

NOTE ON AN INGENIOUS ADULTERATION OF MILK.

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SOME time ago I received a sample of milk which, on analysis, gave :—

Fat	2.1
Solids not fat	8.3
Total	...	...	...	...	10.4
Ash	...	...	...	...	.5

I was, however, struck by the very low ash, a somewhat unusually hygroscopic appearance about the residue, and a taste which indicated a much higher degree of dilution than that indicated by the above figures. I accordingly set to work to make a full analysis, which gave :—

Fat	...	...	...	...	2.10
Sugar (taken by Fehling)	...	...	...	...	2.70
Casein	...	...	...	...	3.35
Ash	...	...	...	...	.50
Total	...	...	...	...	8.65

Here, therefore, were only 6.55 true solids (not fat), showing, as I expected, a much larger quantity of water.

After numerous researches, I at last found that the foreign matter in the milk was glycerine, which is certainly a most ingenious addition, as a solution of that body in water of 12 per cent. strength has a specific gravity of 1.030; and I found, after several experiments, that 35 per cent. of such glycerine water might be added to milk without being detectable either by gravity or by the ordinary "solids not fat" process. Moreover, such an amount does not give any extraordinary sweetness easily detectable by the taste.

The following is the modification of Mr. Wanklyn's process, which I have devised to meet this case :—

- (1.) Evaporate, as usual, and weigh the residue.
- (2.) Extract the residue with *pure* anhydrous ether, and weigh the fat or the solids not fat whichever the operator may prefer.

- (3.) Extract the solids not fat with a mixture of *absolute* alcohol and ether, in equal volumes, and evaporate the solution at a gentle heat. Any oily-looking liquid that is left should now be tested for glycerine, by warming with a little sulphuric acid, and getting off the fumes of acrolein. If this be found the solids not fat are perfectly unreliable, and nothing remains but to make a full analysis of the milk, estimating both the sugar and the casein directly—the former by Fehling's solution and the latter by precipitation. If the Fehling be used gravimetrically it should be borne in mind that the true equivalent, as shown in my manual of chemistry, is not that usually given, but is 100 parts milk-sugar = 147.76 parts CuO.

- (4.) The ash must be taken on a separate portion.

In case the milk be sour it must be carefully neutralised by a known weight of sodium-carbonate before evaporating.

This difference between the true and the apparent solids not fat will indicate the amount of "glycerine-water" added, and if the gravity of the milk is about 1.030 it is then safe to call 12 per cent. of that glycerine and the rest water. Of course as the glycerine is slightly volatilised during the evaporation, the estimation will always be something under the truth.
