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Getränkeanalytik

Würzburg UTAFIX test

version 04/2007

- Test for detecting a possible UTA formation in young wine and barrel wine -

This test represents the basis for the "preparation of UTA-free wine according to the Veitshöchheim procedure".

Test principle:

The aroma impact compound 2-aminoacetophenone (AAP) is regarded to be the indicator substance of the untypical aging off-flavours (UTA). According to the current state of knowledge, radicals form UTA and AAP respectively only after sulphuration of the young wine.
The Würzburg UTAFIX test permits to check unsulphurated and already sulphurated young wine to determine whether or not the same tends to form UTA. The principle of this test consists in the sensory assessment of 2 and 4 samples respectively of the young wine after the addition of special reagents and a 3-day warm storage at approx. 40°C. After that period it is already possible to recognise the UTA characteristics in young wine and to take suitable actions to avoid the forming of UTA.

Short description:

After addition of the UTAFIX-1 reagent solution, the young wine is apportioned to two and four 0.25 l screw-cap bottles A (B) and C (D) respectively: Special reagent UTAFIX-2 is additionally added to sample C (D), all preparations being then stored for three days at approx. 40°C. After cooling, sample A (B) is tested by tasting in comparison with sample C (D) and with standard samples to which UTAFIX-3 (AAP solution) has been added to determine whether or not UTA-type odour characteristics can be detected.

Reagents:

- **UTAFIX-1** reagent solution in brown glass bottle with 2 ml syringe and cannula;
- **UTAFIX-2** reagent in a black plastic bottle with a spatula in the cap;
- **UTAFIX-3** reagent solution (AAP test solution with a very intensive smell) in brown glass bottle with dropping attachment;
- **UTAFIX-4** reagent solution (for the determination of the free SO_2 in ascorbic acid-containing wines) in plastic bottle with plastic pipette.

One set of reagents for the determination of sulphurous acid should always be kept on stock.

Materials and equipment:

- **250 ml glass bottles** with neutral plastic screw cap. Since the bottles are being reused, it must before implementing the test always be made sure that they are odourless. It is as a matter of principle recommended to use only fresh caps, e.g. also from mineral water bottles.
- Before tasting, **tasting glasses** are to be rinsed with the respective samples.
- **Equipment for heating the samples constantly to 37 - 45°C** (e.g. yoghurt maker) for three days. If available, a breeding or drying oven should be used. Alternatively, the sample bottles can also be heated in a water bath. Warm fermentation can also be made in the oven of an electric kitchen stove, provided that a constant temperature of approx. 40°C can be set (set oven regulator e.g. to below 50°C, checking and regulating the temperature by means of a thermometer).

Analyses process of the Würzburg UTAFIX Test:

1. Sampling:

1-2 litres of young wine are taken out of the upper third of the container after completed fermentation or in the decaying phase of fermentation.
The UTAFIX test can also be used for already sulphurated young wines.

Note: A condition for the implementation of the test is that the wine has been fermented largely without any faults, i.e. does not represent any hydrogen sulfide odours. In the case of presence of hydrogen sulfide it has to be eliminated by cupric-solution.

2. Implementation of the test:

2.1 Activation phase, addition of UTAFIX-1 reagent solution to the young wine:

Allow very turbid young wine to deposit before the addition of UTAFIX-1 reagent solution for one day at a low temperature. Fill a measuring cup of 1 litre from the supernatant liquid. Less turbid young wines can be tested directly:

- **Unsulphurated young wine:**
  Add 2.0 ml of UTAFIX-1 reagent solution to 1 litre of wine, stirring steadily and intensively.

- **Sulphurated young wine:**
  - In case of more than 40 mg/l free SO_2 no UTAFIX-1 is added
  - for 30–40 mg/l free SO_2 per litre add + 0.25 ml UTAFIX-1
  - for 15–30 mg/l free SO_2 per litre + 0.5 ml UTAFIX-1, stirring steadily and intensively.

2.2 Sample apportioning in 0.25 l bottles:

It seems to be reasonable to implement a double determination to achieve a better tasting comparability. For a double preparation, 4 sample bottles (A, B, C and D) are required. But in many cases, the available space for the warm fermentation of larger series will be too small to permit double determinations. For the single determination, 2 sample bottles (A and C) are needed.

- Apportion the sample to which UTAFIX-1 reagent solution has been added to 2 and 4 screw-cap bottles respectively, labelling them or marking them with a felt marker as samples A (B) and C (D).
- Make sure that the bottles are only filled up to max. 4 cm underneath the upper edge and the bottles are shaken once more.

