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EAST AFRICAN STANDARD

Fresh prickly pear — Specification and grading

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Introduction

In the preparation of this East African Standard, the following sources were consulted extensively:

CODEX STAN 186:1993 (Rev. 2005), *Standard for Prickly Pear*

CODEX STAN 193:1995 (Rev.5:2009), *General Standard for Contaminants and Toxins in Foods*

CODEX STAN 228:2001 (Rev.1:2004), *General methods of analysis for contaminants*

CODEX STAN 230:2001 (Rev.1:2003), *Maximum levels for lead*

Codex Alimentarius website: http://www.codexalimentarius.net/mrls/pestdes/jsp/pest_q-e.jsp

USDA Foreign Agricultural Service website: http://www.mrldatabase.com

USDA Agricultural Marketing Service website: http://www.ams.usda.gov/AMSv1.0/Standards

USDA Plant Inspectorate Service website: http://www.aphis.usda.gov/import_export/plants

European Union: http://ec.europa.eu/sanco_pesticides/public

Assistance derived from these sources and others inadvertently not mentioned is hereby acknowledged.

This standard has been developed to take into account:

— the needs of the market for the product;

— the need to facilitate fair domestic, regional and international trade and prevent technical barriers to trade by establishing a common trading language for buyers and sellers.

— the structure of the CODEX, UNECE, USA, ISO and other internationally significant standards;

— the needs of the producers in gaining knowledge of market standards, conformity assessment, commercial cultivars and crop production process;

— the need to transport the product in a manner that ensures keeping of quality until it reaches the consumer;

— the need for the plant protection authority to certify, through a simplified form, that the product is fit for crossborder and international trade without carrying plant disease vectors;

— the need to promote good agricultural practices that will enhance wider market access, involvement of small-scale traders and hence making fruit and vegetable production a viable means of wealth creation; and

— the need to keep unsatisfactory produce from the market by allowing the removal of unsatisfactory produce from the markets and to discourage unfair trade practices e.g. trying to sell immature produce at the beginning of the season when high profits can be made. Immature produce leads to dissatisfaction of customers and influences their choices negatively, which disadvantages those traders who have waited until the produce is mature.

Contents

Fresh prickly pear — Specification and grading

1 Scope

This Standard applies to the fruit of commercial varieties of prickly pears grown from *Opuntia ficus indica*, *O. streptachanthae*, and *O. lindheimeiri*, of the *Cactaceae* family, to be supplied fresh to the consumer, after preparation and packaging. Prickly pears for industrial processing are excluded.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CAC/GL 21, *Principles for the Establishment and Application of Microbiological Criteria for Foods*

CAC/RCP 1, *Recommended International Code of Practice — General Principles of Food Hygiene*

CAC/RCP 44, *Recommended International Code of Practice for the Packaging and Transport of Tropical Fresh Fruit and Vegetables*

CAC/RCP 53, *Code of Hygienic Practice for Fresh Fruits and Vegetables*

EAS 38, *Labelling of prepackaged foods — Specification*

CD/K/378:2010, *Horticultural industry — Code of practice*

3 Definitions

For the purpose of this standard the following definition shall apply:

3.1
similar varietal characteristics
having the same general characteristics, such as shape, texture and colour

3.2
well matured
reaching a stage of development which is indicative of good handling and keeping quality for the variety

3.3
fairly well matured
reaching a stage of development in which the outer skin (shell) is not tender

3.4
cracked
split open, exposing the flesh

3.5
damage
any specific defect which materially detracts from the appearance or edible or marketing quality. The following specific defects shall be considered as damage:

(1) Scars, except stem scars caused by rodents or other means, which are not well healed and corked over, or which cover more than 10 percent of the surface in the aggregate, or which form depressions or pits that materially affect the appearance.

(2) Stem scars which are unhealed on varieties which normally retain their stems after harvesting.

(3) Dry rot which affects an area more than 2.5cm in diameter in the aggregate on a 4.5kg specimen or correspondingly smaller or larger areas depending on the size of the specimen.

3.6
serious damage"
any specific defect which seriously detracts from the appearance or the edible or marketing quality. The following specific defects shall be considered as serious damage:

(1) Scars, except stem scars, caused by rodents or other means which are not well healed or corked over, or which cover more than 25 percent of the surface in the aggregate, or which form depressions or pits that seriously affect the appearance.

(2) Dry rot which affects an area more than 5 cm in diameter in the aggregate on a 4.5 kg specimen, or correspondingly smaller or larger areas depending on the size of the specimen.

4 Provisions concerning quality

4.1 General

The purpose of the standard is to define the quality requirements of prickly pear at the export control stage, after preparation and packaging.

4.2 Minimum requirements

4.2.1 In all classes, subject to the special provisions for each class and the tolerances allowed, the prickly pears must be:

(a) whole;

(b) sound, produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;

(c) clean, practically free of any visible foreign matter;

(d) practically free of damage caused by pests;

(e) free of abnormal external moisture, excluding condensation following removal from cold storage;

(f) free of any foreign smell and/or taste;

(g) firm;

(h) fresh in appearance;

(i) free of damage caused by low temperatures;

(j) free of prickles;

(k) free of pronounced blemishes;

(l) sufficiently developed and display satisfactory ripeness, depending on the nature of the produce.

Depending on the prickly pear variety, the receptacle of the fruit will be flat or slightly hollow. The prickly pears must have a shape, colour, taste and smell characteristic of the species.

4.2.2 The development and condition of the prickly pears must be such as to enable them:

(a) to withstand transport and handling; and

(b) to arrive in satisfactory condition at the place of destination.

4.3 Classification

Prickly pears are classified in three classes defined below:

4.3.1 "Extra" Class

Prickly pears in this class must be of superior quality. They must be characteristic of the variety and/or commercial type. They must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

4.3.2 Class I

Prickly pears in this class must be of good quality. They must be characteristic of the variety and/or commercial type. The following slight defects, however, may be allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

— slight defects in shape and colour;

— slight skin defects such as bruising, sunspots, crusting, blemishes or other superficial defects. The total area affected shall not exceed 4%.

The defects must not, in any case, affect the pulp of the fruit.

4.3.3 Class II

This class includes prickly pears which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in 4.2. They must be characteristic of the variety and/or commercial type. The following defects, however, may be allowed, provided the prickly pears retain their essential characteristics as regards the quality, the keeping quality and presentation:

— defects in shape and colour, as long as the produce has the characteristics common to prickly pears;

— skin defects due to bruising, scarring, crusting sunspots or other defects. The total area affected shall not exceed 8%.

The defects must not, in any case, affect the pulp of the fruit.

