MINISTRY FOR AGRICULTURE, FISHERIES,
FOOD AND ANIMAL RIGHTS
PLANT PROTECTION DIRECTORATE

Guidelines for the Production *of* Seeds in Malta intended for Marketing, 2021

This document highlights the Administrative Procedures for the production and subsequent marketing of Seeds of *Agricultural Plants and Vegetables* (Annex 1) in Malta and also lays down a set of good seed production practices (Annex 2). For this reason, the document is divided into two parts, Part A and Part B, which deal with the two sections separately.

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Part A: *Administrative Process*

The Administrative Process can be subdivided into three steps:

1) Registration with the Plant Protection Directorate in the Malta Official Register;
2) Notification of seed production for future marketing; and
3) Seed production record keeping.

These steps are explained below:

1) Registration with the Plant Protection Directorate in the Malta Official Register

The registration with the Plant Protection Directorate is obligatory to ensure compliance of the activity. Registration is possible by filling the **MOR Registration Form**. The form can be obtained either by contacting the Plant Protection Directorate on freephone 80072310 or number 22926535, or by sending an email to plantprotection.mafa@gov.mt, or in person from the Plant Biotechnology Centre, 110, Annibale Preca Street, Lija. A plant protection official can provide assistance for the completion of the form.

It is important to note that any person involved in the production or marketing activity is registered with the Plant Protection Directorate. This means that even individual farmers that are growing plants intended for seed production and marketing need to be registered with the Plant Protection Directorate.

Once an entity is registered, this will be liable to at least an annual inspection by the Monitoring and Control Unit (MC) within the Plant Protection Directorate. If the registered entity is found to be compliant under the requirements of the Plant Quarantine Act, 2001, where applicable, the MC will issue a Plant Passport.

2) Notification of Seed Production

Following the registration with the Plant Protection Directorate, the entity responsible for the Seed Production Activity will have to submit to the MC at the above-mentioned address, for every variety of seed that will be grown, a **Form A - Notification of Production of Seeds**. The form can be obtained from the Plant Protection Directorate as indicated under step 1.

The application form includes details on the Latin name and variety name of the seeds that will be produced and marketed. This information will be used by the MC to ensure that:

1) the varieties indicated in the form are registered in the EU Common Catalogue and
2) that the Seed producers are registered with the Plant Protection Directorate.

This documentation, together with the Seed Production Record Sheet (referred to in step 3 below) is needed by the MC for its annual inspection and for issuing a supplier's document in connection with Seed Certification.

3) Seed Production Record Keeping

At the end of production, i.e. when the seed is harvested and cleaned, the entity responsible for the production of seed shall submit to the MC the **Form B - Seed Production Record Sheet** The form can be obtained from the Plant Protection Directorate as indicated under step 1.

It is important to note that this application is filled in with the same codes that were used in Form A - Notification of Production of Seeds Form.

One must keep in mind that apart from Form B, the following records are to be kept as a minimum:

- Annual Work Plan
- Records of Purchases
- Records of the storage or planting on the premises
- Records of plants under production
- Records of plants which were dispatched to others
- Record of all varieties of plants, flowers, seedlings & plant trees
- Record of Plant passports/suppliers' documents received & issued
- Records of pests & diseases
- Records kept for at least one year
- Documents/letters/previous inspection reports & related documents from the Plant Protection Directorate being kept.

Such record sheets are to be kept for at least one year to be examined during the annual inspections carried out by the Plant Protection Directorate.

Part B: *Guidelines for the Production of Seeds in Malta*

The Second Part is a set of guidelines that are recommended by the Plant Protection Directorate for the production of seeds which emphasise on the following aspects:

- Outlining the process of Seed Processing
- Potential Seed Damage during Processing
- Safety Precautions during Processing
- Maintaining Identity during Processing
- Cleanliness and Disinfection

These are explained in more detail in Annex 2 - **Good Seed Production Practices**.

Apart from these guidelines, specific obligations for specific species of crops are listed below:

Tomato seeds	
Seed Extraction	Seed extraction should be obtained by means of an appropriate acid extraction method or an equivalent method approved in accordance with the procedure referred to in Article 107 of REGULATION (EU) 2016/ 2031 of the European Parliament of the Council,, as per point 27 of Section II of Part A of Schedule IV of S.L. 433.03 when originating in the EU, and as per point 48 of Section I of Part A of Schedule IV of S.L. 433.03 when originating from outside the EU.
Seed Treatment	Seeds of tomatoes moved into Malta need to undergo soaking in 1-3% Sodium hypochlorite solution for 5 minutes and rinsed 3 times with water.