2.3 Inhibitor addition, addition of reagent UTAFIX-2 to bottle C (and D):

Fill sample bottle C (D) by means of a micro spatula with UTAFIX-2 reagent, dissolve and distribute the reagent by shaking it carefully (caution: Flatness).

2.4 UTA formation by warm storage (forced ageing):

- Store all sample bottles for 3 days (approx. 72 hours) at temperatures of 37-45°C in a suitable warming device (drying oven, breeding oven, water bath, electric kitchen stove).
- Check temperature by means of a thermometer.

2.5 Tasting and determination of UTA:

- Fill samples A (B) and C (D) after cooling down to ambient temperature into tasting glasses (pre-rinse the glasses in case of need with the respective sample, filling volume 50 %).
- Check odour and taste of samples A (B) and C (D) with regard to UTA characteristics. Sample A (B) is in this case the UTA test sample of which UTA can be determined; sample C (D) is the comparative probe that should not allow to evidence any UTA.
- Sensory test:

For single preparation: Whether sample A differs from sample C. For double preparation: Whether samples A and B as well as C and D are identical each. Whether samples A and B differ from C and D.

Notes for tasting:

- It is recommended to implement the tasting with several testers who have no knowledge of the sample sequence.
- When tasting double preparations, the pair allocation of the samples (A/B and C/D respectively) should be recognised by the tasters. This permits to determine the reliability of the tasters.
- It has to be made sure that the odour in the room in which the tasting takes place is neutral.
- In case of dubious results, tasting should be repeated after another warm fermentation for 1–2 days.

2.6 Tasting evaluation:

Case 1: UTA test sample A (B) and C (D) have no UTA:

When matured according to the state of art, the wine will with great probability not get any UTA.

Case 2: UTA test sample A (B) has a weak UTA; sample C (D) has no UTA:

The wine can form UTA after sulphuration and during storage. A wine maturation with up to 150 mg/l (15 g/hl) of ascorbic acid seems to be reasonable!

If sample C (D) shows in comparison to sample A (B) no UTA, a UTA formation can in the young wine phase be reduced or delayed by adding ascorbic acid. This corresponds to the "**preparation of UTA-free wine according to the Veitshöchheim procedure".**

2.7 Establishment of odour standards:

The establishment is not absolutely required, but may be useful when lacking experience with the UTAFIX test. It is for this purpose recommended to establish an odour standard in the following way:
Add with caution 10 drops of the UTAFIX-3 solution to the UTA-free sample C (D); compare after profound mixing in a new tasting glass the UTA taste with the odour characteristics of sample A (B)

Preparation of further comparative samples with UTA:
Add 2.0 ml UTAFIX-1 reagent solution to one litre of unsulphurated young wine, do not add any UTAFIX-1 to sulphurated wines with sufficient free SO_2 (>40mg/l), apportioning it to four times 250 ml. Add subsequently UTAFIX-3 solution:

- 5 drops to 250 ml: Standard for weak UTA
- 10 drops to 250 ml : Standard for medium UTA
- 15 drops to 250 ml : Standard for significant UTA
- 20 drops to 250 ml : Standard for intensive UTA

Caution!

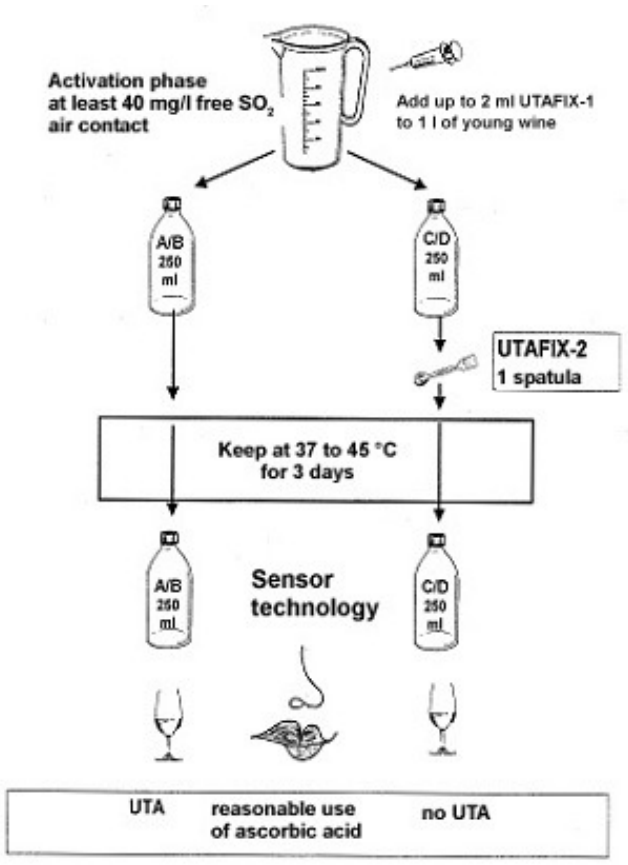
The AAP test solution UTAFIX-3 is very odour-intensive and therefore calls for cautious handling; otherwise the risk of influencing other samples, tasting glasses as well as the ambient air exists, making tasting impossible. It is insofar recommended to prepare the comparative UTA samples preferably separate from the other samples and if possible and not at the time of tasting (they can even be prepared at the day before).