5 Provisions concerning sizing

Size is determined by the weight of the prickly pear, in accordance with the following table:

Size Code	Weight (in grams)
A	90 – 105
B	105 - 140
C	140 - 190
D	190 - 270
E	> 270

6 Provisions concerning tolerances

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

6.1 Quality tolerances

6.1.1 "Extra" Class

Five percent by number or weight of prickly pears not satisfying the requirements of the class, but meeting those of Class I or, exceptionally, coming within the tolerances of that class.

6.1.2 Class I

Ten percent by number or weight of prickly pears not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.

6.1.3 Class II

Ten percent by number or weight of prickly pears satisfying neither the requirements of the class nor the minimum requirements, with the exception of produce affected by rotting, pronounced irregularities or any other deterioration rendering it unfit for consumption.

6.2 Size tolerances

For "Extra" Class, 5%; and for Class I or Class II, 10%; by number or weight of prickly pears not satisfying the requirements as regards sizing, but falling within the class immediately above or below or those indicated in Clause 6.

7 Provisions concerning presentation

7.1 Uniformity

The contents of each package (or lot for produce presented in bulk) must be uniform and contain only prickly pears of the same origin, variety, quality and size. For "Extra" Class, colour and ripeness should be uniform. The visible part of the contents of the package (or lot for produce presented in bulk) must be representative of the entire contents.

7.2 Packaging

Prickly pears must be packed in such a way as to protect the produce properly. The materials used inside the package must be new[1], clean, and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

Prickly pears shall be packed in each container in compliance with CAC/RCP 44.

7.2.1 Description of containers

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the prickly pears. Packages (or lot for produce presented in bulk) must be free of all foreign matter and smell.

8 Marking or labelling

8.1 Consumer packages

In addition to the requirements of EAS 38, the following specific provisions apply:

[1] For the purposes of this Standard, this includes recycled material of food-grade quality.

8.1.1 Nature of produce

If the produce is not visible from the outside, each package shall be labelled as to the name of the produce and may be labelled as to name of the variety.

8.2 Non-retail containers

Each package must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside, or in the documents accompanying the shipment. For produce transported in bulk these particulars must appear on a document accompanying the goods.

8.2.1 Identification

Name and address of exporter, packer and/or dispatcher. Identification code (optional).[2]

8.2.2 Nature of produce

Name of the produce if the contents are not visible from the outside. Name of the variety or commercial type (optional).

8.2.3 Origin of produce

Country of origin and, optionally, district where grown or national, regional or local place name.

8.2.4 Commercial identification

— Class;

— Size (size code or weight range in grams);

— Number of units (optional);

— Net weight (optional).

8.2.5 Official Inspection Mark (optional)

9 Contaminants

9.1 Heavy metals

Prickly pears shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission for this commodity.

9.2 Pesticide residue

Prickly pears shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity.

10 Hygiene

10.1 It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of CAC/RCP 1, CAC/RCP 53, and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

10.2 The produce should comply with any microbiological criteria established in accordance with CAC/GL 21.

[2] The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference “packer and/or dispatcher (or equivalent abbreviations)” has to be indicated in close connection with the code mark.

Prickly pear cactus bearing reddish fruit

Prickly Pear Cactus Fruit on tree

Ripening prickly pear — Cactus fruit

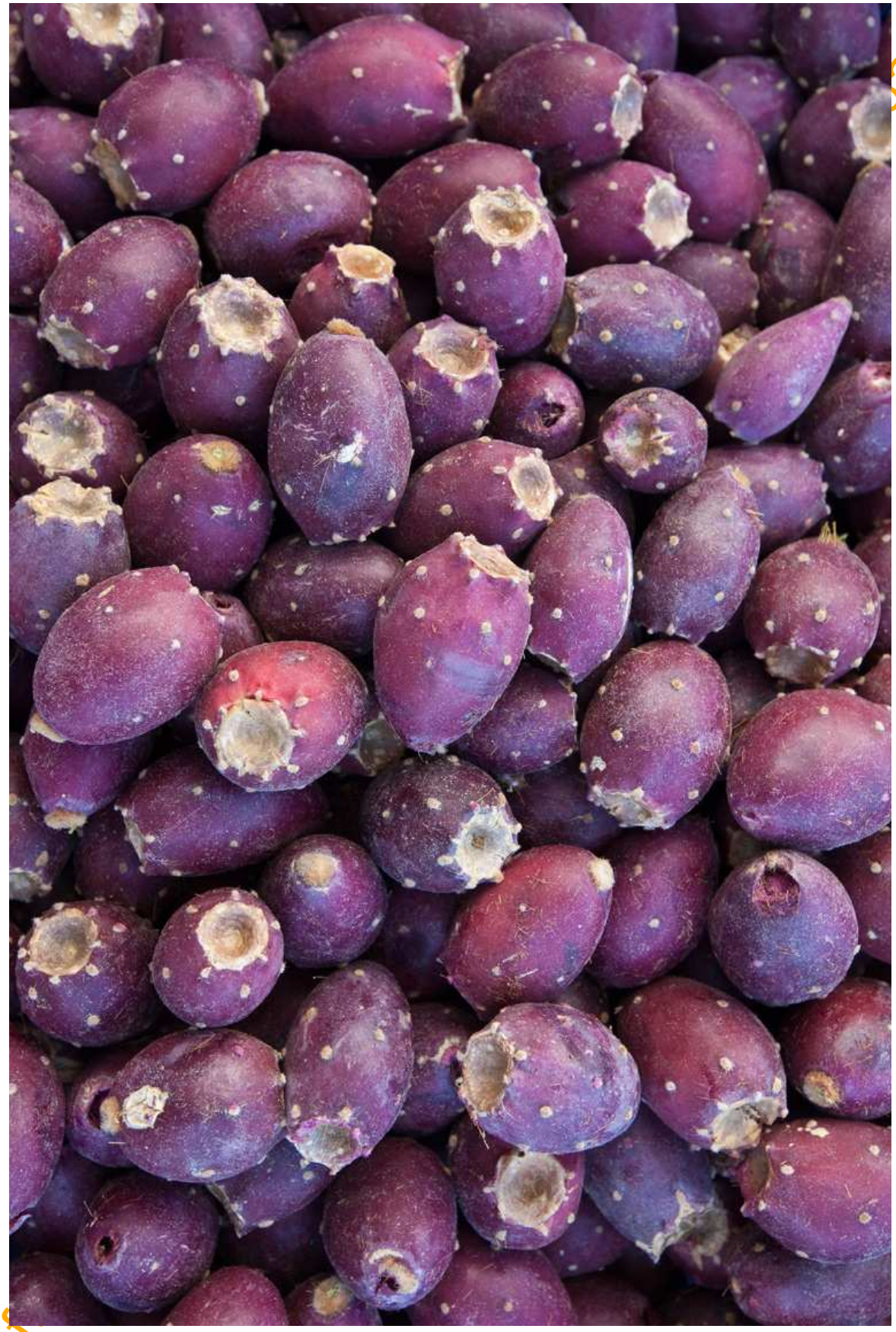
Prickly pear cactus fruit

Fruiting prickly pear in field

Fresh prickly pear fruits

Fresh prickly pear fruits

Fresh prickly pear fruits



Fresh prickly pear fruits

Annex C
(informative)

