APPLICATION NOTE

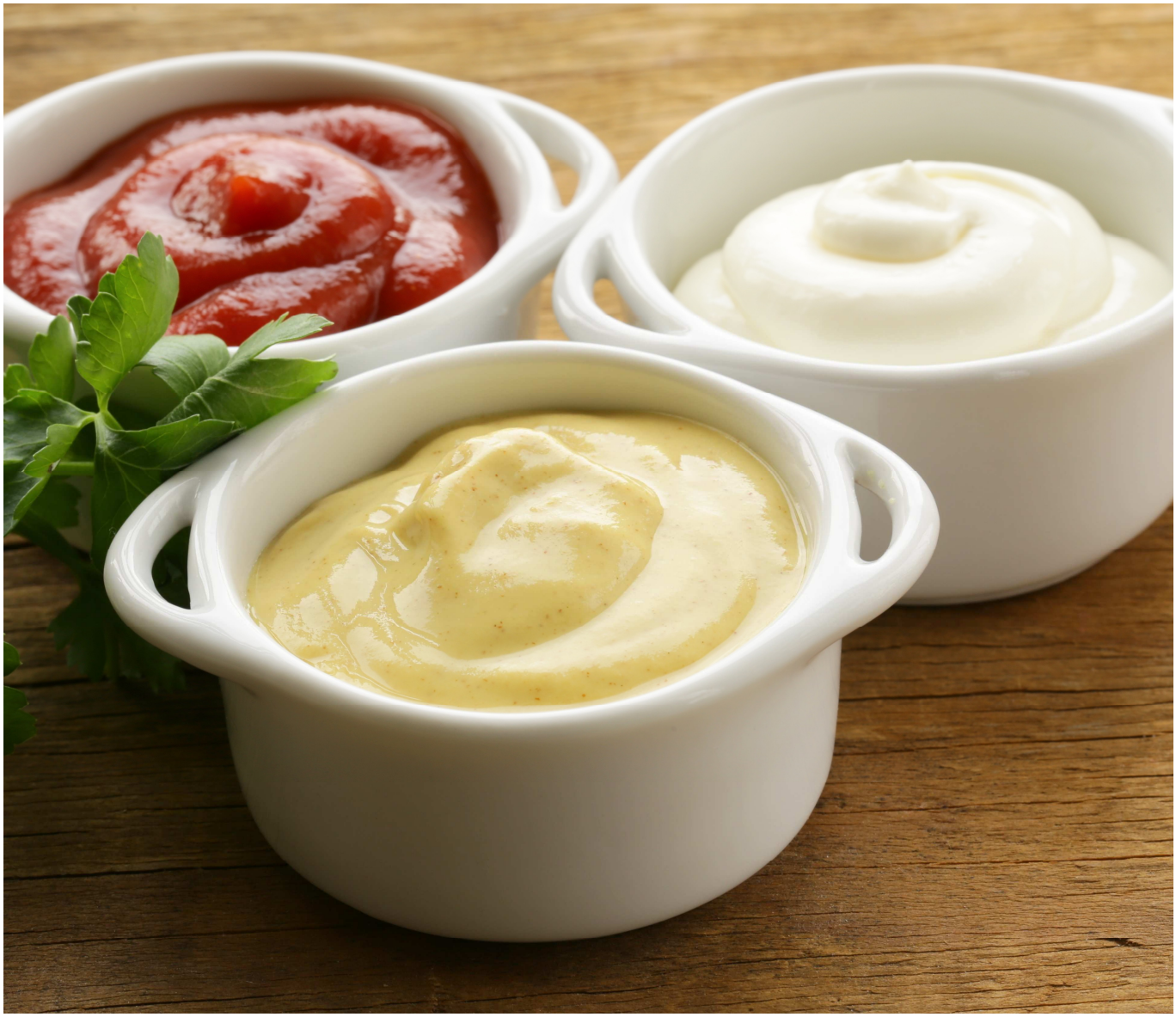
F&F-S-002-2015/A1

Crude Fat Determination in Mayonnaise

according to the Randall method

Reference: **AOAC Official Method 920.172**

Tested with **VELP Scientifica SER 158/6 Solvent AutoExtractor** (Code F303A0380)



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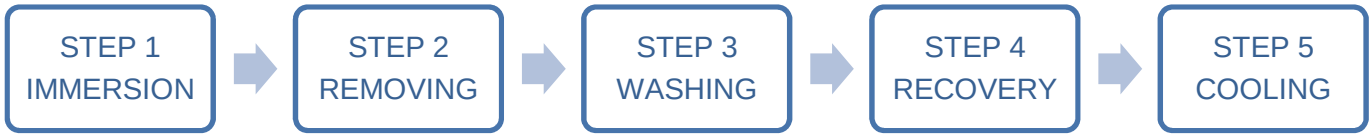
CRUDE FAT DETERMINATION IN MAYONNAISE
RANDALL METHOD

Introduction

Mayonnaise is a white or pale yellow cream used as dressing for salads, fish or meat dishes. It is a stable emulsion of vegetable oil fractionated in water, with egg yolk as an emulsifier, and flavored with vinegar or lemon juice.
Commercial product has a fat content ranging between 70-80%, however an handmade mayonnaise can reach 85%.
The low-fat mayonnaise contains starches, cellulose gel or other similar ingredients to simulate the texture of normal mayonnaise.

