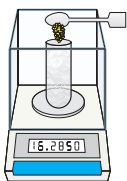


Application:
Randall Hot Extraction
with 4-Sample Extractor ED4



012103

Course of the Hot Extraction

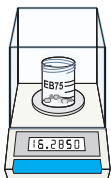


Weigh the (dry) sample into an extraction thimble

Example: if fat content is 10%, a sample weight of 2 g will yield an output weight of 200 mg.

Cover with clean cotton.

Stick thimble into magnetic ring as far as it will go.



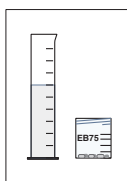
Weigh the empty extraction beaker

Put some boiling chips or boiling beads into the beaker.

Dry for 30 minutes at 103 °C and let cool down in an exsiccator.

An empty beaker weighs about 100 g.

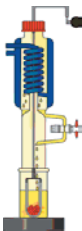
It must be weighed with 0.1 mg accuracy (analytical balance).



Fill the solvent in

First extraction of the day: fill solvent (e. g. 60 ml) into the beaker

The following extractions: Screw the beaker under the condenser, open the stopcock and let solvent flow into the beaker, take the beaker off, replace solvent losses (typ. 10ml).



Decoction - typ. 20 minutes

Hang the thimble under the magnetic holder by the magnetic ring, lift it up.

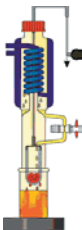
Screw the beaker with solvent under the condenser.

Set temperature: for petroleum ether 40-60 about 150 to 160 °C.

Open the reflux stopcocks.

Lower the apparatus into the heaters and lower the thimbles into the beakers.

Switch on, heat to boiling, wait for the the prescribed decoction time.

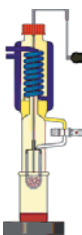


Rinsing - 20 - 40 minutes depending on sample

Lift the thimbles up.

Now the samples will be rinsed by the condensate dripping down from the condensers. Is reflux sufficient from all condensers? If need be, increase temperature slightly (e. g. for 10 °C).

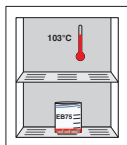
Wait for the prescribed rinsing time.



Evaporating - typ. 10 minutes

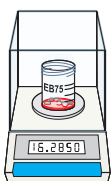
Close the reflux stopcock.

After about 10 minutes most of the solvent will have evaporated; it has been collected in the condensers so it can be used again for the next extraction.



Drying

Take the extraction beaker off. **Put into the fume hood until the solvent has largely evaporated.** Only then dry at 103 °C for 30 minutes. Let cool down in a desiccator..



Weigh the residue

Weigh the dried and cooled extraction beaker with 0.1 mg accuracy.

The Extraction Procedure

The Randall Hot Extraction Procedure consists of three steps.

1. Decocting

During the first step, the extraction thimble containing the sample is immersed in the boiling solvent in the beaker - just like a tea bag in a cup of hot water. Much of the substance that is to be extracted will already dissolve during this step, and disperse in the solvent.

The upper part of the apparatus just works as a reflux condenser; the reflux will drip into the thimble, thus helping to dissolve the substance.

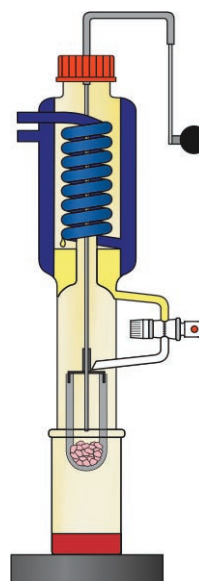
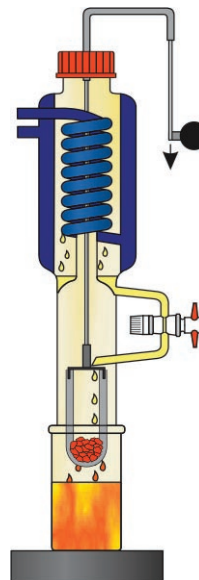
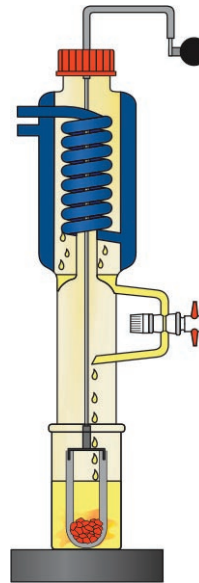
2. Rinsing

In the second step, the extraction thimble is lifted out of the beaker. It still contains some adhering extract; and it might still contain some substance that has not yet been dissolved. Now the reflux from the condenser will rinse the adhering extract and also, given time, dissolve the parts of the substance that are yet undissolved.

If you want to process the solution, extraction is finished now. If you need the dry substance, now evaporate the solvent.

3. Evaporation

In order to evaporate the solvent, just close the reflux stopcock below the condenser. Now the condensate will gather in the lower part of the condenser; you can use it again for the next extraction. Due to the short distances in the apparatus, it is possible to evaporate the sample almost to dryness.

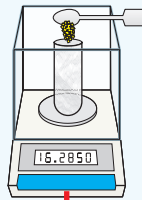


Fat Determination



Raw Fat Determination

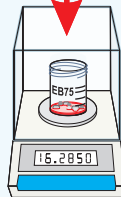
Weigh sample into extraction thimble



Do the extraction



Dry the extract and weigh



Divide extract weight by sample weight

Result: Raw Fat Content

Calculate the fat content like this:

$$F[\%] = \frac{m_2 - m_1}{E} * 100$$

where

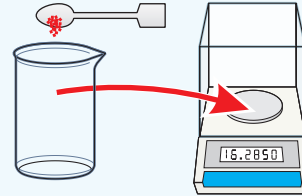
m_1 Weight of the empty, dried vessel (with boiling chips) in g

m_2 Weight of the vessel after extraction (including fat and boiling chips) in g

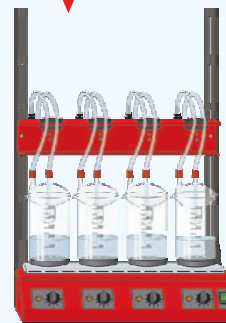
E Sample weight in g

Total Fat Determination

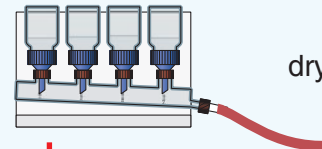
Weigh sample into beaker



Hydrolyse the sample



Filtrate, dry the filters



Do the extraction



Dry the extract and weigh



Divide extract weight by sample weight

Result: Total Fat Content