is characteristic and distinguishable.

By the end of the monsoon period the sprayed plots were of outstanding appearance and yield figures bore testimony to their health and vigour.

On the other hand, fields which recover from bad attacks of blight tend to give vigorous flush when the weather improves, but a prolonged attack slowly exhausts the bushes and their recovery becomes more and more delayed.

Practically all the variations in the results given could be explained on these grounds, taking into account the errors in plucking, in manufacture, and in tasting. It is not possible, entirely, to exclude absorption of small amounts of copper with some effect on quality, but there is insufficient evidence to make any further discussion worthwhile.

The really important conclusion is that, on the average, better teas result from sprayed areas than from comparable areas unprotected from the ravages of blister blight disease.