Fat Determination in Mayonnaise

Hot solvent extraction process with SER 158 Series can be summed up in 5 steps, for a fully unattended operation::



During IMMERSION the sample is immersed in boiling solvent. Then the REMOVING step automatically lowers the level of the solvent to below the extraction thimble. During WASHING the condensed solvent flows over the sample and through the thimble to complete the extraction process. The fourth step involves solvent RECOVERY. Approximately 90% of the solvent used is collected in the internal recovery tank. The final step is the COOLING of the extraction cups containing the extracted matter. The cups are raised to prevent burning. The extraction cups containing the extract are placed in a drying oven, cooled in a desiccator and weighed for the extract percentage calculation.

Sample

Mayonnaise Fat labeled value: 72 g / 100 g

Chemicals and Equipment Required

- Analytical balance, 3 decimals
- Extraction thimbles (33x80 mm) (Code A00000295)
- Glass extraction cups
- Viton seals
- Petroleum Ether 40 – 60 °C as solvent
- Sodium sulphate anhydrous
- Defatted cotton

Sample Preparation

Fix the Extraction thimbles with the Extraction thimbles holders (Code A00000312). Mix around 20 g of mayonnaise in an empty and clean beaker. Then, put 1 g of sample (*Sample*) directly in the VELP extraction thimbles using the Thimble weighing cup (Code A00000310). Add about 2 g of sodium sulphate anhydrous and mix thoroughly using a glass rod. Clean the glass rod using a piece of clean defatted cotton and place it into each thimble, over the sample.
Position the extraction thimbles in the extraction cups.

Glass Extraction Cups Preparation

Position the empty extraction cups in an drying oven (105 °C) for 1 hour.
Cool them in a desiccator until constant weight of the tare (*Tare*). The extraction cups containing the extraction thimble can now be placed on the ultra-fast heating plate of SER 158.

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RANDALL METHOD

Extraction Procedure with SER 158

On the ControlPad select “Analysis”, and then method “Creme & sauce” including the following parameters:

- Immersion Time: 15 minutes
- Removing Time: 8 minutes
- Washing Time: 15 minutes
- Recovery Time 10 minutes
- Cooling Time: 5 minutes
- Petroleum Ether 40-60 °C, 100 ml

Close the safety guard and add the solvent using the automatic solvent dispensing system SolventXpress™ to minimize exposure to the solvent ensuring operator safety.
Press START to begin the extraction process. At the end of analysis position the extraction cups containing the extract in a drying oven (1 hour at 105 °C), cooled them in a desiccator to room temperature and record the accurate weight (*Total*).

Typical Results on Mayonnaise

Analysis results are calculated automatically and stored in the ControlPad when entering the weights into the software (manually or automatically through a balance). The extract percentage calculation is performed by using the following formulas:

$$Extract\ (g) = (Total - Tare)$$
$$Extract\ (\%) = Extract \times 100 / (Sample)$$

Where:

Sample = sample weight (g)
Tare= weight of the empty extraction cup (g)
Total = weight of the extraction cup + extract (g)

Tare (g)	Sample (g)	Total (g)	Extract (g)	Extract (%)
128.2772	0.9956	128.9970	0.7198	72.30
129.7454	1.0891	130.5305	0.7851	72.09
127.1787	1.0125	127.9150	0.7363	72.72
128.4261	1.0863	129.2118	0.7857	72.33
126.7936	0.9903	127.5146	0.7210	72.81
127.8123	1.0856	128.6033	0.7910	72.86
			Average ± SD%	**72.52 ± 0.32**
			RSD% **	**0.44**
Fat Labeled Value: 72 g / 100 g				

****** RSD% = (Standard Deviation x 100) / Average

Conclusion

The results obtained are reliable and reproducible in accordance with the expected values, with a low relative standard deviation (RSD < 1%), that means high repeatability of the results.
Therefore, SER 158 Solvent Extractor is ideal for the fat content determination in mayonnaise.

Benefits of hot solvent extraction (Randall) by using 158 Automatic Solvent Extractor:
- up to 5 times faster than Soxhlet (hot solvent vs. cold solvent)
- low solvent consumption (high solvent recovery, approximately 90%) - limited cost per analysis
- no exposure to solvent
- worldwide official method
- full traceability with automatic result calculation and on-board archive

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