Model certificate of conformity with standards for fresh fruits and vegetables

1. Trader:	Certificate of conformity with the Community marketing standards applicable to fresh fruits and vegetables No. …….. (This certificate is exclusively for the use of inspection bodies)	
2. Packer identified on packaging (if other than trader)	3. Inspection body	
	4. Place of inspection/country of origin ([1])	5. Region or country of destination
6. Identifier of means of transport	7. ☐ Internal ☐ Import ☐ Export	
8. Packages (number and type)	9. Type of product (variety if the standards specifies)	10. Quality Class / 11. Total net weight in kg

12. The consignment referred to above conforms, at the time of issue, with the Community standards in force, vide:

CD/K/039:2010, *Fresh prickly pear — Specification and grading*

Customs office foreseen …… Place and date of issue ……

Valid until (date): ……

Signatory (name in block letters): ……..

Signature Seal of competent authority

13. Observations:

([1]) Where the goods are being re-exported, indicate the origin in box 9.

Annex D
(informative)

New fruits for arid climates

D.1 Introduction

In many countries around the world “developers” take the best agricultural lands for housing, and urbanization spreads rapidly. As a result, the agricultural industries are pushed into less productive lands in which the climate is not the most suitable for crops. A very good example is found in Israel. The best agricultural area is along the Mediterranean coast where the citrus industry flourished for almost a century and is the area where the famous ‘Shamouti’ (syn. Jaffa) orange was found and developed. Later, “Jaffa” became the trade name for the whole successful Israeli citrus industry. Today, most of this area is heavily populated and the agricultural industry is pushed into the Negev Desert where extreme temperatures exist, the soil is less fertile, and water, if available, is saline and/or very expensive. Labour is also less available and very expensive. The government by doing “more of the same” is encouraging the reestablishment of the citrus industry in the Negev and planting olives for oil.

Traditional crops in Israel appear to be at the end of their viable economic-life-cycle, but there is hope that new crops could establish a future profitable agricultural industry (Mizrahi and Nerd 1996). New crops could also ameliorate the increase in atmospheric CO_2 concentration (greenhouse effect) which increases temperature and drought, changing fertile lands into deserts (Mizrahi and Nerd 1996). The old traditional crops cannot cope with these expected changes. Over a decade ago Noel Vietmeyer (1986, 1990) raised the point that humans are “stupid” to neglect the huge treasure-house of biodiversity available in the thousands of wild plants and neglected crops that might solve many of our present and future agricultural problems. The aim of our program that started 16 years ago was to develop totally new fruit crops not known in the world markets, as new crops for desert areas (Nerd et al. 1990, 1993; Mizrahi and Nerd 1996, 1999). After many years of extensive R&D we had both failures and successes and we wish to share our experiences with others interested in new crops.

D.2 Fruit trees introduction under different desert ecozones

Since 1984 we have introduced and tested over 45 fruit tree species. Many of them are totally wild while others are neglected crops known only in their country of origin. All these species were tested in different ecozones around our Negev Desert, each differ from the other by average and extreme high and low temperatures and salinity of the irrigation water. In Israel, climatic and socio-economical considerations dictate that almost all crops are irrigated and in the Negev desert, most areas are irrigated with saline water. Salinity differs in the various ecozones not only by degree of salinity but also by ion composition. Whenever Na^{+} is more abounded than Ca^{++} (Rengel 1992) and Cl^{-} is more abounded than SO_4^{--}, the damage of salinity is more pronounced and more species will die even under $4dS/m^2$ (Nerd et al. 1990; Mizrahi and Nerd 1996).

D.3 Failures with some African species

As would be expected we have had many failures. Among our unsuccessful attempts is the yehib (*Cordeauxia edulis* Hemsl., Caesalpiniaceae), a wild shrub from the horn of Africa. This shrub produces a tasty edible nut even under extreme drought conditions when most plants will die. Unfortunately, we found yehib to be extremely sensitive to chilling temperatures, and plants have died at 4℃ (Mizrahi and Nerd 1996). This unique bush de serves much more R&D efforts to save it from extinction (Miege and Miege 1979; National Research Council 1979).

Mongongo (*Ricinodendron rautanenii* Schniz, Euphobiaceae) is a nut-producing wild tree from the Kalahari Desert in southern Africa. It is highly nutritious and tasty nut but the yields are very low with no hope for the Israeli horticultural industry (Biesele et al. 1979; Fox and Norwood-Young 1982; Mizrahi and Nerd 1996). In all of the tested ecozones we only established fruiting mongongo trees in the Besor region with moderate temperatures and good quality irrigation water (Nerd et al. 1990).

A species which performed very well in most tested ecozones is the African plum (*Harpephyllum caffrum* Bernh. ex C. Krauss, Anacardiaceae). This wild tree of Southern Africa produces many small, tasty, aromatic, red fruits in bunches with different hues. However, there are problems that inhibit cultivation. First, the fruit is very small (few grams) and hence labor intensive and second the flesh is only 10% of the total weight. However it can be used for home gardens and city and park gardening with fruits that children and others will enjoy picking.

D.4 Cacti

Of the many plant families we have explored, the Cactaceae is the most important one for Israel, since water is the major limiting factor and becomes scarcer every day. In the future, the water authorities think that only recycled water will be used for agricultural production. The high water use efficiency of the cacti stems from their Crassulacean acid metabolism (CAM) pathway (Gibson and Nobel 1986; Nobel 1994; Mizrahi et al. 1997). Cacti have many uses as crops (Mizrahi et al. 1997). Our efforts have concentrated on fruit production of the unknown pitayas and not on the well-known prickly pear now called cactus pear [*Opuntia ficus-indica* (L.) Miller] that is already grown world-wide (Mizrahi et al. 1997, Mondragon Jacobo 1999, 2001).

Pitaya is a common name to many genera and species of cacti, all with elongated coloumnar stems (Ortiz 1999, 2001). Most of our work was recently reviewed (Mizrahi and Nerd 1999; Nerd et al. 2002) and here we would like to concentrate on updating the data and on the take-home-lesson and consequences from dealing with “real new crops.” These crops are not well known and there is great confusion about their botanical identity. We shall describe briefly each one of the species that have made their way into the European markets.

