INTERNATIONAL OLIVE COUNCIL

STUDY ON STEROLS COMPOSITION AND CONTENT

MODIFICATION OF QUESTIONNAIRE

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STEROLS COMPOSITION AND CONTENT

Among the established purity criteria for the authenticity control of olive oil, sterols (individual and total) are included.

The official bodies have established limits with regard to the composition and content of sterols in olive oil, after thorough studies and taking into account the olive oil composition of various countries.

So, modifications in the sterols limits influence of fraud detection levels.

STEROLS COMPOSITION AND CONTENT

Factors responsible for the variations in the composition of virgin olive oils:

- **variety,**
- **climatic conditions (temperature and rainfall),**
- **soil and geographical conditions (soil type, altitude, latitude),**
- **cultural practices (irrigation, fertilisation, phytosanitary treatment),**
- **degree of fruit ripeness at harvest**
- **method of oil production.**

DEVIATIONS IN STEROLS COMPOSITION AND CONTENT

In 2020, deviations from the official limit in total sterols content were reported by the main countries in world olive oil production (Spain, Italy, Greece).

Possible factors, among others, explaining these anomalies

- ✓ **The harvest moment,**
- ✓ **the degree of ripeness,**
- ✓ **the size of olive fruit.**

Except of deviations in total sterols content, deviations in individual sterols (e.g. deviations in campesterol not complying with the adopted decision tree) and erythrodiol+uvaol were reported.

DEVIATIONS IN STEROLS COMPOSITION AND CONTENT

The deviations regarding sterols are recorded in high quality extra virgin olive oils and it is obvious that these deviations create great difficulties in the marketing of these authentic olive oils.

This topic presented for study at the IOC. So, the whole matter was discussed during the IOC composition and expert chemists meetings and the IOC gave an undertaking to its Council of Members to conduct a survey on individual sterols composition and total sterols content in authentic virgin olive oils.

DEVIATIONS IN STEROLS COMPOSITION AND CONTENT

However, what is the real extent of the deviations regarding sterols analysis and in what parameters?

DEVIATIONS IN STEROLS COMPOSITION AND CONTENT

Knowledge of two factors: in what parameters and in what extent in the world total production there are deviations, will help us to further examine those deviations that are significant.

If this percentage concerns small proportion of the production in some countries and of the world olive oil production, alternative ways should be considered to solve the problem of deviated authentic olive oils by allowing its marketing in the domestic markets where they are produced.

SURVEY ON STEROLS COMPOSITION AND CONTENT

To conduct this study,

- ✓ **data and**
- ✓ **analysis of samples**

that deviate from the official limits regarding sterol analysis are required.

SURVEY ON STEROLS COMPOSITION AND CONTENT

The collection of data is necessary in order to be determined:

1. **The deviated parameters regarding the analysis of sterols**
2. **The ranges of these deviations**
3. **The percentage of deviated olive oils in the world total production**

SURVEY ON STEROLS COMPOSITION AND CONTENT

The analysis of samples is designed to allow better assessment of the test results and to assist those countries that are unable to supply sufficient test results for various reasons.

MODIFICATION OF THE IOC QUESTIONNAIRE

The IOC Questionnaire was modified as follows :

- ➔ **Introduction. Attached to this document are two excel documents**
- ➔ **An excel document named questionnaire including two sheets : information and data**
- ➔ **An excel document named "sample's sheet"**

MODIFICATION OF THE IOC QUESTIONNAIRE

In the 1st sheet of the IOC Questionnaire, the countries need to enter information regarding:

a. The total quantity of olive oil production (the last two or three crop-years)

b. The varieties cultivated in each country and the percentage with which each variety participates in the total quantity of olive oil production.

c. The varieties which exhibit deviations from the official limits in any one of individual sterols or total sterols content, the representativity of olive oil produced by these varieties-areas on total olive oil production of the country and the percentage of deviated olive oils produced from these varieties-areas.

MODIFICATION OF THE IOC QUESTIONNAIRE
1st sheet Information

IOC SURVEY ON THE NATURAL VARIATION OF INDIVIDUAL STEROLS COMPOSITION AND TOTAL STEROLS CONTEN IN AUTHENTIC VIRGIN OLIVE OILS ORGANIZED BY THE IOC-2021

Questionnaire

GENERAL INFORMATION

Please fill in the cells with yellow color

COUNTRY :	

TOTAL PRODUCTION OF OLIVE OIL (during the last three crop years)

crop year	olive oil production (tons)

The varieties cultivated in each country and the percentage with which each variety participates in the total quantity of olive oil production.

variety	percentage on the total production

ARE THERE DEVIATIONS OF OLIVE OILS FROM THE OFFICIAL LIMITS REGARDING INDIVIDUAL AND TOTAL STEROLS COMPOSTITION ?

If yes, specify the varieties and areas which produce olive oils deviated in any one of the individual sterols or total sterols from the official limits

OLIVE CROP YEAR	VARIETY	AREA	REPRESENTATIVITY OF OLIVE OIL PRODUCED BY THIS VARIETY-AREA ON TOTAL OLIVE OIL PRODUCTION	DEVIATED INDIVIDUAL STEROLS or TOTAL STEROLS	percentage of deviated olive oils produced from this variety-area		
					<10%	10%-50%	>50%

MODIFICATION OF THE IOC QUESTIONNAIRE
2nd sheet Data

In the 2nd sheet of the IOC Questionnaire the countries need to enter data on samples which exhibit deviations regarding the limits of sterols analysis.

Except of data on sterols analysis, data on fatty acids composition, triterpenic dialcohols and ΔECN42 are requested.

These data can be very useful in case that we move on to a solution (e.g. a decision tree), with regard to the sterols deviations.

