GOOD AGRICULTURAL PRACTICES FOR THE ORGANIC PRODUCTION OF MEDICINAL PLANTS

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Abstract

Guidelines on Hygiene and Good Agricultural Practices for vegetables used as medicinal herbs in the herbal and pharmaceutical industry need to be adaptable to the specific situation of the companies and the activity they accomplish.

This guide proposes a voluntary process control system to ensure the healthiness of the primary product and to outline other, more detailed and complete guideline that contemplate the remaining aspects on quality to guarantee the acceptance of products in all markets.

1. Introduction

The Code of the European Herbal Infusion Association (1993) is the main guideline of hygiene and good agricultural practices (G.A.P.) for aromatic and medicinal vegetables. Another G.A.P. (Demarco and López, 1996) was presented in the National Congress of SAIPA in La Plata, Argentina. The present guide is dedicated exclusively to medicinal plants traded in herb stores and the pharmaceutical industry, cultivated or collected in the wild environment within an organic production system.

From a pharmaceutical view, a vegetable to be used as such must follow basic premises for any product health-oriented: quality, innocuousness, efficacy (ANMAT, 1997).

From the producers’ view, these premises can be reduced to a single one: pharmaceutical quality, this is: precise identification, adequate contents of active principles, and no presence of contaminants, aspects intimately related to production practices. For example, the contents of active principles is not only related to the species, variety and its genotype, but also is related to the cultivation area, the harvesting period and the drying process. The presence of contaminants, is related to the production area, but also to the training of personnel, hygienic-sanitary standards, etc. (Codex - ALINORM 93 /13 & 97/13).

Altogether, the same premises for medicines indicate the convenience to produce without the application of chemical synthesis pesticides, many of them having proven cancerous effects, induce mutations and teratogeny, jointly producing environmental damages and not allowing a really sustainable production.

The organic production system fulfills these requisites. Done in equilibrium with the environment, sustainable techniques arise from the observance of natural cycles, and healthy and safe medicines, free of chemicals and other products that can damage the health of the user, consumer, or patient, are produced. (CEE, 1991; IFOAM, 1986; SAPyA, 1992, OCIA, 1995).

Once the transition process towards organic growing starts, two years average, the system provides the possibility to perform a continuous verification of the process, detect
and prevent risks, as well as facilitate an audit to obtain an official quality certificate (CEE, 1991; IFOAM, 1986; SAPyA, 1992, OCIA, 1995), satisfying the needs and requirements of a legislation concerning monographs on medicinal plants (ANMAT, 1997).

There is a national and an international legislation, as well as recognition of the main exporting countries of the Argentine organic production system (SAPyA, 1992; CEE, 1991), allowing the trade of guaranteed quality products at an adequate preferential price. The G.A.P. guide is a tool to understand the legal aspects of these rules.

The adoption of the G.A.P. by producers enable purchasers of these primary products, to reduce sampling costs and other verifications of non-certified products, leaving a disposition to pay higher prices for such goods. (AgriSystems, 1994; Chapman, 1991).

Today the niche of consumers demanding certified organic, quality products is increasing at a rate higher than the global market growth, hence making organic production a very important reason to adopt these production practices.

The complete text of the guide can be requested to any of the authors.

2. Objective

The objective of this study is the promotion of a practical methodology as guidelines on Hygiene and Good Agricultural Practices, to stimulate the producers to adopt it and to offer the necessary information to maximize benefits.

The attempt is to minimize contamination during the organic agricultural production process.

3. Good Agricultural Practices Principles

3.1 Flow chart

A holistic view of the productive process, its most important influential variables, and the points where G.A.P. allows major efficiency. (Figure 1).

3.2. Resources

3.2.1. Soil

Growers must not collect or cultivate in soils where unhealthy, toxicologically hazardous substances are present (sewer waters, human faeces, toxic weeds, pesticides, heavy-metals). The production area should be isolated from all contamination sources (roads, high voltage lines, factories, neighbourhoods). Risks of erosion and adequate methods for prevention and control (level curves, soil coverage, barriers) should be known.

Fertility and biological activity of soil (minimum farm work, rotations, green fertilizers), respect for wildlife conditions (reservation areas, do not hurt beneficial insects), and increases in biodiversity (agricultural-cattle rotation, menaced species protection), should be maintained.

3.2.2. Vegetal material

Plants for cultivation must be correctly identified and free of diseases and/or plagues that could be introduced into the soil. Seeds, as well as propagation material (seedlings,
shrubs, cuttings), should be of certified organic origin, and must not be treated with chemical products. The use of genetically modified seeds or transgenic produced material is absolutely forbidden.

In wild, collected material, careful attention should be paid to the “Primary Production Standards for Wild Area Vegetables” (SAPyA, 1992). Appropriate professional assistants or institution aid is highly recommended if text is difficult to understand.

3.2.3. Plague, diseases and weed control

Growers should not use conventionally produced pesticides. Products such as, pyrethrum, pheromones, bordeaux mixes, sulphur, heat) are allowed in common regulations (CEE, 1991; IFOAM, 1986, SAPyA, 1992, OCIA, 1995). Monitoring, traps, live-fences and spread predators, are recommended to introduce biological control. A control plan, contemplating mechanic means, rotations, use of adequate varieties and protection of natural flora and fauna, should be programmed. Empty packaging should be properly discarded, so as not to contaminate the area, environment, or product.

3.2.4. Fertilizers

Fertilizers used by growers should be of well composted residues and only used before or after the productive cycle. Unnecessary high doses of fertilizer can affect the consumer, user or patient or environment, besides being an useless cost. Growers should never use human faeces, in any form.

