

TEA IN RELATION TO FOOD AND DRUG REGULATIONS

I.—ASH CONTENTS

J. LAMB

In a recent article ⁽¹⁾ the implications of Food and Drug Regulations with respect to tea were briefly outlined.

The ash content of a product such as tea offers the analyst a convenient way of checking adulteration and fraud particularly in cases liable to occur in wartime when high prices or rationing make adulteration profitable. Adulteration by means of, say, spent leaves would reduce both the total ash and, in particular, the soluble ash since the brewing of tea removes soluble minerals and any considerable adulteration would at once be indicated by examination of the ash. Likewise the incorporation of grit or sand to make up weight, or of lime to increase the colour of inferior tea, or tea adulterated by spent leaves, would be detected on account of high total ash content with a correspondingly low soluble ash content.

During the last war a double form of adulteration was practised in which grit and vegetable matter was incorporated with spent leaves by means of rolling in a moist condition. On drying, the adulteration was not easily discernible to the eye when this product was mixed with genuine tea in proportions up to 20 per cent. Other means are available for confirming adulteration but the determination of ash contents is a convenient routine method of detecting adulteration.

Such methods must be based on fairly accurate knowledge of the natural variation of ash contents. The mineral matter in the leaf of any plant is liable to vary with growth conditions. The ash content of tea appears to be dependent upon elevation at which the leaf is grown and upon rainfall, and there is little doubt that soil conditions are an important factor. Abnormal growth conditions may, and in fact do, occasionally cause genuine teas to be questioned by food and drug authorities although within our experience, other characters have enabled the doubt to be removed.

Detailed knowledge of the range of ash contents of genuine teas grown under various conditions is therefore of value to the Tea Industry, and since we have collected a good deal of information on this subject we now publish the figures so that these characters of genuine Ceylon teas may be on record.

1. ELEVATION

Teas grown at high elevations appear to have a lower ash content than those grown at low elevations. Table I shows the ash contents of B.O.P's from different elevations produced under similar weather conditions.

TABLE I

	% Ash Content	
	Total	Soluble
1. Nuwara Eliya District	4.88	3.21
2. Dimbula and Dickoya District	5.27	3.32
	5.41	3.30
	5.22	3.33
	5.07	3.40
3. Kelani Valley	6.46	4.37

2. WEATHER AND SOIL CONDITIONS

Table II shows the ash content of teas grown mainly between 3,000 and 4,000 feet on the South West side of the Island during the South West Monsoon, whilst Table III shows similar figures for the Uva Province during dry weather. Both sets of figures are roughly comparable on the basis of elevation.

The average total ash content is slightly higher in the teas grown under dry conditions, whilst there are considerable variations in the figures in each table which are presumably due to different soil conditions in the various districts in which the teas were grown. The ash contents of the O.P's are markedly higher than those of B.O.P's indicating that stalky teas are liable to contain higher amounts of ash than leaf grades. Teas made from tipping leaf did not show any marked variation from the normal.

TABLE II

S. W. Monsoon Conditions

Estate No.	Ash Percentage on Dry Weight					
	B.O.P.			O.P.		
	Total	Soluble	% Soluble of Total	Total	Soluble	% Soluble of Total
1	4.28	2.70	63.1	—	—	—
2	5.13	3.30	64.3	4.59	2.95	64.3
3	5.00	3.14	62.8	5.73	3.66	63.3
4	4.80	2.97	61.9	5.43	3.30	60.8
5	4.98	3.00	60.2	5.93	3.93	66.3
6	4.91	2.94	59.9	5.42	3.36	62.7
7	4.78	3.28	68.6	5.59	3.79	67.8
8	4.43	3.19	72.0	5.42	3.40	62.7
9	5.17	3.38	65.4	6.17	3.85	62.4
10	4.90	3.36	68.6	5.10	2.87	56.3
11	4.84	3.07	63.4	5.11	3.42	66.9
12	5.14	3.59	69.8	5.09	3.51	69.0
13	4.53	2.68	59.2	5.01	2.75	54.9
14	4.58	2.67	58.3	5.15	3.13	60.8
15	5.11	2.93	57.3	—	—	—
16	5.22	3.09	59.2	5.43	3.52	64.8
17	4.21	2.52	59.9	4.65	3.21	69.0
Average	4.83	3.05	63.2	5.33	3.38	63.5

TABLE III

Dry, Windy Conditions

Estate No.	Ash Percentage on Dry Weight					
	B.O.P.			O.P.		
	Total	Soluble	% Soluble of Total	Total	Soluble	% Soluble of Total
18	5.06	3.39	67.0	—	—	—
19	5.32	3.37	63.3	5.66	3.56	62.9
20	5.00	3.15	63.0	5.60	3.63	64.8
21	5.07	3.07	60.6	5.76	3.72	64.6
22	4.77	2.45	51.4	4.77	3.32	69.6
23	5.47	3.26	59.6	5.83	3.41	58.5
24	5.09	3.04	59.7	5.77	4.07	70.5
25	4.93	2.94	59.6	5.67	3.53	62.3
26	5.19	3.19	61.5	—	—	—
27	5.51	3.52	63.9	6.09	4.36	71.6
28	5.51	3.22	58.4	5.69	3.26	57.3
29	4.99	2.69	53.9	5.72	3.27	57.2
30	4.35	2.45	56.3	5.67	3.47	61.2
31	4.73	2.60	55.0	5.77	3.80	65.9
32	5.24	3.49	66.6	5.63	3.97	70.5
Average	5.08	3.06	60.0	5.66	3.64	64.4

SUMMARY AND CONCLUSION

The ash contents of a number of Ceylon teas produced under a wide range of conditions has been investigated in order to determine the variation which may be expected in the ash contents of genuine Ceylon teas. Taking round figures and thereby allowing margins for exceptional cases we arrived at the following characteristics:—

1. Total ash is not less than 4 per cent and not more than 7 per cent of the dry weight of tea.
2. Soluble ash is not less than 2 per cent and not more than 5 per cent of the dry weight of tea. Expressed as a ratio to total ash the soluble ash varies between 50 per cent and 70 per cent.

REFERENCE

1. *Tea Quarterly* 1941, XIV, 76.