A Rapid Method for the Determination of Fat

in the Industrial Production of Forcemeats^X

By

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Introduction

Analysis of raw materials for forcemeat production have shown that different batches of the same raw material quality can deviate by as much as $\frac{+}{-}$ 8% from the required fat percentage.

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A series of investigations was therefore started to find a method which could be used in industry to reduce this variation. The results showed that a determination of the specific gravity of representative samples could be used as a method if the raw materials were:

- a) cut into suitably uniform pieces (30 50 mm in size).
- b) thoroughly mixed in suitably big charges.

There was a good relationship between specific gravity and the analytically determined fat content of samples of the raw materials.

An apparatus has been developed for fat determination called FAT-CON, which uses the above-mentioned method. On this apparatus the fat content of raw materials, fresh or pre-saltet, can be read off directly from the scale. This paper describes the apparatus and its use. SLAGTERIERNES FORSKNINGSINSTITUT 11. juni 1971

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The apparatus consists of:

- 1. A special balance.
- 2. A stainless steel sample container.
- 3. A vacuum pump with motor mounted on a flexible platform, which acts as a vibrator.
- 4. A vacuumstat and meter connected to a steam trap.
- 5. A water hose with steel pipe extension.
- 6. A plastic cistern.

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Measuring principle

An essential feature of the method is that a standard sample of raw material is accurately weighed out. For fresh raw materials a 17 kg sample is used; for pre-salted raw materials 17 kg sample plus a correction for the salt added is used.

Specific gravity of the sample is determined by:

- 1. Weight of the sample.
- 2. Known volume of the sample container (V_+) .
- 3. Volume of water held by the container besides the sample i.e. quantity of water registered on the balance (V_).

Then, the specific gravity of the sample = $\frac{\text{weight of sample}}{\text{volume of sample}} = \frac{17}{V_{\pm} - V_{\odot}}$

The previously mentioned relationship between fat content and the specific gravity of the raw material has been converted on the specially designed scale of the meter, so that the fat percentage of the sample can be read off directly.

Adjustment of the balance

The sample container is almost filled to the rim with water at 8 - 10°C, and placed on the mounting plate of the vacuum pump with the lid on. The steen trap is connected to the sample container and the pump is started. The valve on the lid is opened slightly and vacuum (approx. 650 mm Hg) applied to remove any air present. When the required vacuum is reached, the valve is closed and the pump stopped automatically. The container is then moved to the weighing platform and filled to the top with water from the cistern. Finally the outside of the container is rinsed with water. The balance is then activated via the foot contact, and the pointer adjusted to the fat percentage which corresponds to a specific gravity of 1.000 (for both fresh and pre-salted materials) by means of the tare handle. The container is then emptied of water. SLAGTERIERNES FORSKNINGSINSTITUT 11. juni 1971 FARSVARER-FEDTBESTEMMELSE Manuskript nr. 484 E E5

The lid is placed on the hook and the container on the weighing platform. 17 kg weights are then placed in the container and the balance again activated. The moveable zero point is adjusted to the pointer position. The only difference between fresh and pre-salted products is a parallel displacement of the curve on which the scale is based. For pre-salted materials, therefore, an extra 425 g of raw material is weighed out to correct for the salt used (20 - 30 g/kg).

Procedure

A sample of the chopped and thoroughly mixed charge is weighed into the sample container on the balance. The sample container is then placed on the vibrating platform and the pump started. During shaking water is added from the bottom using the hose with the steel pipe extension, so that the air escapes as the container is filled up. The water is added until the level reaches about 2 cm from the rim. The water-meat mass is stirred slightly with the steel extension.

The lid is then placed on the container which is connected to the vacuum equipment, and the container is shaken under vacuum (approx. 650 mm Hg) for one minute so that as much as possible of the entrapped air is removed from the sample. The valve is then closed and the vacuum pump stopped automatically. The sample container is allowed to stand for 15 sec. under full vacuum.

The container is moved back to the weighing platform and filled with water from the cistern until overflow. The balance is then activated and the fat percentage of the sample read off directly from the scale.

Each determination takes approximately 5 minutes and is non-destructive to the sample.

The method can give the fat content $\frac{1}{2}$ assuming that the weighing is exact and that the method is carried out exactly as described in this paper.

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