Good Manufacturing Practice (GMP) guidelines for virgin olive oil production

By **Christos Petrakis**
Eleourgiki, research and control, ATHENS.

SUMMARY

Good Manufacturing Practice (GMP) guidelines for virgin olive oil production

This paper presents GMP guidelines for the production of virgin olive oil. Standard procedures and conditions are indicated for olive production, harvesting, transportation and storage, for oil manufacture, storage and packaging, for buildings, process logistics and the materials used throughout the production chain.

KEY-WORDS: FLAIR Project - Good Manufacturing Practice - Virgin olive oil.

INTRODUCTION

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 guidelines were prepared by the FLAIR team, especially the University of Milan, Eleourgiki, the Instituto de la Grasa and the Stazione Sperimentale Oli e Grassi of Milan.

The GMP represent a set of *minimum standard conditions* that should be followed throughout the whole production chain, from cultural operations in the olive grove to the shelves of the supermarket.

GMP are to be considered as voluntary rules and they can be taken as a reference for quality system certification.

The following text of GMP was finally approved by the FLAIR team.

Olive Production

Pest control is the most critical phase of olive production for both oil quality and safety.

Pest monitoring

Olive groves should be provided with traps for the monitoring of *Dacus oleae* infestation.

Trap distribution and inspection should be recorded in written documents.

Pesticide treatments should be planned according to monitoring results.

The responsibility for pest monitoring and treatment planning should be assigned to a clearly identified person.

Pesticide treatment

All pesticide treatments should be carried out in accordance with EEC and national laws.

It is advisable to keep pesticide use to a minimum.

Bait treatments or biological techniques are advisable.

Treatments should be recorded in a register, which should be available for inspection by officials and the certification institute.

The following information is to be recorded:
- pesticide product(s) employed
- treatment procedure and equipment
- average amount of pesticide per hectare or per tree
- date
- signature of the person who has carried out the treatment.

The responsibility for pesticide use should be assigned to a clearly identified person.

Olive Harvesting

Precautions should be taken to avoid fruit breakage through mechanical damage and fruit contamination by soil material.

Harvesting should be carried out manually or by mechanical means.

Spontaneous fruit drop, resulting from over-ripeness or from damage by parasites or atmospheric agents, should be avoided as far as possible.

Olives should be harvested on nets lifted up from the ground or on other similar materials, so that olives avoid contact with the soil.

Olive Transportation and Storage

Olive transportation and storage should be considered as critical phases for controlling both mechanical damage and temperature. Unproper handling during these phases can result in undesirable enzymatic reactions and the growth of yeasts and moulds.

Olives should be processed as soon as possible after harvesting (max 7 days).

During transportation and handling of olives (truck loading and unloading, transfers, etc.) mechanical damage should be minimized and fermentation or mould growth prevented.

Olives should be kept in well ventilated places, at temperatures below 25°C and relative humidities below 75%.

The direct contact of olives with the soil should be avoided and the thickness of layers should not exceed 50 cm.

Store organization should allow olive handling on a cllear first in-first out basis.

Oil Manufacture

The critical factors of the extraction process for oil quality are time-temperature relationship and contamination of the oil by accidental contaminants and process aids.

Defoliation

Leaves and small branches that are normally collected with olives during harvesting should be removed. The weight of these materials should not exceed 1% of the total harvested.

Olive washing

The water used for washing must be potable in accordance with EEC and national law.

Milling, Malaxing, Extraction and Separation

The temperature of olive paste, oil and process water[1] should never exceed 35°C.

The temperature of heating fluid in the jacket of malaxing machines or other plants should never exceed 45°C.

Process water must be potable in accordance with EEC and national law.

Recycling of vegetable water, freshly separated from olives by centrifugation, and its use as process water is permitted.

The malaxing time depends on olive variety and maturity. In any case malaxing time should never exceed 90 min.

Oil Storage and Packaging

During these phases the following two factors are to be controlled: temperature and contact of oil with water, solid residues or colloidal impurities, in order to avoid degradative (lipolytic or oxidative) reactions.

Storage

During storage, oil should be kept in the dark, at temperatures lower than 25°C, in completely filled tanks.

Within 3 months of production, oil should be separated from solid impurities and water by decantation, filtration or centrifugation and transferred into clean, dry containers.

Packaging

Cleanliness and integrity of containers as well as absence of extraneous materials inside them, should be guaranteed and carefully controlled in the packaging line.

Oil Marketing

The labels on oil containers should clearly indicate the optimum conditions (or recommended conditions) for product storage and handling.

Buildings and Process Logistics

The following areas in the oil factory should be physically separated: -olive reception, storage and washing; -oil extraction and separation; -oil storage and packaging; -packaging material and process aid storage; -bathrooms, dressing rooms and other restrooms for workers.

By-product storage, boiler, refrigeration plant, workshop service and laboratories should be clearly separated from the extraction plant and olive and oil storage buildings.

In all processing and storage rooms walls should be painted with washable, antimould, non-porous coatings. Floors should be made with washable, non-slippery, non-porous inert materials.

Special care should be taken to separate the oil factory from the fuel-oil storehouse, refrigeration plants and sources of aerosol and smoke contamination.

In fire estinguishers the use of freon should be avoided.

Contamination by volatile solvents used in laboratories should be avoided.

Attention should be paid to avoid oil contamination by lubricants used in equipment transmissions and gears as well as by water condensate drips.

A program for pest monitoring, prevention and control should be performed at regular intervals and recorded in written documents. The person who is responsible for this service should be clearly identified.

Materials

All the materials that may come into contact with olive paste or oil should conform with EEC and national regulations.

In the expression plants, special care should be taken in the cleaning and hygiene of draining pads. Draining pads should be integral and not deformed.

The responsibility for draining pad maintenance and hygiene should be assigned to a clearly identified person.

NOTES

1. We define "process water" as the water that is purposefully mixed with the product or can come into contact with it (for example: the water used for rinsing tanks an equipment.