COMPARISON OF DRYING OVENS FOR DETERMINING THE MOISTURE CONTENT OF CHEESE

As cheese moisture determinations comprise a considerable proportion of the work carried out in a dairy laboratory situated in a cheesemaking area, the efficiency of three types of drying ovens was investigated.

The methods used in determining the moisture content of cheese were as follows:—

(a) Vacuum oven.—The official A.O.A.C. method was used (A.O.A.C., 8th Ed. 278-15-129 and Method 1:31).

(b) Convection oven—as for (a).

(c) Meihuizen quick-drying oven.—Samples of approximately 2 g of the grated cheese are weighed out in the special dishes provided. These are placed in a vertical rack, which is lowered into the oven, where it is surrounded by a paraffin-oil jacket electrically heated through a thermostatic control. The cheese samples are heated in the oven for 27 min at 165°C, cooled in a desiccator and reweighed.

The results obtained are shown in Tables 1–3.

TABLE 1

COMPARISON OF MEIHUIZEN OVEN AND CONVECTION OVEN, USING THE SAME 19 SAMPLES

—	Meihuizen Oven	Convection Oven
Average difference between duplicates within method (per cent. moisture)	0·10	0·13
Range of differences between duplicates within method (per cent. moisture)	0·00 to 0·39	0·00 to 0·42
Average difference between methods (per cent. moisture)	+ 0·03	− 0·03
Range of differences between methods	− 0·42 to + 0·32	− 0·32 to + 0·42

TABLE 2

COMPARISON OF CONVECTION OVEN AND VACUUM OVEN, USING THE SAME 13 SAMPLES

—	Convection Oven	Vacuum Oven
Average difference between duplicates within method (per cent. moisture)	0·16	0·19
Range of differences between duplicates within method (per cent. moisture)	0·01 to 0·60	0·01 to 0·65
Average difference between methods (per cent. moisture)	+ 0·006	− 0·006
Range of differences between methods (per cent. moisture)	− 0·32 to + 0·6	− 0·6 to + 0·32

TABLE 3

COMPARISON OF CONSISTENCY FOR CONVECTION OVEN AND VACUUM OVEN

—	Convection Oven	Vacuum Oven
Number of samples	161	97
Range of difference between duplicates (per cent. moisture)	0·00 to 0·83	0·01 to 0·95
Average difference between duplicates (per cent. moisture)	0·194	0·218

Table 1 shows that moisture values obtained in the quick-drying oven are only very slightly higher than those obtained in the vacuum oven and the convection oven. As the quick-drying oven provides a rapid method of obtaining a moisture percentage, it could be extremely useful in compositional control at cheese factories, where it is sometimes desirable to conclude a moisture determination on the previous day's batch of cheese before the manufacture of the current day's batch has commenced. With matured cheese, however, the results could be raised by the higher temperature employed and the fact that the moisture dishes are in direct metallic content with the oven, causing some loss of volatiles other than moisture.

Table 2 indicates that for the same cheese the convection oven is a little more consistent than the vacuum oven. The average difference between duplicates was 0·19 per cent. in the vacuum oven and 0·16 per cent. in the convection oven, and the maximum variation between duplicates was 0·65 per cent. and 0·60 per cent. respectively.

Table 3 confirms that the convection oven is a little more consistent than the vacuum oven. However, the average differences between duplicates of 0·194 and 0·218 per cent. are small and serve to show that both ovens give fairly consistent results. It is possible that in the vacuum oven different levels of heat are obtained as a result of uneven movement of air.

Though no thorough investigation has been carried out, some evidence has been obtained to suggest that the official method for determining cheese moistures can be shortened without affecting the accuracy of the results. In another laboratory outside the Department, the cheese moisture dishes are not placed on the steam bath at all and they are given only 4 hr in the convection oven. The results obtained in a very small number of checks made were within 0·3 per cent. moisture lower than those obtained in this laboratory using the official methods.

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