D.4.1 Vine Cacti

Yellow pitaya [*Selenicereus megalanthus* (Schum.) Britton & Rose], is a vine cactus that needs a trellis system for support. In Israel net-houses are required to avoid photo-inhibition and bleaching of its stems (Mizrahi and Nerd 1999; Nerd et al. 2002). Colombia was the first country to sell *S. megalanthus* in the world market under the name “yellow pitaya.” Until now, the incorrect names of *Hylocereus triangularis* and *Hylocereus undatus* have been used to describe this plant (Weiss et al. 1995). This plant can tolerate high temperatures more than the other vine cacti, yields spiny fruits where the spines abscise easily upon ripening and are unseen by consumers (Fig. 1). The fruits are smaller than the other vine cacti fruits but the taste is superior, hence, the higher prices obtained in the markets in comparison with other vine cacti. Most of the plantations in Colombia have been uprooted due to heavy infestation with fungi (Bibliowicz and Hernandez 1998). We found that desert environment is better than tropical, both from the phytosanitary point of view and the possibility to control and regulate plant production via irrigation, fertilization, and manipulation of shade regimes (Raveh et al. 1996; Mizrahi and Nerd 1999; Nerd et al. 2002).

Figure 1 — Fruit of the real yellow pitaya—*Selenicereus megalanthus*. Notice the tubercles on the fruits' peel, before ripening they contain large spines (1–2 cm), which abscise easily upon ripening.

The red pitaya [*Hylocereus undatus* (Haworth) Britton & Rose] is known in Latin America but the Asian name is dragon-fruit (Fig. 2). There are red flesh clones but we do not know where they are produced. Some red flesh pitayas are produced in Nicaragua and are considered *Hylocereus costaricensis* (Weber) Britton & Rose. In Israel we cultivate *Hylocereus polyrhizus* Weber. Guatemalan researchers refer to it as *Hylocereus undatus* (Mizrahi and Nerd 1999). Pigments differ among the clones and species, and have not been fully explored. For example the *Hylocereus* sp. clone 10487 has red color while the *H. polyrhizus* clones show glowing purple, a unique color, which has been chemically identified as hylocerenin and iso-hylocerenin (Wybraniec et al. 2001). The major problem which exists in these plants in desert areas is their sensitivity both to low and high temperatures (Mizrahi and Nerd 1999). Since variability in these characteristics exist among genotypes, and since there is no genetic barrier among species and even genera, breeding may solve these problems (Lichtenzveig et al. 2000; Tel-Zur et al. 2001). Other important problems with these fruits which might be solved with breeding, is the bland taste and lack of distinct flavor. Sellers of these fruits in Europe claim that the dragon fruit and other red pitayas, which exist today in the market, are bought for their beauty and used mainly for decoration (A. Ronen unpubl. information). Our first hybrids released lately to our growers, exhibit much better taste than the original clones. However there is a lack of effort for breeding tolerance to extreme desert conditions, because of what we consider to be "establishment antagonism." We are convinced that in addition to marketing issues genetic and physiological R&D efforts are required to convert these exotics to mainstream commodities in the world markets.

Figure 2 — Fruit of red pitaya (Dragon fruit in Asia) *Hylocereus undatus*. Note that the fruit contains scales that shrivel post harvest, and they are the main reason for loss of fruit value

D.4.2 Columnar Cacti

Among the various columnar cacti we believe that the most promising one is *Cereus peruvianus* Britton and Rose, which might be the same species as the *Cereus jamacaru* (Nerd et al. 1993; Mizrahi and Nerd 1999; Gutman et al. 2001). The plant is columnar with many branches (Fig. 3). Columns may bear spines to various degrees and length, but the fruits are smooth and totally spineless. The fruits are medium in size, and vary in skin color from yellow to red with various hues. Flesh is white and aromatic with a delicate sour/sweet taste. Black seeds are embedded in the flesh, but are soft and edible reminiscent of kiwifruit seeds (Fig. 4). Israel was the first country to sell this fruit both in the domestic market and in Europe (Fig. 5). Efforts have been carried out in the US and Australia to introduce this unique fruit to their markets. This plant might have other industrial uses because of polysaccharides which may be extracted from its stems (Alvarez et al. 1992). Stem pruning is necessary to ensure efficient fruit harvest. Our results in domestication of this fruit was recently reviewed (Mizrahi and Nerd 1999; Nerd et al. 2002) and here we would like to discuss difficulties in marketing which might hamper introduction. In Israel there are only a few producers. One producer is marketing the fruit at the proper stage of ripeness, with each package containing a leaflet describing the fruit, how to use it fresh, its other uses, storage and nutritional information. However, others sell it in simple boxes with other fruits, at various stages of ripening, from unripe, to ripe and over-ripe, without explanatory leaflets, acts which damage the future of this newly developed fruit. In Europe columnar cactus fruit was accepted quite well but supermarket chains required 300 tonnes/year, while the quantities produced in Israel in 2001 were only 70 tonnes. Special efforts are required from the exporters to sell it in small quantities and if they are not determined to market this fruit it will not be sold. The Israeli establishment (as other establishments) is not interested in new crops. Despite these difficulties, we foresee a great future for this crop due to early and precocious yields (Fig. 6), beautiful appearance, excellent delicate taste, long shelf-life to enable export, and, above all, minimum demand for irrigation and water-stress tolerance.

Figure 3 — Five years old *Cereus peruvianus* plant, multi branched + fruits. The picture was taken at Sde Nitzan in the Western Israeli Negev Desert

Figure 4 — *Cereus peruvianus* cut fruit. Note the smooth peel and the many black, soft edible seeds embedded in the pulp

Figure 5 — Export box of *Cereus peruvianus* ripe fruits, ready to be shipped to Europe. The trade name Koubo is used by AGREXCO the main Israeli export company

Figure 6 — Heavy load of fruits on 4 years old *Cereus peruvianus* plant. The picture was taken at Sde Nitzan in the Western Israeli Negev Desert

D.5 Other fruit tree suitable for desert areas

Of the many fruit trees we have tested the following species are ready for the first trials to test their feasibility as new orchard crops under desert conditions. We have selected clones where we had information on tolerance to desert conditions, fruit yields, quality, and shelf life (Mizrahi and Nerd 1996). These fruits include white sapote (*Casimiroa edulis* Llave & Lex, Rutaceae) (Nerd et al 1992); black sapote (*Diospyros digyna* Jacq., Ebenaceae); desert apple ber or bor in India (*Ziziphus mauritiana* Lam., Rhamnaceae); marula from Southern Africa [*Sclerocarya birrea* (A. Rich) Hochst. sbsp. *caffra* (Sond.) Kokwaro, Anacardiaceae] (Weinert et al. 1990; Nerd and Mizrahi 2000); argan [*Argania spinosa* L. (Skeels), Sapotaceae], wild tree of Morocco, the best culinary oil is extracted from its seeds (Prendergast and Walker 1992; Nerd et al. 1994); and sapodilla [*Manilkara zapota* (L.) van Royen, Sapotaceae], from South East Asia, which is already a crop in many warm countries (Morton 1987). Some of these species (pitaya, white and black sapotes, and sapodilla) are also recommended for tropical zones such as Northern Queensland in Australia (Finocchiaro 2001). Unfortunately there is a lack of support to develop these and other new crops and farmers are afraid to take the risks. The daring farmers of Israel are already involved in production of various pitayas.