3. Use of the AAP test solution (UTAFIX-3) for the evaluation of a possible UTA buffering and –sequestering of already matured wines:

Tasting samples of already matured wines, to which different quantities of the UTAFIX-3 solution have been added (see item 2.7), permits an estimate as to whether or not low AAP concentrations will have a noticeable effect on the finished wine.

To do so, add UTAFIX-3 solution gradually to 250 ml of wine, tasting it in the triangular test, i.e. against 2 comparative samples. If the sample to which the test solution has been added is recognised, the threshold value has been reached.

- The addition of 5 drops of UTAFIX-3 already shows significant UTA: Caution! This wine is highly UTA-endangered, i.e. already low AAP volumes can lead to significant UTA; add up to 150 mg/l (15 g/l) ascorbic acid to the wine, store it as cool as possible and sell it as soon as possible.
- Only the addition of 10 drops of UTAFIX-3 shows significant UTA: When storing it at low temperature consuming it at an early stage, no extreme UTA has to be expected.
- Only the addition of more than 15 drops of UTAFIX-3 shows significant UTA: The wine can also buffer higher AAP concentrations.



Avoiding the formation of UTA by adding ascorbic acid in the young wine phase
"Preparation of UTA-free wine according to the Veitshöchheim procedure":

When the Würzburg UTAFIX test is positive, i.e. no changes towards UTA can be determined on sample A (B), but not on sample C (D), the formation of UTA can be avoided by adding ascorbic acid, which can also still be done after sulphuration.

Implementation:

After a positive UTAFIX test, i.e. increased UTA potential, add up to 150 mg/l (15 g/hl) of ascorbic acid to the young wine. The ascorbic acid must be distributed evenly in the container. After at least 2 days, the free SO_2 is checked in the container filled up to the bung and adjusted to above 40 mg/l of free SO_2.

Determination of free sulphurous acid in wines with ascorbic acid additives:

The addition of ascorbic acid simulates in nearly all common analysis methods an increased concentration of free sulphurous acid. This has to be taken into account when determining the free sulphurous acid. For this reason, the following procedure has to be chosen for the analysis of sulphurous acid:

1. Implement the determination of free SO_2 as usual

2. Determination of reductones:
   The determination is made analogue to the determination of free SO_2, but requires that the free SO_2 is bound. Add 1 ml of UTAFIX-4 to 25 ml of wine (using a plastic pipette), and implement the determination after a waiting time of 5 minutes analogue to the determination of free SO_2. The difference resulting from the determination of the free SO_2 and the reductones indicates the actual content of free sulphurous acid.

Further winery and cellar management actions to avoid UTA:

- Temperature-controlled fermentation
- Cool storage in special steel containers
- Early filling, marketing and consumption

Notes:

When making sensory tests, other wine faults than the UTA are often addressed as well. The ascorbic acid procedure is not qualified to counter these aberrations (e.g. flat, lean wines do not become richer in abstracts and more mature).

The maturation of ascorbic acid-containing wines calls for certain measures of precaution:

☞ Ascorbic acid affects the determination of sulphurous acid. It simulates sulphurous acid, a fact that has to be taken into account before the examination.

☞ The content of free SO_2 should in all wine maturity phases, after deduction of the reductones, exceed 35 mg/l.

☞ An aeration of the wines is problematic, since ascorbic acid is being oxidised. The containers must in any case be filled up to the bung.

☞ The hydrogen sulphide odour treatment with copper sulphate is restricted since it adds to the danger of copper turbidity.

☞ The contact of wine with non-ferrous metal devices and screw caps is to be avoided.