Annex 1

Lists of Seeds of Agricultural Plants and Vegetables

1. Agricultural plants

I. Cereals

Table 1.1:

Latin Name	Common Name
Avena nuda L.	Small naked oat, Hulless oat
Avena sativa L. (includes *A. byzantina* K. Koch)	Oat and Red oat
Avena strigosa Schreb.	Black oat, Bristle oat
Hordeum vulgare L.	Barley
Phalaris canariensis L.	Canary grass
Secale cereale L.	Rye
Sorghum bicolor (L.) Moench subsp. *bicolor*	Sorghum
Sorghum bicolor (L.) Moench subsp. *drummondii* (Steud.) de Wet ex Davidse	Sudan grass
x Triticosecale Wittm.ex A. Camus	Hybrids resulting from the crossing of a species of the genus *Triticum* and a species of the genus *Secale*
Triticum aestivum L. subsp. *aestivum*	Wheat
Triticum turgidum L. subsp. *durum* (Desf.) van Slageren	Durum wheat
Triticum aestivum L. subsp. *spelta* (L.) Thell.	Spelt wheat
Zea mays L. (partim) except *Zea mays* convar. *microsperma* Koern. and *Zea mays* convar. *saccharata* Koern.	Maize (except popcorn and sweet corn)

Sorghum bicolor (L.) Moench subsp. bicolor x Sorghum bicolor (L.) Moench subsp. drummondii (Steud.) de Wet ex Davidse	Hybrid resulting from crossing of *Sorghum bicolor* and *Sorghum sudanase*

II. Fodder Plants

Table 1.2:

Latin Name	**Common Name**
Poaceae (Gramineae)	**Grasses**
Agrostis canina L.	Velvet bent
Agrostis capillaris L. (*ex tenuis*)	Brown top
Agrostis gigantea Roth.	Roth Redtop
Agrostis stolonifera L.	Creeping bent grass
Cynodon dactylon (L.) Pers.	Bermuda grass
Festuca filiformis Pourr.	Fine-leaved sheep's fescue
Festuca ovina L.	Sheep's fescue
Festuca pratensis Huds.	Meadow fescue
Festuca rubra L.	Red fescue
Festuca trachyphylla (Hack.) Hack.	Hard fescue
Lolium multiflorum Lam.	Italian ryegrass (incl. Westerworld ryegrass)
Lolium perenne L.	Perennial ryegrass
Poa pratensis L.	Smooth-stalked meadow grass
Fabaceae (Leguminosae)	Legumes
Biserrula pelecinus L.	Biserrula
Galega orientalis Lam.	Fodder galega
Hedysarum coronarium L.	Sulla

Lathyrus cicera L.	Chickling vetch/Dwarf chickling vetch
Medicago doliata Carmign.	Straight-spined medic
Medicago italica (Mill.) Fiori	Disc medic
Medicago littoralis Rohde ex Loisel.	Shore medic/Strand medic
Medicago murex Willd.	Sphere medic
Medicago polymorpha L.	Bur medic
Medicago rugosa Desr.	Wrinkled medic/Gama medic
Medicago sativa L.	Lucerne
Medicago scutellata (L.) Mill.	Snail medic/Shield medic
Medicago truncatula Gaertn.	Barrel medic
Ornithopus compressus L.	Yellow serradella
Ornithopus sativus Brot.	Serradella
Pisum sativum L. (partim)	Field pea
Trifolium alexandrinum L.	Berseem, Egyptian clover
Trifolium fragiferum L.	Strawberry clover
Trifolium glanduliferum Boiss.	Glandular clover
Trifolium hirtum All.	Rose clover
Trifolium isthmocarpum Brot.	Moroccan clover

Trifolium michelianum Savi	Balansa clover
Trifolium pratense L.	Red clover
Trifolium squarrosum L.	Squarrose clover
Trifolium subterraneum L.	Subterranean clover
Trifolium vesiculosum Savi	Arrow-leaf clover
Vicia benghalensis L.	Purple vetch
Vicia faba L.	Field bean
Vicia sativa L.	Common vetch

Other species of fodder plants

Table 1.3

Latin Name	**Common Name**
Brassica oleracea L. convar. *acephala* (DC) Alef. var. *medullosa* Thell. + var *varidis* L.	Fodder kale
Plantago lanceolata L.	Ribwort plantain

III. Potatoes

Table 1.4:

Latin Name	**Common Name**
Solanum tuberosum L.	Potato

2. Vegetables

Table 1.5:

Genus or species	**Common name**
Allium cepa L. -*Cepa* group -*Aggregatum* group	 Onion Echalion Shallot
Allium fistulosum L. -all varieties	Japanese bunching onion or Welsh onion
Allium porrum L. -all varieties	Leek
Allium sativum L. -all varieties	Garlic
Allium schoenoprasum L. *-all varieties*	Chives
Anthriscus cerefolium (L.) Hoffm. -all varieties	Chervil
Apium graveolens L. -Celery Group -Celeriac Group	 - -
Asparagus officinalis L. *-all varieties*	Asparagus
Beta vulgaris L. -Garden Beet Group -Leaf Beet Group	 Beetroot including Cheltenham beet Spinach beet or Chard
Brassica oleracea L. -Kale Group -Cauliflower Group -Capitata Group -Brussel Sprouts Group -Kohlrabi Group -Savoy Cabbage Group -Broccoli Group -Palm Kale Group -Tronchuda Group	 - - Red cabbage and White cabbage - - - Calabrese type and sprouting type - Portuguese cabbage
Brassica rapa L. -Chinese Cabbage Group -Vegetable Turnip Group	 - -
Capsicum annuum L. -all varieties	Chilli or Pepper
Cichorium endivia L. -all varieties	Endive

Cichorium intybus L. -Witloof Chicory Group -Leaf Chicory Group -Industrial (Root) Chicory Group	 - Large-leaved chicory or Italian chicory -
Citrullus lanatus (Thunb.) Matsum. et Nakai -all varieties	Watermelon
Cucumis melo L. -all varieties	Melon
Cucumis sativus L. -Cucumber Group -Gherkin Group	 - -
Cucurbita maxima Duchesne -all varieties	Gourd
Cucurbita pepo L. -all varieties	Marrow, including mature pumpkin and scallop squash or Courgette, including immature scallop squash
Cynara cardunculus L. -Globe Artichoke Group -Cardoon Group	 - -
Daucus carota L. -all varieties	Carrot Fodder carrot
Foeniculum vulgare Mill. -Azoricum Group	Fennel
Lactuca sativa L. -all varieties	Lettuce
Petroselinum crispum (Mill.) Nyman ex A.W. Hill -Leaf Parsley Group -Root Parsley Group	 - -
Phaseolus coccineus L. -all varieties	Runner bean
Phaseolus vulgaris L. -Dwarf French Bean Group -Climbing French Bean Group	 - -
Pisum sativum L. (partim) -Round Pea Group -Wrinkled Pea Group -Sugar Pea Group	 - - -
Raphanus sativus L. -Radish Group -Black Radish Group	 - -

Rheum rhabarbarum L. -all varieties	Rhubarb
Scorzonera hispanica L. -all varieties	Scorzonera or Black salsify
Solanum lycopersicum L. -all varieties	Tomato
Solanum melongena L. -all varieties	Aubergine or Eggplant
Spinacia oleracea L. -all varieties	Spinach
Valerianella locusta (L.) Laterr. -all varieties	Corn salad or Lamb's lettuce
Vicia faba L. -all varieties	Broad bean
Zea mays L. -Sweet Corn Group -Popcorn Group	 - -

Annex 2

Good Seed Production Practices

Good Seed Production Practice	1	Outlining the Process of Seed Processing

The objective of fruit or seed processing is to achieve clean, pure seeds of high physiological quality (germinability) which can be stored and easily handled during succeeding processes, such as pre-treatment, transport and sowing.

Processing can be grouped into the following 7 procedures:

1) Pre-cleaning, for fruit or seed lots containing larger debris, leaves, twigs, empty fruit parts, etc.
2) Pre-curing, for fruits that must be after-ripened, or where rapid desiccation hampers extraction.
3) Extraction, for species where the fruits are collected but only the seeds (and occasionally part of the fruit) are stored and sown.
4) Dewinging, for fruits and seeds with wings. Also including removal of dry appendices like spines, arils and hairs.
5) Cleaning, for fruits or seeds with impurities like fruit parts, leaves, twigs, empty seeds, foreign seeds and chaff.
6) Grading for seed lots with large variation in seed size or weight.
7) Adjustment of moisture content for seeds which, after the other procedures, have a higher or lower moisture content than considered optimal for storage of the particular species for the expected storage period.

Seed processing normally follows this order, but certain steps may be irrelevant and hence omitted for particular species or seed lots.

Processing should, as far as possible, take place immediately after the fruits or seeds have been brought to the processing depot.

1) Pre-Cleaning

Pre-cleaning is the removal of larger matter such as leaves, twigs and empty fruits. It is usually done manually after arrival at the seed-processing depot. It may be undertaken during the same process as sorting according to maturity.