Another interesting fruit, which has not reached the R&D stage, is the monkey orange. It consists of three main species as follows: *Strychnos cocculoides* Backer; *S. spinosa* Lam.; and *S. pungens* Solereder, Loganiaceae, all native to Southern Africa (Wehmeyer 1966; Fox and Norwood-Young 1982; Taylor 1986). *Strychnos pungens* did not survive in any of our introduction orchards. *Strychnos cocculoides* which is considered the best of the three (in terms of eating quality), survived only in the Besor region (good quality water and moderate temperatures) and some trees started to bear fruits not of very high quality. It is too early to judge its performance. So far the best of the three under our conditions is *S. spinosa*. It survived in three of our introduction orchards and performed very well in the Besor area (Fig. 7). We have around 15 fruiting trees with high variability for growth, yields, fruit size, ripening season, and taste. Some of the seedlings bear astringent, bitter fruits, other bear very sour ones but two of the trees bear excellent tasty fruits. In organoleptic taste tests, people were requested to compare the monkey orange fruit with familiar fruits; the most common answers were, orange, banana, and apricot, and all possible combinations among them. The fruits emit a delicate aroma reminiscent of the spice clove. GC/MS analysis performed by Ephraim Lewinson of Newe Ya'ar, (ARO Israel) found eugenol, the essential oil found in clove (unpubl. results). Over 90% of the panel claimed that it was very tasty. Various products such as juices and dry fruit rolls are potential uses for this fruit. The fruit is large (400–1200 g), (Fig. 8), round, has a thick shell 4–7 mm, and contains 30%–45% juicy flesh with over 20% total soluble solids, and high acidity (over 200 µeq H^+/gFW).

Figure 7 — Six years old tree of monkey orange Strychnos spinosa bearing fruits. The picture was taken in the Besor Research Farm, in the Western Israeli Negev Desert.

Figure 8 — Open fruit of monkey orange Strychnos spinosa. Note the very thick peel

We are aware of the difficulties in introducing a new product into a market which is full of other temperate and tropical fruits. The first questions we are asked is—who needs these strange fruits? Who is going to buy them? For how much? What is the volume that the market can receive? All these are legitimate questions, which are discouraging for the establishment to deal with. On the other hand it is quite clear that apples and citrus fruits will struggle to withstand the changing economic and climatic conditions (Vietmeyer 1990). Also it is known that among the affluent class in the Western societies there is an increasing demand for exotic fruits and vegetables and some such as kiwifruit have become mainstream products (Anon. 2000).

The health profile of these new fruits is unknown and needs to be explored. For example the non-proteinecious amino acid, taurine was found in Opuntia ficus-indica, in spite of the common belief that the main source of taurine in our diet, comes from animals especially sea-food (Stitzing et al. 1999). Taurine is an important ingredient in the so called “energy drinks” with proven positive activity on human well-being (Seidl et al. 2000). In spite of all these arguments, exotic new fruit trees have received strong antagonism from all possible established organizations, such as the officials in the Ministry of Agriculture, Associations of Fruit Growers, and the main Export Company AGREXCO. We conclude with a plea from a report which speaks for itself.

Annex E
(informative)

Prickly pear — EU pesticide residue limits

(*) Indicates lower limit of analytical determination

Pesticide	mg/kg
1,1-dichloro-2,2-bis(4-ethylphenyl)ethane (F)	0,01*
1,2-dibromoethane (ethylene dibromide) (F)	0,01*
1,2-dichloroethane (ethylene dichloride) (F)	0,01*
1-methylcyclopropene	0,01*
1,3-Dichloropropene	0,05*
1-Naphthylacetamide	0,05*
1-Naphthylacetic acid	0,05*
2,4 DB	0,05*
2,4,5-T (F)	0,05*
2,4-D (sum of 2,4-D and its esters expressed as 2,4-D)	0,05*
Abamectin (sum of avermectin B1a, avermectinB1b and delta-8,9 isomer of avermectin B1a) (F)	0,01*
Acephate	0,02*
Acetamiprid (R)	0,01*
Acibenzolar-S-methyl (sum of acybenzolar-S-methyl and acibenzolar acid (CGA 210007) expressed as acybenzolar-S-methyl)	0,02*
Aldicarb (sum of aldicarb, its sulfoxide and its sulfone, expressed as aldicarb)	0,02*
Aldrin and Dieldrin (Aldrin and dieldrin combined expressed as dieldrin) (F)	0,01*
Amitraz (amitraz including the metabolites contyaining the 2,4 -dimethylaniline moity expressed as amitraz)	0,05*
Amitrole	0,01
Aramite (F)	0,01*
Atrazine (F)	0,05*
Azimsulfuron	0,02*
Azinphos-ethyl (F)	0,02*
Azinphos-methyl (F)	0,05*
Azocyclotin and Cyhexatin (sum of azocyclotin and cyhexatin expressed as cyhexatin)	0,05*
Azoxystrobin	0,05*
Acequinocyl	0,01*
Acetochlor	0,02
Aclonifen	0,05*
Acrinathrin (F)	0,05*
Alachlor	0,05*
Amidosulfuron	0,01*
Anilazine	0,05*
Asulam	0,5
Azadirachtin	0,01*
Amynopyralid	0,01*
Barban (F)	0,05*
Benalaxyl including other mixtures of constituent isomers including benalaxyl-M (sum of isomers)	0,05*
Benfuracarb	0,05*
Bentazone (sum of bentazone and the conjugates of 6-OH and 8-OH bentazone expressed as bentazone) (R)	0,1*
Bifenazate	0,01*
Bifenthrin (F)	0,05*
Binapacryl (F)	0,05*
Bitertanol (F)	0,05*
Bromophos-ethyl	0,05*
Bromopropylate	0,05*

