THUJONE ANALYSIS IN SPIRIT DRINKS

Thujones are expected to meet in those spirit drinks extract or distillate from the plant *Artemisia absinthium*.
Such spirit drinks are a series of bitters and liquers bearing the indication “ABSINTHE” which are produced in several countries of the EC. Vermouth contains extract of this plant as well.
The GCSL (General Chemical State Laboratory) branch of Corinth (Chemical Service of Corinth) has developed a validated GC method for the estimation of α- and β- thujones in beverages, by using menthol as internal standard and extracting the thujone from the sample with chloroform.

METHOD

The initial standard solution (1000mg/l which results in 840mgl α- and β- thujones), is diluted into alcoholic solution 50%. From this, a series of standard solutions of various concentrations are prepared, 1 ml of the internal standard (menthol 1000mg/l) solution is added and the volume is completed up to 100ml always with alcoholic solution 50%. From each sample 10ml are extracted with 10ml chloroform. The chloroform layer is taken and concentrated in 0,1ml. 1μl of this solution is injected to GC.
10ml of the unknown sample are transferred into an extraction funnel, 0,1μl of the internal standard solution and 10ml chloroform are added. The procedure follows as for the standard solutions.

RESULTS

Nine samples of spirit drinks have been examined by the above method. The concentration varies between 1,2 and 9,2 mg/kg of α- and β- thujone (as total):

	Sample	α-thujone (mg/kg)	β-thujone (mg/kg)	(α+β) thujone (mg/kg)
1	Spirit drink with absinthe ext.	0,1	1,1	1,2
2	Spirit drink with absinthe ext. and anithole	0,98	2,8	3,78
3	Spirit drink with absinthe ext. and anithole	0,54	1,63	2,17
4	Spirit drink with absinthe ext. and anithole	1,23	1,98	3,21
5	Spirit drink with absinthe ext.	1,41	4,06	5,47
6	Spirit drink with absinthe ext.	3,06	2,84	5,90
7	Spirit drink with absinthe ext.	1,99	7,22	9,21

No thujone was detected in the two other spirit drinks (bitter).
In the analysed products the β-thujone content is much higher than that of α-thujone. This may be used as an indication of authenticity of the drink.

Apart from the above mentioned results and from a number of tests previously performed by the laboratory it was concluded that the thujone content of the extract and therefore of the spirit drinks depends on the following factors:

- the quality, maturity, quantity and origin of the extracted plants
- how long the plant has been in contact with the alcoholic liquid
- the alcoholic strength
- the production process, extraction or distillation

Linalole, a substance which is produced during the extraction of fennel seeds and also occurs in *Artemisia absinthium* and phenylethyl alcohol a substance usually found in wine products, give peaks with the same retention time as α-thujone. Therefore in case α-thujone is determined by GC, it is suggested to perform further analysis by Mass Spectometer, in order to avoid confusion between these substances.