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# Crude Fat Determination in Meat Products according to the Randall method

Reference: ISO 1444:1996, AOAC 991.36, AOAC 960.39

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



## Introduction

*Salame* is an Italian word defining crude or cooked meat obtained after a long period of seasoning, with the addition of several different kind of ingredients as salt, garlic, wine, herbs in a spice mix.

The variety of cured meat types is huge, depending on the meat origin, the grinding way, the ingredients and method of cure. Salami can have different textures, tastes and flavors; it can be hot or smoked.

For this reason, almost every Italian town has a local salami with a typical name.

## Fat Determination in Italian Salami

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

Italian Salami

Fat labeled value: 34 g / 100 g

Moisture: 33 g / 100 g

## Chemicals and Equipment Required

- Analytical balance, 3 decimals
- Extraction thimbles (33x80 mm) (code A00000295)
- Glass extraction cups
- Viton seals (code A00000297)
- Petroleum Ether 40-60 °C as solvent
- Sodium sulphate anhydrous
- Defatted cotton

## Sample Preparation

Cut the salami in slices and grind it with a blade grinder for few seconds. Leave it in an oven for 6 hours at 105°C in order to remove all the moisture. Record the weight of the sample before and after the desiccation in order to calculate the loss of humidity.

Fix the Extraction thimbles with the Extraction thimbles holders (Code A00000312). Put 3 - 4 g of desiccated homogenized sample directly in the VELP extraction thimbles using the Thimble weighing cup (Code A00000310). Position the extraction thimbles in the extraction cups.

## 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 ( $M_{tare}$ ). The extraction cups containing the extraction thimble can now be placed on the ultra-fast heating plate of SER 158.

## Extraction Procedure with SER 158

On the ControlPad select “Analysis”, and then method “Crude fat in meat” including the following parameters:

- Immersion Time: 20 minutes
- Removing Time: 10 minutes
- Washing Time: 20 minutes
- Recovery Time 30 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 ( $M_{tot}$ ).

## Typical Results on Salami

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:

$$\text{Extract (g)} = (\text{Total} - \text{Tare})$$

$$\text{Extract (\%)} = \text{Extract} \times 100 / (\text{Sample})$$

Where:

*Sample<sub>on w.m.</sub>* = sample weight considering wet matter (g)

*Tare* = weight of the empty extraction cup (g)

*Total* = weight of the extraction cup + extract (g)

Tare (g)	Sample <sub>on w.m.</sub> (g)	Total (g)	Extract (g)	Extract (%)
124,8150	4,4195	126,3380	1,5230	34,461
123,3130	4,0970	124,7256	1,4126	34,479
122,1910	3,9338	123,5340	1,3430	34,140
124,4620	4,0330	125,8377	1,3757	34,111
123,2250	4,0513	124,5880	1,3630	33,644
125,3890	3,8306	126,7040	1,3150	34,329
			<b>Average ± SD%</b>	<b>34.194 ± 0.311</b>
			<b>RSD% **</b>	<b>0.909</b>

Fat Labeled Value: 34g / 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 salami.

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