



# **Consensus of the Society of Hair Testing on hair testing for chronic excessive alcohol consumption**

**2009**

Proposed statement:

1. Compared to other substances, the detection of chronic alcohol abuse by hair analysis has some particularities. Alcohol is a legal compound and is consumed in much higher amounts by a much higher portion of the population.
2. According to the World Health Organization and a literature survey, excessive alcohol drinking corresponds to a consumption higher than 60 g of pure ethanol per day since several months.
3. For clinical and forensic purposes, there is a need to discriminate between social and excessive alcohol drinkers.
4. The direct determination of ethanol itself in hair is not possible due to its volatility and its potential absorption from external sources. Instead, the minor ethanol metabolites ethyl glucuronide (EtG) and fatty acid ethyl esters (FAEE) should be measured in hair as direct alcohol markers.
5. After absorption, a small fraction of ethanol is conjugated with glucuronic acid during phase II metabolism to form ethyl glucuronide.
6. Ethyl glucuronide is a polar water-soluble substance, stable but sensitive to cosmetic treatment and whose incorporation is not biased by hair color.

7. Both gas and liquid chromatography coupled to (tandem) mass spectrometry with d5-EtG as internal standard should be used to test for ethyl glucuronide in hair.
8. The discrimination cut-off of ethyl glucuronide in hair between social and excessive alcohol drinkers is proposed at 30 pg/mg.
9. Fatty acid ethyl esters are formed after alcohol consumption by different enzymes in blood and human tissues.
10. Fatty acid ethyl esters are insoluble in water and stable at neutral pH but are sensitive to hair treatment at basic pH.
11. From the different esters, ethyl myristate, ethyl palmitate, ethyl oleate and ethyl stearate should be chosen. For interpretation, the sum of the concentrations of these four esters should be used.
12. Headspace solid phase microextraction in combination with gas chromatography-mass spectrometry and use of d5-FAEE's as internal standards is a suitable technique for determination of FAEE in hair.
13. The discrimination cut-off for the sum of the four esters in hair between social and excessive alcohol drinkers is proposed at 0.8 ng/mg.
14. FAEE are sensitive to cosmetic treatment and their incorporation is not biased by hair color
15. Both EtG and FAEE can be used independently for excessive alcohol consumption diagnosis. For mutual confirmation and for exclusion of false positive or false negative results the determination of both parameters can be useful, in some special cases.
16. Proficiency tests for determination of EtG and FAEE are required in order to enable equal standards of analysis and interpretation in different laboratories.
17. This statement was adopted on 16 June 2009 by the Society of Hair Testing during the meeting in Roma (Italy).

## **Important Information**

The above consensus is a proposal that will be finally discussed during the Roma meeting.

[See Meeting Program: Tuesday, June 16, 12.50 h:  
Discussion of the “Consensus of the Society of Hair Testing on hair testing for chronic excessive alcohol consumption”.]

**All comments are welcome!**

Please send your feelings to:

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