THE ABSORPTION OF MOISTURE BY MADE TEA.

DEUSS, J. J. B.—Over het wateraantrekkend vermogen van thee.—De Thee, September, 1926, pp. 97-101.

Deuss points out that during a rush of crop, or if the sifting room is too small, the made tea cannot be sifted in good time, and consequently may be left lying in a damp atmosphere for more than 24 hours. In that case, it will usually absorb moisture, and instead of a properly dried tea, with a moisture content of 6-8 per cent., it may contain so much water that its keeping qualities are impaired.

Further, cutting machines may give unsatisfactory results if the tea is not sufficiently dry. The performance of different types of cutters will differ, according to the degree of moisture in the tea.

Examinations of packet tea showed that 12 to 14 per cent. of moisture was not uncommon in them. As the tea when it came from the drier contained 4 to 6 per cent., evidently the remainder had been absorbed during sifting and packing.

As illustrating the absorptive capacity of tea, it is noted that cigars can be kept dry by storing them in tea in a stoppered bottle.

Experiments were carried out to determine how rapidly the absorption of moisture occurred, how strong the attraction of tea for water is, and what can be done to avoid it.

Teas of different types were used, both leaf teas and brokens, and from estates whose teas differed considerably in quality.

In addition to teas with a water content of about 8 per cent., samples were prepared from the former with approximately 0, 2, 4, 10-12 and 14-16 per cent. of moisture.

The different samples were then placed in closed tins or flasks, under the following conditions:—

(1) Over quicklime; relative humidity of the air about 0%
(2) Over 70% sulphuric acid; humidity of the air about 9%
(3) Over a saturated solution of calcium chloride; humidity of the air about 30%
(4) Over 43·5% sulphuric acid; humidity of the air about 50%
(5) Over water; humidity of the air about 100%

Further samples were exposed to the air of the laboratory, in which the humidity, measured by a self-registering hygrometer, varied between 70 and 80%, and on one occasion between 70 and 100%.

The gain or loss of weight was determined daily. The results obtained were the same whether leaf grades or brokens were used, and the source of the tea, whether from up-country or low-country estates, made no difference. It had been expected that the broken grades would absorb moisture the quicker, but that was not the case.

Over quicklime, all the teas lost moisture, tending to a minimum moisture content of about ½ per cent. The loss was greatest during the first two days. After twelve days the teas had deteriorated in quality, indicating that tea should not be dried too far, even at a low temperature. Deuss states that this has been previously observed in the case of tea stored in open packets over lime, and if tea kept in such a manner is to remain fit for consumption, the lime should be half slaked, so that the absorption of moisture is small.

With a humidity of 9% (over 70% sulphuric acid), the loss of water was less pronounced, but the process was similar to that with lime, the greatest loss occurring in the first two days.

In atmospheres of 30% and 50% humidity, all the teas, even those which contained only 4·7 per cent. of water, still lost moisture.

The teas kept in a saturated atmosphere (humidity about 100%) all absorbed moisture, even those which originally contained 14 to 16 per cent. of water. Within six days, the moisture content had increased, in some cases, up to 26·5 per cent.

In the atmosphere of the laboratory (humidity 70 to 80%), the teas which contained 14·8 to 15·8 per cent. of water lost moisture. Those containing 1 to 9·9 per cent. of water absorbed moisture from the air. As in the previous cases, the gain was greatest during the first two days. When the humidity of the atmosphere fell to 55 to 60%, all the teas began to lose moisture again, to re-absorb it when the humidity of the air again rose to 70 to 80%.

It follows that the more usual kind of tea, which has a moisture content of 4 to 8 per cent., will keep its moisture content fairly constant in an atmosphere of relative humidity 60 to 65%, so that the latter should be the relative humidity of a sifting room.

Teas with a very high moisture content rarely occur. These would be improved by exposure to a relative humidity of 60 to 65%.

Teas with a moisture content of 1 to 4 per cent. have been too severely dried.

Made tea usually has a moisture content of 4 to 6 per cent. It may be allowed to gain one or two per cent., but preferably not more. If sifting is finished in a day, the increase in an atmosphere of 70-80% humidity will be 1 to 1·5 per cent; that would not be serious, but if the sifting took two days or longer, or if the moisture which the tea takes up in cutting and packing is taken into account, the increase can amount to double that, and the moisture content of the tea would then be dangerously high.

To keep the sifting room dry, warm air from the driers should be drawn through it when it is not in use. If that cannot be done, a continuous steam of warm dry air should be led slowly through the room, so as not to disturb the fannings.

Teas kept in a saturated atmosphere had become musty and mouldy to a high degree in six to seven days. In an atmosphere of 70 to 80% humidity that occurred first after fourteen to sixteen days and then only to a slight extent.

Deuss arrives at the following conclusions:—

(1) If the relative humidity of the air is not above 60 to 65%, made tea should be sifted and stored within two days.

(2) If the relative humidity of the air is not higher than 70 to 80%, made tea should be sifted and stored within twenty-four hours.

(3) The sifting room should be as damp proof as possible and it should be capable of being dried by drawing in warm air. It is preferable to have a humidity of 60 to 65%.

(4) If the humidity in the sifting room is less than 55%, the tea loses moisture. It is not desirable to put on the market tea with too low a moisture content, since it is both bad for quality and uneconomic.

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