Pesticide	mg/kg
Bromoxynil (bromoxynil including its esters expressed as bromoxynil) (F)	0,05*
Beflubutamid	0,05*
Benfluralin (F)	0,05*
Benthiavalicarb (Benthiavalicarb-isopropyl (KIF-230 R-L) and its enantiomer (KIF-230 S-D) and diastereomers (KIF-230 R-L and KIF-230 S-D)	0,01*
Bifenox (F)	0,1
Boscalid (F) (R)	0,05*
Bromide ion	20
Bromuconazole (sum of diasteroisomers) (F)	0,05*
Bupirimate	0,05*
Buprofezin (F)	0,05*
Butralin	0,02*
Butylate	0,05*
Camphechlor (Toxaphene) (F) (R)	0,1*
Captafol (F)	0,02*
Captan	0,02*
Carbaryl (F)	1
Carbendazim and benomyl (sum of benomyl and carbendazim expressed as carbendazim) (R)	0,1*
Carbofuran (sum of carbofuran and 3-hydroxy-carbofuran expressed as carbofuran)	0,02*
Carbosulfan	0,05*
Carfentrazone-ethyl (determined as carfentrazone and expressed as carfentrazone-ethyl)	0,01*
Chlorbenside (F)	0,01*
Chlorbufam	0,05*
Chlordane (sum of cis- and trans-chlrodane) (F) (R)	0,01*
Chlorfenapyr	0,05*
Chlorfenson (F)	0,01*
Chlorfenvinphos (F)	0,02*
Chlormequat	0,05*
Chlorobenzilate (F)	0,02*
Chlorothalonil	0,01*
Chloroxuron (F)	0,05*
Chlorpropham (chlorpropham and 3-chloroaniline, expressed as chlorpropham) (F) (R)	0,05*
Chlorpyrifos (F)	0,05*
Chlorpyrifos-methyl (F)	0,05*
Chlozolinate	0,05*
Cinidon-ethyl (sum of cinidon ethyl and its E-isomer)	0,05*
Clofentezine (R)	0,02*
Cyazofamid	0,01*
Cyclanilide (F)	0,05*
Cyfluthrin (cyfluthrin including other mixtures of constituent isomers (sum of isomers)) (F)	0,02*
Cyhalofop-butyl (sum of cyhalofop butyl and its free acids)	0,02*
Cypermethrin (cypermethrin including other mixtures of constituent isomers (sum of isomers)) (F)	0,05*
Cyromazine	0,05*
Carbetamide	0,05*
Carboxin	0,05*
Chloridazon	0,5
Chlordecone (F)	0,02
Chlorsulfuron	0,05*
Chlorthal-dimethyl	0,01*
Chlorthiamid	0,1
Chlorotoluron	0,05*
Clethodim (sum of Sethoxydim and Clethodim including degradation products calculated as Sethoxydim)	0,1
Clodinafop and its S-isomers, expressed as clodinafop (F)	0,02*
Clopyralid	0,5

Pesticide	mg/kg
Copper compounds (Copper)	20
Cyanamide including salts expressed as cyanamide	0,05*
Cycloxydim including degradation and reaction products which can be determined as 3-(3-thianyl)glutaric acid S-dioxide (BH 517-TGSO2) and/or 3-hydroxy-3-(3-thianyl)glutaric acid S-dioxide (BH 517-5-OH-TGSO2) or methyl esters thereof, calculated in total as cycloxydim	0,05*
Cymoxanil	0,05*
Cyproconazole (F)	0,05*
Cyprodinil (F) (R)	0,05*
Chlorantraniliprole (DPX E-2Y45)	0,01*
Chloropicrin	0,01*
Chromafenozide	0,01*
Clomazone	0,01*
Clothianidin	0,02*
Cyflufenamid	0,02*
Daminozide (sum of daminozide and 1,1-dimethyl-hydrazine, expressed as daminazide)	0,02*
DDT (sum of p,p´-DDT, o,p´-DDT, p-p´-DDE and p,p´-TDE (DDD) expressed as DDT) (F)	0,05*
Deltamethrin (cis-deltamethrin) (F)	0,05*
Desmedipham	0,05*
Diallate	0,05*
Diazinon (F)	0,01*
Dichlorvos	0,01*
Dicofol (sum of p, p´ and o,p´ isomers) (F)	0,02*
Dimethenamid‼ p (dimethenamid-p including other mixtures of constituent isomers (sum of isomers))	0,01*
Dimethoate (sum of dimethoate and omethoate expressed as dimethoate)	0,02*
Dinoseb	0,05*
Dinoterb	0,05*
Dioxathion	0,05*
Diphenylamine	0,05*
Diquat	0,05*
Disulfoton (sum of disulfoton, disulfoton sulfoxide and disulfoton sulfone expressed as disulfoton) (F)	0,02*
Dithiocarbamates (dithiocarbamates expressed as CS2, including maneb, mancozeb, metiram, propineb, thiram and ziram)	0,05*
DNOC	0,05*
Dalapon	0,05*
Dazomet (Methylisothiocyanate resulting from the use of dazomet and metam)	0,02*
Dicamba	0,05*
Dichlobenil	0,1
Dichlorprop, incl. Dichlorprop-p	0,05*
Diclofop (sum diclofop-methyl and diclofop acid expressed as diclofop-methyl)	0,05*
Dicloran	0,1
Diethofencarb	0,05*
Difenoconazole	0,1
Diflubenzuron (F) (R)	0,05*
Diflufenican	0,05*
Dimethachlor	0,02*
Dimethipin	0,1*
Dimethomorph	0,05*
Dimoxystrobin	0,01*
Diniconazole	0,05*
Dinocap (sum of dinocap isomers and their corresponding phenols expressed as dinocap) (F)	0,05*
Dithianon	0,01*
Diuron (Diuron including all components containing 3,4- dichloraniline moiety expressed as 3,4-dichloraniline)	0,1
Dodine	0,2*
Endosulfan (sum of alpha- and beta-isomers and endosulfan-sulphate expresses as endosulfan) (F)	0,05*

Pesticide	mg/kg
Endrin (F)	0,01*
Ethephon	0,05*
Ethion	0,1
Ethofumesate (sum of ethofumesate and the metabolite 2,3-dihydro-3,3-dimethyl-2-oxo-benzofuran-5-yl methane sulphonate expressed as ethofumesate)	0,05*
Ethoxysulfuron	0,05*
Ethylene oxide (sum of ethylene oxide and 2-chloro-ethanol expressed as ethylene oxide) (F)	0,1*
Etoxazole	0,02*
Epoxiconazole (F)	0,05*
EPTC (ethyl dipropylthiocarbamate)	0,05*
Ethalfluralin	0,02*
Ethirimol	0,05*
Ethoprophos	0,02*
Ethoxyquin (F)	0,05*
Etofenprox (F)	0,01*
Etridiazole	0,05*
Famoxadone	0,02*
Fenamidone	0,02*
Fenamiphos (sum of fenamiphos and its sulphoxide and sulphone expressed as fenamiphos)	0,02*
Fenarimol	0,02*
Fenbutatin oxide (F)	0,05*
Fenchlorphos (sum of fenchlorphos and fenchlorphos oxon expressed as fenchlorphos)	0,01*
Fenhexamid	0,05*
Fenitrothion	0,5
Fenpropimorph (R)	0,05*
Fenthion (fenthion and its oxigen analogue, their sulfoxides and sulfone expressed as parent) (F)	0,01*
Fentin acetate (F) (R)	0,05*
Fentin hydroxide (F) (R)	0,05*
Fenvalerate and Esfenvalerate (Sum of RR & SS isomers) (F)	0,02*
Fenvalerate and Esfenvalerate (Sum of RS & SR isomers) (F)	0,02*
Flazasulfuron	0,01*
Florasulam	0,01*
Flucythrinate (F) (R)	0,05*
Flufenacet (sum of all compounds containing the N fluorophenyl-N-isopropyl moiety expressed as flufenacet equivalent)	0,05*
Flumioxazine	0,05*
Flupyrsulfuron-methyl	0,02*
Fluroxypyr (fluroxypyr including its esters expressed as fluroxypyr) (R)	0,05*
Flurtamone	0,02*
Folpet	0,02*
Foramsulfuron	0,01*
Formothion	0,02*
Fosthiazate	0,02*
Furathiocarb	0,05*
Fenazaquin	0,01*
Fenbuconazole	0,05*
Fenoxaprop-P	0,1
Fenoxycarb	0,05*
Fenpropidin (R)	0,05*
Fenpyroximate (F)	0,05*
Fipronil (sum fipronil + sulfone metabolite (MB46136) expressed as fipronil) (F)	0,005*
Florchlorfenuron	0,05*
Fluazifop-P-butyl (fluazifop acid (free and conjugate))	0,2
Fluazinam (F)	0,05*