Regulations allow the use of some fertilizers or soil improvements such as straw, manure, bone flour, sulphur, phosphate rock and potassium sulphate of mineral origin, (SAPyA, 1992, IFOAM, 1986; OCIA, 1995).

3.2.5. Machinery

The machinery and tools used with crops should be kept clean (using any authorized product) and in good functioning conditions. All machinery that has been used with a product forbidden in organic production must be cleaned appropriately.

3.2.6. Water

Water needs by growers must be free of contaminants, be potable and non-chemically treated. Irrigation systems should be used only in the organic production system and should be kept clean and in good condition. Reservoirs and water channels should be clean and the soil humidity recorded.

3.2.7. Installation and equipment

Growers must minimize foreign contamination. The hygienic conditions of the surrounding areas as well as sheds and warehouses should be controlled. Installations and buildings must be protected against entry of birds, insects and other animals, aired, and never used with cattle (GMC/RES 80/96). Buildings must be kept clean and dry with minimum temperature variation during the day.

Use of appropriate methods and resources for the cleaning of the installations, according to the kind of products being stored, is essential. A good identification/labelling system is recommended to separate organic and non-organic products. Specific areas that have been selected and cleaned must be protected against contamination. All equipment must be easy to clean to diminish contamination.
If the processing line was used with non-organic products, the line must be cleaned adequately and wait the necessary time, prior to the entry of any organic product. Obsolete or worn out equipment must be excluded to avoid any possible contamination.

Authorized resources that can be used as a last option are available but their origin and composition must be previously controlled. Exceptional plague control with unauthorized resources of installations and equipment can be done only with previous authorization and under supervision of competent authority, keeping herbs out of the place.

3.3. Documentation

In organic production, documentation is indispensable and necessary for medicinal herbs to control exploitation. Group documentation under inventory items (covers installations, machinery, systems, roads, natural and sown vegetation), register (production, crops healthiness, climate, rotation programs) and vouchers (invoices, receipts, analysis and protocols).

It is particularly important to record every selling party and to retain a well identified sample during all your pharmaceutical activity.

In the collection of wild materials a verifiable parameter as to the stability of the system will be necessary for the products that are being collected and the collection criteria, as well as descriptive memory of them.

3.4. Quality

To ensure genuine materials, identification of the botanical, parts to be used, phenological aspect, origin, date of harvest/collection, active principles, percent dampness, visual, sensorial properties/virtues, heavy metals, microbiological contents, fungi, and toxins, must be quantified and certified.

Be aware that all these specifications are necessary data for the purchasers of your product.

3.5. Personnel

According to general hygiene practices (Codex, 1985), the recommendation is to train personnel in the appropriate production techniques, harvesting and handling processes (short training sessions, videos). Education to obtain a high level comprehension of hygiene concept, periodic sanitary check ups, adequate clothing, daily habits, healing of wounds, pricks and transmissible diseases, as well as of all the installations (cleaning, disinfection, sanitary elements) are required.

3.6. Activities

3.6.1. Sowing /Planting and farm works

Growers should always increase or maintain fertility and biological activity of the soil, with minimum soil ploughing. Implements and equipment that do not mix soil layers, but allow weed control and maintain good coverage should be used. Control fuel or oil leakage and uniform dosage in the machinery.
There are authorized products within the normative that can be used as preventive and soil and vegetal healers (compost, sawdust), and their use is very convenient under professional supervision (CEE, 1991; SAPyA, 1992).

Watering of plants must be regular and uniform. Every activity must be recorded.

3.6.2. Collection in the wild and harvesting

Collection in the wild and harvesting should be done in the correct season according to each species at times of low atmospheric humidity. Sharp blades, correct cut height and cones without residues of previous harvest should be verified prior harvesting stage. Only allowed resources should be used and dryers should be avoided.

Collectors should harvest/collect in the wild only what will be processed that day and transfer it to clean receptacles protecting the harvested material from animals, insects and other contamination. Compression of the harvested material should be avoided.

Destroy deteriorated or damaged material and avoid mixing species of different qualities of product.

In the collection, it should be done without overcoming the selfregulation capacity of the existing flora. In annual species, allow a percentage to seed. The same criteria must be applied towards perennial plants in the collection of roots and bark.

Consideration should be given to adequate handling of remnant species, plants and animals.

3.6.3. Drying

Natural drying is most convenient and can be done by placing the collected material in narrow layers over clean frames, rotating them frequently, avoiding exposure to direct sun and rain, and placing well above the ground. If mechanical drying is being used, control the relationship between the discoloration, mouldiness, damage, soil, stones and other foreign material and contaminants is necessary.


3.6.4. Packaging

The use of new packaging approved by the normative and manufactured with biodegradable materials (sacks, boxes, bags), is preferable, the manufacturing process does not affect the environment. Used materials and packaging must be cleaned and must never contain conventional products.

Empty packages should be stored distant from the processing area. Already packaged goods must be kept perfectly and correctly identified.

Products must be placed in dry and clean places, far from the ground and the walls. They must be clearly separated and identified from conventional products, if there were any. Environment temperature should be controlled and recorded.

The use of controlled atmosphere (heat and cold) is recommended to treat plague and diseases during storage.

If the storing place must be cleaned, the procedures of the normative must be followed (CEE, 1991; IFOAM, 1986; SAPyA, 1992, OCIA, 1995). Some allowed products are: bleach, plants natural essence and formic acid.

Every activity must be recorded.

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Figure 1 - Flow chart of agricultural organic production

K: Capital  Tech.: Technological level