

## A Modified Moisture and Volatile Matter Determination in Fats and Oils

Sir,

The moisture and volatile matter content of fats and oils can be determined according to the AOCS Official Ca 2b-38 Hot-Plate Method, the AOCS Official Ca 2d-25 Vacuum Oven Method and the IUPAC I.I.C.I.1 Sand-Bath Method. The last two methods are rather time-consuming, whereas we have found the Ca 2b-38 Hot-Plate Method gives varying results owing to the recommended heating of the sample to the point of incipient smoking.

Recently, we had to elaborate for an industrial firm a moisture and volatile matter determination procedure which could be accomplished in a time span of no more than one hour without the use of elaborate equipment. The short time factor was necessary to rapidly determine the commercial value of crude fats and oils to be purchased. After several experiments, the following equipment and procedure were adopted:

### Apparatus:

1. An electric hot plate with a magnetic stirring device.
2. A water pump aspirator producing a vacuum equivalent to 100 mm absolute pressure.
3. A filtering flask (125 mL) of Pyrex glass.
4. Magnetic stirrer of 2 cm length.
5. Rubber tubing withstanding the specified vacuum.
6. Porcelain dish with glycerol as heating bath.
7. Thermometer from 0-150°C.
8. Desiccator containing an efficient desiccant.

### Procedure:

15-20 g of well-mixed sample are weighed accurately in the tared filtering flask provided with a magnetic stirrer. Pure acetone (5 mL) are added by a measuring cylinder. The flask is placed in the glycerol bath, stoppered with a rubber plug and connected with the water pump. The mixture

in the flask is stirred, put under vacuum, heated up to 100°C in about 10 min and held at the above temperature for 20 min. The flask is then removed from the glycerol bath and cooled under vacuum to room temperature in a water bath. After carefully releasing the vacuum, the flask is dried with a piece of cloth, put into the desiccator for a few minutes and weighed. The percentage of moisture and volatile matter is equal to

$$\frac{\text{loss in weight}}{\text{weight of sample}} \times 100$$

### Final remarks:

1. The addition of acetone serves to avoid the spattering of the liquid during evaporation of the moisture. Acetone, being a solvent for both oil and water, was found to perform this service better than alcohols and hydrocarbons.
2. The efficiency of the described procedure was tested by adding weighed amounts (0.5-1%) of water to a dried sample and reinitiating the treatment. The reproducibility and the exactness of the procedure were found to be satisfactory. The difference between the amounts of water added and found was below 1%.
3. In employing the described procedure, the determination of moisture and volatile matter can be accomplished within one hour.

L. Hartman and F.H. Jablonka  
National Center of Food Technology Research-  
CTAA-EMBRAPA  
Guartiba  
Rio de Janeiro-RJ  
Brazil 23020-470

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