MODIFICATION OF THE IOC QUESTIONNAIRE
2nd sheet Data

IOC SURVEY ON THE NATURAL VARIATION OF INDIVIDUAL STEROLS COMPOSITION AND TOTAL STEROLS CONTEN IN AUTHENTIC VIRGIN OLIVE OILS
ORGANIZED BY THE IOC-2021

Questionnaire
DATA ON THE DEVIATED VIRGIN OLIVE OILS regarding STEROLS ANALYSIS

Please fill in the cells with yellow color. If there are available results from other analysis, please insert them, as well.

COUNTRY :	

SAMPLE's CODE	OLIVE CROP YEAR	VARIETY	AREA	DEGREE OF RIPENING (or DATE OF PRODUCTION)	CATEGORY

MODIFICATION OF THE IOC QUESTIONNAIRE
2nd sheet Data

IOC SURVEY ON THE NATURAL VARIATION OF INDIVIDUAL STEROLS COMPOSITION AND TOTAL STEROLS CONTEN IN AUTHENTIC VIRGIN OLIVE OILS
ORGANIZED BY THE IOC-2021

Questionnaire

DATA ON THE DEVIATED VIRGIN OLIVE OILS regarding STEROLS ANALYSIS

sterols							triterpenic dialcohols		
cholesterol %	brassicasterol %	campesterol %	stigmasterol %	apparent β-sitosterol %	Δ7-stigmastenol %	TOTAL STEROLS mg/kg	erythrodiol%	uvaol%	erythrodiol mg/kg

MODIFICATION OF THE IOC QUESTIONNAIRE
2nd sheet Data

IOC SURVEY ON THE NATURAL VARIATION OF INDIVIDUAL STEROLS COMPOSITION AND TOTAL STEROLS CONTEN IN AUTHENTIC VIRGIN OLIVE OILS
ORGANIZED BY THE IOC-2021

Questionnaire

DATA ON THE DEVIATED VIRGIN OLIVE OILS regarding STEROLS ANALYSIS

fatty acids composition %													ΔECN42
C 14:0	C 16:0	C16:1	C 17:0	C 17:1	C 18:0	C 18:1	C 18:2	C18:3	C 20:0	C 20:1	C22:0	C 24:0	

MODIFICATION OF THE IOC QUESTIONNAIRE

The questionnaire should be sent by IOC in all olive oil producing counties, asking for their responses in excel format and in English.

The questionnaire should be sent together with the information note-introduction where in addition to the answers to the questionnaire, the competent authorities of each country are invited to send the Executive Secretariat a minimum of three (3) samples of virgin olive oils deviated in sterols representative of each producing area, each containing at least 250 ml.
Each sample should be labelled and must be accompanied by the sample's sheet.

IOC SURVEY ON THE NATURAL VARIATION OF STEROLS IN AUTHENTIC VIRGIN OLIVE OILS
ORGANIZED BY THE IOC-2021

SAMPLE's SHEET

A. General sample information

Country:	
Sample's code:	

1. Description of the olive growing area*:

Name:	
Region:	
Locality:	
Geographical location:	
- Latitude:	
- Altitude:	
Identifier code:	
Other identifier data:	

Crop year:(*)	
Date of olive harvest (if known):	
Date of oil extraction:	
Olive variety:	
Representativity of the sample on total area production (if known):	
Declared category of the oil:	
Extraction system:	
Organic farming? (*Yes/No*)	
Irrigation? (*Yes/No*)	

2. Sampling performed by (name of the official body and contact details)**:

IOC SURVEY ON THE NATURAL VARIATION OF STEROLS IN AUTHENTIC VIRGIN OLIVE OILS ORGANIZED BY THE IOC-2021

SAMPLE's SHEET

B. Analytical characteristics of the olive oils produced

sterols	
cholesterol %	
brassicasterol %	
campesterol %	
stigmasterol %	
apparent β-sitosterol %	
Δ7-stigmastenol %	
TOTAL STEROLS mg/kg	

triterpenic dialcohols	
erythrodiol%	
uvaol%	
erythrodiol mg/kg	

ΔECN42	

fatty acids	
C 14:0	
C 16:0	
C16:1	
C 17:0	
C 17:1	
C 18:0	
C 18:1	
C 18:2	
C18:3	
C 20:0	
C 20:1	
C22:0	
C 24:0	

* Description of each olive growing area of the country

The term olive growing area means a uniform producing area lying within demarcated geographical boundaries, which has similar characteristics in terms of olive varieties, cultural practices, soil and climatic conditions and oil production methods. The information requested is designed to evaluate the factors that might affect the analytical composition of the olive oils produced.

** Identity and contact details of the sampling body

The particulars of the contact person are needed to facilitate the compilation of the replies and any requests for additional information. A representative sample of the virgin olive oils produced, by olive growing area, must be analysed to make sure the test results are representative; there is no limit as to the maximum number. To mitigate any analytical discrepancies that might arise for a variety of reasons, samples will be tested by three IOC-recognised laboratories.

SURVEY ON STEROLS COMPOSITION AND CONTENT

The answers to the questionnaire and the analysis of samples will help us to form an overall figure of what happens to the sterols composition and content.

However, the real extent of the deviations regarding sterols analysis in the world total production will be determined only if data from all olive oil producing countries and information for the percentage of deviated olive oils per country are available.

In addition, moving on to a solution (e.g. a decision tree) should also have the composition of these olive oils in all other authenticity parameters (fatty acids, ΔECN42, etc.).

SURVEY ON STEROLS COMPOSITION AND CONTENT

Let us hope that the countries will respond and send data and samples, in order to achieve the purpose of the survey which is to address the deviations of authentic virgin olive oils from the limits of sterol analysis.

Thank you
for your attention