Pesticide	mg/kg
Flucycloxuron	0,05*
Fludioxonil	0,05*
Flufenoxuron (F)	0,05*
Flufenzin	0,05*
Fluoxastrobin	0,05*
Fluquinconazole (F)	0,05*
Flurochloridone	0,1*
Flusilazole (F) (R)	0,02*
Flutolanil	0,05*
Flutriafol	0,05*
Formetanate: Sum of formetanate and its salts expressed as formetanate(hydrochloride)	0,05*
Fosetyl-Al (sum fosetyl + phosphorous acid and their salts, expressed as fosetyl)	2*
Fuberidazole	0,05*
Fenpropathrin	0,01*
Flonicamid (sum of flonicamid, TNFG and TNFA) (R)	0,05*
Flubendiamide	0,01*
Fluometuron	0,01*
Fluopicolide	0,01*
Fluoride ion	2*
Fluoroglycofene	0,01*
Flurprimidole	0,01*
Fomesafen	0,01*
Furfural	1
Glyphosate	0,1*
Gibberellic acid	5
Glufosinate-ammonium (sum of glufosinate, its salts, MPP and NAG expressed as glufosinate equivalents)	0,1*
Guazatine	0,1*
Heptachlor (sum of heptachlor and heptachlor epoxide expressed as heptachlor) (F)	0,01*
Hexachlorobenzene (F)	0,01*
Hexachlorociclohexane (HCH), sum of isomers, except the gamma isomer	0,01*
Hexaconazole	0,02*
Haloxyfop including haloxyfop-R (Haloxyfop-R methyl ester, haloxyfop-R and conjugates of haloxyfop-R expressed as haloxyfop-R) (F) (R)	0,05*
Hexythiazox	0,5
Hymexazol	0,05*
Halosulfuron methyl	0,01*
Imazalil	0,02*
Imazamox	0,05*
Imazosulfuron	0,01*
Indoxacarb as sum of the isomers S and R (F)	0,02*
Iodosulfuron-methyl (iodosulfuron-methyl including salts, expressed as iodosulfuron-methyl)	0,02*
Ioxynil, including its esters expressed as ioxynil (F)	0,05*
Iprodione (R)	0,02*
Iprovalicarb	0,05*
Isoproturon	0,05*
Isoxaflutole (sum of isoxaflutole, RPA 202248 and RPA 203328, expressed as isoxaflutole)	0,05*
Imazaquin	0,05*
Imidacloprid	0,05*
Isoxaben	0,02*
Ipconazole	0,01*
Kresoxim-methyl (F) (R)	0,05*
Lambda-Cyhalothrin (F) (R)	0,02*
Lindane (Gamma-isomer of hexachlorociclohexane (HCH)) (F)	0,01*
Linuron	0,05*

Pesticide	mg/kg
Lenacil	0,1*
Lufenuron(F)	0,02*
Lactofen	0,01*
Malathion (sum of malathion and malaoxon expressed as malathion)	0,02*
Maleic hydrazide (R)	0,2*
MCPA and MCPB (MCPA, MCPB including their salts, esters and conjugates expressed as MCPA) (F) (R)	0,05*
Mecarbam	0,05*
Mecoprop (sum of mecoprop-p and mecoprop expressed as mecoprop)	0,05*
Mepanipyrim (Mepanipyrim and its metabolite (2-anilino-4-(2-hydroxypropyl)-6-methylpyrimidine) expressed as mepanipyrim)	0,01*
Mercury compounds (sum of mercury compounds expressed as mercury) (F)	0,01*
Mesosulfuron-methyl expresssed as mesosulfuron	0,01*
Mesotrione (Sum of mesotrione and MNBA (4-methylsulfonyl-2-nitro benzoic acid), expressed as mesotrione)	0,05*
Metalaxyl and metalaxyl-M (metalaxyl including other mixtures of constituent isomers including metalaxyl-M (sum of isomers))	0,05*
Methacrifos (F)	0,05*
Methamidophos	0,01*
Methidathion (F)	0,02*
Metholachlor and metholachlor-S (metholachlor including other mixtures of constituent isomers including S-metholachlor (sum of isomers))	0,05*
Methomyl and Thiodicarb (sum of methomyl and thiodicarb expressed as methomyl)	0,05*
Methoxychlor (F)	0,01*
Methoxyfenozide (F)	0,02*
Metsulfuron-methyl	0,05*
Mevinphos (sum of E- and Z-isomers)	0,01*
Milbemectin (sum of MA4+8,9Z-MA4, expressed as milbemectin) (R)	0,05*
Molinate	0,05*
Monolinuron	0,05*
Myclobutanyl (R)	0,02*
Mepiquat	0,05*
Metaldehyde	0,05*
Metamitron	0,1*
Metazachlor	0,1*
Metconazole (F)	0,02*
Methabenzthiazuron	0,1*
Methiocarb (sum of methiocarb and methiocarb sulfoxide and sulfone, expressed as methiocarb)	0,2
Methoprene	0,05*
Metosulam	0,01*
Metrafenone	0,05*
Metribuzin	0,1*
Monuron	0,05*
Mandipropamid	0,01*
Mepronil	0,05*
Meptyldinocap (sum of 2,4 DNOPC and 2,4 DNOP expressed as meptyldinocap)	0,05*
Metaflumizone (sum of E- and Z- isomers)	0,05*
Nitrofen (F)	0,01*
Napropamide	0,05*
Nicosulfuron	0,05*
Novaluron (F)	0,01*
Oxadiargyl	0,01*
Oxamyl	0,01*
Oxasulfuron	0,05*
Oxydemeton-methyl (sum of oxydemeton-methyl and demeton-S-methylsulfone expressed as oxydemeton-methyl)	0,02*
Oxadiazon	0,05*

