A SHORT PROCESS FOR THE EXAMINATION OF BUTTER AND MARGARINE.

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THE quasi-official method for the analysis of butter and margarine, known as the Wollney Reichert process, is essential for the final determination of the extent of adulteration in the case of any impure sample of butter, or the determination of an excess of butter in a sample of margarine, but the use of this process is not necessary for the first examination of the fat of butters or margarines, collected under the Food and Drug Acts, as a sufficiently valuable indication of the genuine or suspicious character of a sample of fat may be obtained by the use of the Valenta or the Zeiss butyro-refractometer tests. Again the determination by weight of the moisture in a sample of butter or margarine is not absolutely necessary; as a valuable though somewhat rough indication of the amount is furnished by a volumetric calculation of the fat. In view of the number of samples collected under the Food and Drug Acts in large towns, and the pressure of other work in municipal laboratories, it would be well if some rapid methods for dealing with the large numbers of this class of substance, similar to those methods in use in milk analysis, could be adopted. I have, during the past three years, found the following process the most rapid for differentiating the normal samples of this class from the suspicious, abnormal, or adulterated samples, and I therefore submit it for consideration. A series of samples are taken in order, each being introduced into a numbered Nessler jar, accurately graduated in cc.'s up to 50 cc., and not merely marked at the 50 cc. mark. The butter or margarine is introduced in sufficient quantity to nearly rise to the 50 cc. mark when melted out in the water oven; when the jars have been in the oven for about fifteen minutes, they are transferred to the cup of an ordinary Lefman Beam centrifugator, and centrifugated for two minutes. This causes a complete separation of the fat from the curd salt and water, the total volume of fat can be accurately read, but the line of demarcation between the fat and curd, floating in the water, is not so clear, and the reading is here somewhat rough. The volumetric percentage

of fat is then determined from these two readings. After making these readings, the fat is immediately poured into a dry filter, carefully avoiding the transference of any curd or moisture. The filtration of the warm fat is very rapid after centrifugation, and I find that margarine, which if merely melted out in a beaker and then transferred to a filter, took over an hour to filter, now filters through in a few minutes, so that a convenient amount of clear fat is rapidly obtained, besides the transference of any of the curd or moisture to the filter being entirely avoided. Three cc. of clear fat are mixed with 3 cc. of glacial acetic acid, and warmed until solution is obtained; a thermometer is introduced into the mixture, and the temperature at which turbidity appears is noted, the acetic acid being previously tested against genuine butter-fat, and the Valenta figure for that particular acid and genuine fat obtained. I have found this to vary for good glacial acetic acid between 35°C and 45°C. If a sample of butter gives a figure as low as 30°C or as high as 50°C it is necessary to take a butyro-refractometric observation, but if it falls within the narrower limits the sample may be passed as genuine; in case this is felt to be not conclusive, a butyro-refractometric observation with the fixed butter-scale may be made with every sample with very little more trouble, and with the expenditure of very little time. The two important points in the composition of butter and margarine which engage the attention of the analyst are thus rapidly arrived at, the fat is passed as genuine if it gives a Valenta figure of 35-45, and the moisture is regarded as not exceeding 16 per cent. if the volumetric estimation of the fat is not less than 83-84 per cent. I have in a large number of cases in which this volumetric percentage of fat has been present determined the amount of moisture by weight, and in the large majority of cases I have found about two per cent. less moisture by weight than the difference figure (100 — volumetric fat percentage) only in one or two cases have I found that the figures are nearly identical; this is probably due to the variation in the amount of curd in the particular samples, which also minimises the accuracy of the process and prevents a satisfactory deduction of the weight percentage of the fat from the rough volumetric percentage and the specific gravity, satisfactory determinations of which I have been unable to obtain by this process; yet the fact remains that a satisfactory and useful deduction as to the limit of moisture present can be made. In this way more than a dozen samples may be dealt with in one hour, and the remainder of the fat in the abnormal specimens used for the determination of other and more important constants for fixing the extent of sophistication.