Implications for the future and recommendations for modifications to current regulations concerning virgin olive oil

By **Claudio Peri** and **Cristina Rastelli**
DISTAM - University of Milan - Via Celoria, 2. 20133 Milano - ITALY

SUMMARY

Implications for the future and recommendations for modifications to current regulations concerning virgin olive oil

The main conclusions of the FLAIR project can be summarized as follows:

1. The sensory wheel set up by the FLAIR team is proposed as a European standard to evaluate the sensory profile of extra virgin olive oil.
2. Preference studies demonstrate that the sensory profile of extra virgin olive oil should be optimized as a function of consumer expectations. Once a sensory profile has been selected, it must be used as a reference for product standardization.
3. Sensory analysis cannot be used as a legal tool for evaluating the quality or the origin of extra virgin olive oils. It is suggested that a sensory test can only be used as a legal tool if it is applied to assess the absence of defects. This implies a modification of the COI test.
4. The Good Manufacturing Practices set up by the Flair team are proposed as a European standard for process control and quality system certification.
5. Nutritional studies demonstrate that extra virgin olive oil has a noticeable in vivo antioxidant activity. This activity is related to the tocopherols and phenols content of oil and is highly variety-dependent.

KEY-WORDS: FLAIR Project - Virgin olive oil.

The results of this project and their potential effects can be presented in terms of answers to questions that were put to the research team, at the beginning of the program, by scientists and industry alike.

FIRST QUESTION:
Can the sensory analysis of virgin olive oil be standardized in order to obtain within-panel repeatability and between-panel reproducibility?

The research results can be considered as an essential contribution to solve this problem. We propose that the sensory wheel, set up by the FLAIR team, should become a European standard to evaluate the sensory profile of virgin olive oils.

The sensory wheel is based on a three-year sound scientific research, carried out by leading experts form different laboratories and countries. This is a good point of departure for the success of this proposal.

SECOND QUESTION:
Is it useful or necessary for a company to standardize the sensory profile of virgin olive oil?

The answer to this question can be drawn from preference studies carried out in the United Kingdom and in Italy. These studies demonstrate that olive oil acceptability is closely related to the sensory profile of oil, both for traditional and potential consumers. In addition, consumers attitudes may change from preference to aversion on changing the sensory profile.

We can conclude that optimization of the sensory profile of virgin olive oil as a function of consumer expectations is useful and highly advisable.

Once a sensory profile has been selected it must be guaranteed to consumers and be used as a reference for process control and product standardization.
Companies that are unable to consistently produce virgin olive oil according to the sensory profile characterizing their trade mark will confront client dissatisfaction and market unstability.

THIRD QUESTION:
Can the sensory analysis be used as a legal test for evaluating the quality of virgin olive oil or for certifying its origin?

Based on our research results, the answer is no.

An optimum sensory profile of virgin olive oil does not exist. In fact, there are many different sensory profiles that may be considered optimal for different consumers. On the other hand, the origin (or variety) factor, the degree of ripeness of olives, climate conditions, processing technology and storage conditions, may greatly affect the sensory profile.

We must now clearly set the limitations of sensory analysis use and validity. We can only trust sensory analysis when it is used by companies to optimize and standardize the sensory quality of oils.

When sensory analysis is used in legal controversies, its responses are largely influenced by contrasting commercial interests. We must admit that it is much easier to alter sensory analysis responses than instrumental analysis responses. On the other hand, a virgin olive oil, which

meets legal requirements from a chemical or physical point of view may, in theory, have serious sensory defects. Such defects may result from unexpected contamination or reveal lack of genuineness. Therefore, a sensory test should be used as a legal tool to assess the absence of serious sensory defects. This problem should be analyzed carefully. The first point is a semantic one: what should be defined as a serious sensory defect. A general agreement on definition should be reached. Also, the reproducibility of such a test needs to be previously assessed by means of ring tests, using well-defined reference products.

FOURTH QUESTION:
Can standards for process control in the production of virgin olive oil be defined?

According to European law, quality and origin certificates should be based on quality assurance systems. These entail process control. An effective process control is based on standardized operating conditions and procedures. Therefore, GMP (Good Manufacturing Practices) guidelines were prepared by the FLAIR team. We intend to apply for their approval by national and European Standardization Committees.

FIFTH QUESTION:
Can virgin olive oil be considered to have a natural "in vivo" antioxidant activity"?

In recent years, oxidative reactions in the human body have been extensively studied as a source and a symptom of both acute and chronic diseases. Consequently, great emphasis has been given to food components having an antioxidant activity.

Research carried out in this project shows that extra virgin olive oils reduce some indices of oxidative stress in rats. Moreover, this activity seems to be related to the tocopherols and phenols content of oils and is highly variety-dependent. This subject deserves further investigation.

Finally, we should briefly comment about an objective of the FLAIR project that has not been achieved. One of the research goals was so defined in the technical annex of the application form: "to establish, through sensory and nutritional studies, an index related to virgin olive oil quality, acceptability, stability and freshness". Obviously, this is an ideal, unattainable goal. However, it suggests that we should oppose the tendency to multiply analytical indices. Rather, an effort should be made to set up a few synthetic indices, well related to the most important quality attributes. On the basis of the results of our research, we think that an index of oil antioxidant potential might be close to this ideal goal. In fact, the antioxidant potential of virgin olive oil largely affects nutritional quality, oil freshness and stability, as well as sensory quality. In this context, the work carried out by Bertuccioli and Mannino on new methods to determine phenolic compounds and their redox potential, provides a basis for future research.

Hopefully, the application of the results of our research will be useful for virgin olive oil evaluation, production, trade and legislation. We also hope that the proposals for future research that arise from our work, will be developed in new projects. In particular, the following themes can be mentioned:

- improvement of the sensory wheel methodology;
- extension of preference studies to several consumer groups and countries;
- improvement of statistical methods for sensory and preference data processing;
- setting up of a simplified sensory test for assessing the absence of serious sensory defects in virgin olive oils;
- study of psychological factors determining consumer preferences;
- setting up of analytical methods for the evaluation of antioxidant components, mechanisms and potential of virgin olive oils;
- study of relationships between sensory, nutritional and stability characteristics and antioxidant potential of virgin olive oils.
- setting up of experts systems for process control and quality monitoring in virgin olive oil production.

ACKNOWLEDGMENTS

At the end of this project we wish to thank all researches for their valuable scientific contribution and the stimulating climate they have created in the research team.

We also wish to thank the EC officials that have followed our work with attention, open-mindedness and patience. Among others, dr. Xabier Goenaga should be mentioned for his contribution to the Symposium.

The success of this Symposium is also due to the University of Milan, who has provided a beautiful and prestigious seat for the Symposium, and to the italian organizations of olive oil trade (Federolio) and of olive oil production (Assitol) for their financial support.