Pesticide	mg/kg
Oxycarboxin	0,05*
Oxyfluorfen	0,05*
Orthosulfamuron	0,01*
Oryzalin	0,01*
Oxadixyl	0,01*
Paraquat	0,02*
Parathion (F)	0,05*
Parathion-methyl (sum of Parathion-methyl and paraoxon-methyl expressed as Parathion-methyl)	0,02*
Penconazole (F)	0,05*
Pendimethalin (F)	0,05*
Pethoxamid	0,01*
Phenmedipham (R)	0,05*
Phorate (sum of phorate, its oxygen analogue and their sulfones expressed as phorate)	0,05*
Phosphamidon	0,01*
Picolinafen	0,05*
Picoxystrobin (F)	0,05*
Pirimiphos-methyl (F)	0,05*
Prochloraz (sum of prochloraz and its metabolites containing the 2,4,6-Trichlorophenol moiety expressed as prochloraz)	0,05*
Procymidone (R)	0,02*
Profenofos (F)	0,05*
Prohexadione (prohexadione and its salts expressed as prohexadione)	0,05*
Propiconazole	0,05*
Propineb (expressed as propilendiamine)	0,05*
Propoxur	0,05*
Propoxycarbazone (propoxycarbazone, its salts and 2-hydroxy-propoxy-propoxycarbazone, calculated as propoxycarbazone)	0,02*
Propyzamide (F) (R)	0,02*
Prosulfuron	0,02*
Pymetrozine	0,02*
Pyraclostrobin (F)	0,02*
Pyraflufen-ethyl	0,02*
Pyrazophos (F)	0,05*
Pyridate (sum of pyridate, its hydrolysis product CL 9673 (6-chloro-4-hydroxy-3-phenylpyridazin) and hydrolysable conjugates of CL 9673 expressed as pyridate)	0,05*
Pyrimethanil	0,05*
Paclobutrazol	0,5
Pencycuron (F)	0,05*
Phenothrin	0,05*
Phosalone	0,05*
Phosmet (phosmet and phosmet oxon expressed as phosmet) (R)	2
Phosphines and phosphides:sum of aluminium phosphide, aluminium phosphine, magnesium phosphide, magnesium phosphine, zinc phosphide and zinc phosphine	0,05
Phoxim (F)	0,01*
Picloram	0,01*
Pirimicarb: sum of pirimicarb and desmethyl pirimicarb expressed as pirimicarb	1
Propachlor: oxalinic derivate of propachlor, expressed as propachlor	0,05*
Propamocarb (Sum of propamocarb and its salt expressed as propamocarb)	0,1*
Propanil	0,1*
Propaquizafop	0,05*
Propargite (F)	0,01*
Propisochlor	0,01*
Prosulfocarb	0,05*
Prothioconazole (Prothioconazole-desthio) (R)	0,02*
Pyrethrins	1

Pesticide	mg/kg
Pyridaben (F)	0,5
Pyriproxyfen (F)	0,05*
Permethrin (sum of isomers)	0,05*
Propham	0,05*
Penoxsulam	0,01*
Pinoxaden	0,02*
Profoxydim	0,05*
Proquinazid	0,02*
Pyrasulfutole	0,01*
Pyroxsulam	0,01*
Quinalphos	0,05*
Quinoxyfen (F)	0,02*
Quintozene (sum of quintozene and pentachloro-aniline expressed as quintozene) (F)	0,02*
Quinmerac	0,1*
Quizalofop, incl. quizalfop-P	0,05*
Quinclorac	0,05*
Resmethrin (resmethrin including other mixtures of consituent isomers (sum of isomers)) (F)	0,1*
Rimsulfuron	0,05*
Rotenone	0,01*
Silthiofam	0,05*
Spiroxamine (R)	0,05*
Sulfosulfuron	0,05*
Simazine	0,1
Spinosad: sum of spinosyn A and spinosyn D, expressed as spinosad (F)	0,02*
Spirodiclofen (F)	0,02*
Spiromesifen	0,02*
Sulcotrione	0,05*
Sulphur	50
Spinetoram (XDE-175)	0,05*
Spirotetramat and its 4 metabolites BYI08330-enol, BYI08330-ketohydroxy, BYI08330-monohydroxy, and BYI08330 enol-glucoside, expressed as spirotetramat	0,1*
Sulfuryl fluoride	0,01*
Tecnazene (F)	0,05*
TEPP	0,01*
Thiabendazole (R)	0,05*
Thiacloprid (F)	0,02*
Thifensulfuron-methyl	0,05*
Thiophanate-methyl (R)	0,1*
Thiram (expressed as thiram)	0,1*
Tolylfluanid (Sum of tolylfluanid and dimethylaminosulfotoluidide expressed as tolylfluanid) (R)	0,05*
Triadimefon and triadimenol (sum of triadimefon and triadimenol) (F)	0,1*
Triasulfuron	0,05*
Triazophos (F)	0,01*
Tribenuron-methyl	0,01*
Tridemorph (F)	0,05*
Trifloxystrobin	0,02*
Triforine	0,05*
Trimethyl-sulfonium cation, resulting from the use of glyphosate (F)	0,05*
Triticonazole	0,01*
Tau-Fluvalinate (F)	0,01*
Tebuconazole	0,05*
Tebufenozide (F)	0,05*
Tebufenpyrad (F)	0,05*
Teflubenzuron	0,05*

Pesticide	mg/kg
Tefluthrin (F)	0,05
Terbufos	0,01*
Terbuthylazine	0,05*
Tetraconazole (F)	0,02*
Tetradifon	0,02*
Thiametoxam (sum of thiametoxam and clothianidin expressed as thiametoxam)	0,05*
Thiobencarb	0,1*
Tolclofos-methyl	0,05*
Tri-allate	0,1*
Trichlorfon	0,5
Triclopyr (R)	0,1*
Tricyclazole	0,05*
Triflumizole: Triflumizole and metabolite FM-6-1(N-(4-chloro-2-trifluoromethylphenyl)-n-propoxyacetamidine), expressed as Triflumizole (F)	0,1*
Triflumuron (F)	0,05*
Trifluralin	0,1*
Trinexapac	0,05*
Tembotrione	0,02*
Tepraloxydim	0,1*
Topramezone (BAS 670H)	0,01*
Tralkoxydim	0,02*
Triflusulfuron	0,02*
Tritosulfuron	0,01*
Vinclozolin (sum of vinclozolin and all metabolites containing the 3,5-dichloraninilinemoiety, expressed as vinclozolin) (R)	0,05*
Valiphenal	0,01*
Ziram	0,1*
Zoxamide	0,02*

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