2) Pre-Curing

Pre-curing denotes the procedure during which fruits are kept moist for a prolonged period before extraction. This is done to promote after-ripening of immature fruits and ease extraction of seed where rapid desiccation may cause extraction problems, in extreme cases case-hardening.

The process of pre-curing is basically the same whether used for after-ripening or to ease extraction and consists of the following procedure:

- Separation of fruits in two or three maturity classes;

- Storing at ambient temperature at a ventilated place and high humidity stirring regularly to allow ventilation;
- Reducing moisture as the fruits approach mature colour;
- Concluding the process as the fruits attain mature colour.

3) Extraction

Extraction denotes the procedure of physically releasing and separating the seeds from their enclosing fruit structure in order to reduce bulk, ease handling and improve storability.

4) De-winging

De-winging, in a broad sense, is removal of any dry seed appendage, including wings, spines, hairs, and some aril types. Seed (or fruit) wings do not obstruct germination, but may be inconvenient in handling. Accordingly, the main purpose of de-winging is to reduce bulk and ease handling during storage, pre-treatment and sowing. In some instances wings, hairs or other appendices, which increase the surface area of the seed, tend to collect moisture and promote fungal attack.

5) Cleaning

After extraction and possible de-winging the seed lot typically consists of seeds mixed with inert matter such as twigs, leaf and fruit fragments, soil particles, empty and foreign seeds, dust, chaff and the like. The aim of seed cleaning is to eliminate all this foreign material to reduce bulk, improve storability and make seeds easier to handle during subsequent processes. The ideal cleaned seed lot consists of all viable seeds of the target species, and is free from any other matter. The degree to which this is achieved is called the purity, usually measured in percentage.

Type of cleaning machine must be chosen according to seed type and adjusted appropriately to each seed lot in order to operate efficiently. Cleaning machines generally include one or more of the following techniques:

- Sieving
- Indented Cylinder Cleaning
- Winnowing and Blowing
- Gravity Separation
- Friction Cleaning
- Floatation

6) Seed Grading

While the objective of seed cleaning is to improve purity by eliminating non-seed material and foreign seed from the seed lot, the purpose of grading is to improve the average physiological quality of the seed lot by removing seed of the same species with low quality. Such seed may be empty seed, immature seed, damaged or dead seed or seed developed after self-fertilization. In the latter case the removal also serves to improve the genetic quality of the seed lot. Sometimes a larger fraction of small yet viable seed is deliberately removed from the seed lot based on an assumed correlation between seed size and vigour.

Seed grading may in practice be an extension of the seed cleaning process because the small and light seeds are removed together with chaff and other impurities.

7) Adjusting Moisture Content for Storage

After having obtained clean pure seed the final processing procedure is to adjust moisture content for seed that is to be stored for any length of time. The appropriate moisture content varies with species and potential storage period.

Good Seed Production Practice	**2**	**Potential Seed Damage during Processing**

Seed processing aims to achieve a balance between maximising effectiveness (extraction, cleaning, protection against deterioration) and damage to the seeds. In practice, processing always implies a risk of damage or injury to some seeds. Damage may occur in various ways:

1) **Mechanical damage**

Usually on the seed-coats but occasionally on the embryos with well developed seed cotyledons. Generally, spherical seeds and small seeds tend to suffer less damage than elongated or irregularly shaped seeds.

2) **Heat damage**

Often occurring by exposure to high kiln temperature for extracting seeds from cones, or deliberate burning for removal of fruit or seed hairs. Fatal high temperature can also occur during fermentation of fruit pulp. Moist seeds are more prone to heat damage than dry seeds, and recalcitrant seeds are, accordingly, sensitive to heat damage.

3) **Chemical damage**

Sometimes occurring during separation by flotation in organic liquids. Other potential sources are fungicides.

4) **Water**

Prolonged submersion in water, e.g. to soften the fruit pulp may hamper respiration of the seeds. Prolonged soaking may also cause imbibitions and initiate germination in seeds with no dormancy.

The severity of the damage depends on extraction/handling procedure and of seed type:

1) The more fragile the seed, the more sensitive it is to damage. Seeds with thin seed-coats or large cotyledons without or with little enclosing endosperm are easily damaged by some processing methods.
2) The more frantic the process, the higher the potential damage. Threshing and beating e.g. of indehiscent pods imply a potential risk of breaking the embryo. Especially sensitive is the attachment site of the cotyledons to the embryonic axis (Moore 1972). Mild impact to seed-coats can have a beneficial influence on germination by breaking physical dormancy.

