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Getränkeanalytik

Steam distillation for determining the alcoholic strength by volume in sugared spirits, wines and mash

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Technical informations and instructions for use

General instructions:

The alcohol content of liqueurs and spirits consisting of more ingredients than alcoholic distillate and water cannot be determined directly hydrometrically ("testing"). In wines and mashes, too, these extracts (sugar, proteins, tannins, etc.) must first be separated by distillation before the distillate obtained can be tested with an alcoholometer.

Distillation methods in comparison:

The conventional distillation process is the so-called **sample distillation**, which has been a reliable part of our product range for many years. It delivers very accurate results without requiring extensive analytical expertise or special dexterity. Although the examination of a sample takes about one hour, the distillation, which takes about 40 minutes, does not require constant observation, so that other work can be done at the same time. Compared to the alternative of having samples tested in the beverage laboratory with a time delay, gas- or current-heated **sample distillation** is an inexpensive purchase for small businesses.

Recently we have been able to offer you an accelerated procedure with the same accuracy. This **steam distillation** process, which is also electrically operated, offers the following advantages:

- Minimum time required per sample: just under 15 min for spirits / 10 min for wines and mashes,
- automatic switch-off of distillation,
- no burning in the distillation flask possible,
- automatic cooling water supply,
- significant energy saving.

With steam distillation, even large sample volumes can be easily handled in parallel and without waiting times.

Scope of supply of steam distillation:

- electrically operated steam distillation unit with "½" water tap fitting and Schuko plug (600 W, 230 V)
- 1 x distillation flask for max. 50 ml sample
- 2 x volumetric flasks 40 ml, short neck, with beaded rim and rubber stopper 15x11 mm
- 2 x volumetric flasks 100 ml, short neck, with beaded rim and rubber stopper 18x14 mm
- 500 ml spray bottle with spray cap
- 100 ml bottle of silicone antifoam solution
- Poly adjustable pipette, Griffin cup, plastic funnel Ø55 mm
- spindle cylinder 270x30 mm
- 2 x 1L distilled water

Special accessories, not included in delivery:

- 50 ml volumetric pipette
- alcoholometer for 100 ml distillate (0-7 / 5-12 / 10-17 %vol., graduation 0.1 %vol., incl. thermometer)



Preparation of steam distillation:

- Fill the steam generator bottle with distilled water up to the maximum mark.
- Connect the cooling water supply hose to a water tap and open it.
- Connect the power supply and switch on the appliance; the weaker heating rod now brings the water to boiling temperature and keeps it hot.
- Check whether the steam can enter the distillation flask unhindered and whether, for example, the end of the silicone hose is too close to the inner wall of the sample vessel in the distillation flask or is clogged with dirt.

Sample preparation:

Steam distillation does not require sample preparation. Spirits, wines and mash are tested directly. In order to obtain very accurate results, it is important to measure the average sample taken from the entire batch at exactly 20°C as representative as possible.

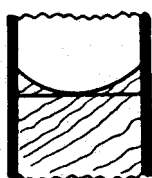
Implementation of the alcohol determination:

- Feed flask (100 ml volumetric flask with short neck and beaded rim) with approx. 5 ml dist. water. Then place the flask in such a way under the cooler that the toothed end of the silicone hose dips into the water.
- Measure the sample as follows:

► Liqueurs and other spirit drinks containing extracts containing not more than 45 %vol. alcohol (dilution factor 2,5):

- Fill the sample into the clean, dry 40 ml volumetric flask with the help of the Griffin cup or funnel, at a temperature of 20°C, as close as possible to the ring mark and without wetting the inner wall of the neck above the ring mark.
- If necessary, adjust the curved sample surface (meniscus) in the neck of the 40 ml volumetric flask exactly to the ring mark using the polyadjustment pipette (see sketch below).

Ablesung



„Meniskus auf Marke“

- Transfer the measured sample loss-free from the volumetric flask into the distillation flask, then rinse the volumetric flask twice with approx. 10 ml distilled water and add this to the distillation flask as well.

► Mash (dilution factor 2):

- Measure 50 ml sample in Griffin beaker, transfer to distillation flask, rinse with about 20 ml distilled water and place it also in distillation flask.,

► Wines and low-viscosity spirits not exceeding 20 % vol. (dilution factor 2):

- Measure the sample at 20°C with a 50 ml volumetric pipette and transfer it completely into the distillation flask.
- Add 2-3 drops of silicone antifoam solution* to the sample in the distillation flask.
- Attach the distillation flask to the spherical foam catcher, first moisten the glass section with a little water so that it appears almost crystal clear after fixing with the screw clamp.
- Set the desired distillation time on the timer (**wine and mash 6 min, spirits 8min**) and start distillation. The stronger heating rod now develops about 10 ml steam / min.
- Carefully remove the distillation flask after the automatic steam generation will be finished.
- Also slowly remove the receiver flask and make sure that the distillate standing in the silicone hose still runs off completely into the receiver flask.
- Fill the distillate in the receiver flask with distilled water to just under the 100 ml ring mark, close the flask tightly with the rubber stopper, shake and temper to 20°C.
- Fill up exactly to the ring mark with distilled water, close the flask again and shake well.
- Transfer the distillate into a dry spindle cylinder 270x30 and determine the alcohol content and temperature with a suitable alcoholometer for 100ml sample.
- If necessary, correct the alcohol level to 20°C using Official Alcohol Table No. 1.
- Multiply the measured value of the distillate (%vol. at 20°C) by the above **dilution factor** to calculate the alcohol content of the sample tested. The dilution factor takes into account that the distillation dilutes the amount of alcohol present in 40 or 50 ml sample to 100 ml distillate:

Calculation example for dilution factor 2.5:

Distillate of a liqueur contains 10,2 %vol.:

→ the liqueur contains $10.2 \times 2.5 = 25.5$ %vol. alcohol

Reference:

*Eggnog can foam a lot depending on its composition. If even 20 drops of silicone antifoam solution do not help, the distillation must be interrupted several times, but nevertheless about 80 ml of distillate must be obtained.