Good Seed Production Practice	3	**Safety Precautions during Processing**

Like seed collection, processing implies both general and specific safety hazards. Processing staff should be familiar with these potential risks and observe appropriate precautions.

Fire danger
Dry fruit parts, resin and dust released during processing of dry fruits can easily catch fire and therefore pose a fire hazard. Use of artificial heat or other electric appliances during extraction increases the danger. Dust may catch fire when coming into direct contact with glow wires or the like. Therefore, heat sources should be safely shielded and dust removed regularly during processing. Water and/or fire extinguishers should be readily available at the seed-processing unit.

Respiratory, eye and skin irritations
During processing, floral parts, fungal spores, dry pulp and other fine particles become suspended in the air and form what is commonly known as dust. Some species, e.g. acacias, are known to release especially large amount of dust when threshed.

Because dust is dry, it causes a general irritation of eyes, nose, and skin with resulting itchiness, coughing and sneezing. For most people this is merely annoying, but for some people some dust elements cause allergic reactions. Dust problems can be minimised by appropriate ventilation, possibly by outdoor handling. Extractors should be placed as close to the sources as possible eg. near threshing machines. Staff working with species or equipment with particular dust problems should be provided with dust masks and possibly also dust glasses.

Mechanical equipment
The risk of accidents with mechanical equipment such as threshers and grinders can be greatly reduced by safe construction and maintenance of the equipment and appropriate training and instruction of the operators. Potentially dangerous mechanical or electrical parts (rotating devices, cords, etc.) should be shielded with screens. Screens should be mounted in the front of inlets to eg. threshers and operators should observe a safe distance. Emergency switches should be placed near the place of operation so that machines can easily be stopped in case of an accident.

Poisonous fruit pulp
Some fruits may have poisonous pulp, fatal to humans and livestock. Removed pulp and water used for extraction must be discharged and disposed of safely.

Good Seed Production Practice	**4**	**Maintaining Identity during Processing**

During processing, the fruits and later the seeds pass through a number of processes, they are unloaded and loaded into different containers and processing equipment, and often handled by a number of people. The risk of losing or accidentally mixing labels are obviously high, especially when handling a number of minor samples of the same species eg. single tree collections or provenance collections. A system must be created to minimise the risk of losing seed identity. Handling of labels is, in many cases, as important as handling of the seed itself. Simple routine procedures are recommended. If some members of the staff are not able to read the labels, they should still be able to maintain the routines. Some points are summarised below:

1) Two labels should always follow the seed lot during collection. One is placed outside the container; one is put inside together with the seeds. The labels should be written with water-repellent ink, the labels should be resistant to some degree of moisture.
2) Labels that are no longer valid should be discarded to avoid later confusion eg. if new labels are written because the old ones become difficult to read, or if several seed lots are mixed.
3) When fruits or seeds are poured into eg. trays, depulping or cleaning machines where the label cannot be kept with the fruits or seeds, or where it would be easily lost by wetting or blowing away, the labels should be clipped or stuck to the processing equipment. Once the particular processing part has been concluded, the label is replaced together with the processed seeds.
4) Partly processed seeds are preferably put into the same containers again. After reduction of the major bulk (e.g. after extraction) fewer, smaller or different types of container may be used. The new containers must be labelled, and redundant labels discharged.
5) If part of the seed is fully processed and another part needs additional processing, the two parts must be separated and labelled individually eg. A, B, C,
6) Discharged labels should be torn or removed completely from the processing site (not just thrown on the floor) in order that they will not later be confused with valid labels.

A second point in maintaining identity relates to the risk of physically contaminating the seed lots. It is rarely possible to clean a seed lot for seeds of the same species, and separation of seeds of some species with very similar seeds may also be impossible. Therefore, contamination is often irreversible.

The chances of contamination during seed processing are many. For this, hygiene routine practices must be followed:

1) The same containers are used before and after part-processing.
2) Emptied containers are thoroughly cleaned before they are used for any other seed lot. Bags are turned inside out to be cleaned in stitching and corners.
3) Processing equipment and labels are thoroughly cleaned after each process. Brushing, the use of compressed air or strong water current is often necessary for appropriate cleaning.

Good Seed Production Practice	5	**Cleanliness and Disinfection**

Cleanliness and disinfection of all the equipment (machinery) and materials (plastic crates and tanks) coming in contact with the seeds is fundamental during the seed processing, most particular between batches of seeds. Disinfection should be done by washing with a 50% bleach solution in order to avoid any potential external contamination.

Ideally, plastic pallets are used to load the full plastic crates of plant material on them to be elevated from the floor and make sure that the processing area is cleared to enable unloading of the tomatoes directly from the van/truck on to the pallets.