



**United States  
Department of  
Agriculture**

**Agricultural  
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Vegetable  
Programs**

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Branch**

# **United States Standards for Grades of Persian (Tahiti) Limes**

**Effective May 31, 2006**

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## Grades

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## Grades

### §51.1000 U.S. No. 1.

"U.S. No. 1" consists of Persian limes which are firm, fairly well formed, of fairly smooth texture, which are free from decay, stylar end breakdown or other internal discoloration, broken skins which are not healed, bruises (except those incident to proper handling and packing), hard or dry skins, and free from damage caused by freezing, dryness or mushy condition, sprayburn, exanthema (ammoniation), scars, thorn scratches, scale, sunburn, scab, blanching, yellow color, discoloration, buckskin, dirt or other foreign material, disease, insects or mechanical or other means.

(a) Each fruit in this grade shall have not less than an aggregate area of three-fourths of the surface of the fruit which shows good green color characteristic of the Persian lime: **Provided**, That lots of limes which fail to meet the U.S. No. 1 grade requirements only because of blanching may be designated as "U.S. No. 1, Mixed Color:" **And provided further**, That lots of

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<sup>1</sup>Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug and Cosmetic Act, or with applicable State laws and regulations.

limes which fail to meet the U.S. No. 1 or U.S. No. 1 Mixed Color grade requirements only because of turning yellow or yellow color, caused by the ripening process, may be designated as "U.S. No. 1, Turning."

(b) The fruit shall have a juice content of not less than 42 percent, by volume or weight.

(c) In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of the fruit in any lot may fail to meet the color requirements. In addition, not more than 10 percent, by count, of the fruit in any lot may be below the remaining requirements of this grade, but not more than one-half of this amount, or 5 percent, shall be allowed for decay, stylar end breakdown, broken skins which are not healed, or defects causing serious damage including not more than one-half of 1 percent for decay at shipping point: **Provided**, That an additional tolerance of 2-1/2 percent, or a total of not more than 3 percent, shall be allowed for decay en route or at destination.

#### **§51.1001 U.S. Combination.**

"U.S. Combination" consists of a combination of U.S. No. 1 and U.S. No. 2 limes: **Provided**, That at least 60 percent, by count, of the limes in the lot meet the requirements of U.S. No. 1 grade.

(a) In this grade the U.S. No. 1 limes shall meet the color requirements of the U.S. No. 1 grade and the U.S. No. 2 limes shall meet the color requirements of the U.S. No. 2 grade: **Provided**, That lots of limes which fail to meet the U.S. Combination grade requirements only because of blanching may be designated as "U.S. Combination, Mixed Color:" **And provided further**, That lots of limes which fail to meet the U.S. Combination or U.S. Combination Mixed Color grade requirements only because of turning yellow or yellow color, caused by the ripening process, may be designated as "U.S. Combination, Turning."

(b) In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of the fruit in any lot may fail to meet the color requirements. In addition, not more than 10 percent, by count, of the fruit in any lot may be below the remaining requirements of the lower grade in the combination, but not more than one-half of this amount, or 5 percent, shall be allowed for limes affected by decay, stylar end breakdown and broken skins which are not healed, including not more than one-half of 1 percent for decay at shipping point: **Provided**, That an additional tolerance of 2-1/2 percent, or a total of not more than 3 percent, shall be allowed for decay en route or at destination.

(c) No part of the above tolerances shall be allowed to reduce for the lot as a whole, the 60 percent of U.S. No. 1 limes required in the U.S. Combination grade, but individual containers may have not less than 50 percent of the higher grade.

#### **§51.1002 U.S. No. 2.**

"U.S. No. 2" consists of Persian limes which are fairly firm, which are not badly deformed, and not of excessively rough texture, which are free from decay, stylar end breakdown or other internal discoloration, broken skins which are not healed, bruises (except those incident to proper handling and packing), and hard or dry skins, and free from serious damage caused by freezing, dryness or mushy condition, sprayburn, exanthema (ammoniation), scars, thorn scratches, scale, sunburn, scab, blanching, yellow color, discoloration, buckskin, dirt or other foreign material, disease, insects or mechanical or other means.

(a) Each fruit in this grade shall have not less than an aggregate area of one-half of the surface of

the fruit which shows good green color characteristic of the Persian lime: **Provided**, That lots of limes which fail to meet the U.S. No. 2 grade requirements only because of blanching may be designated as "U.S. No. 2, Mixed Color;" **And provided further**, That lots of limes which fail to meet the U.S. No. 2 or U.S. No. 2 Mixed Color grade requirements only because of turning yellow or yellow color, caused by the ripening process, may be designated as "U.S. No. 2, Turning."

(b) The fruit shall have a juice content of not less than 42 percent, by volume or weight.

(c) In order to allow for variations incident to proper grading and handling, not more than 10 percent, by count, of the fruit in any lot may fail to meet the color requirements. In addition, not more than 10 percent, by count, of the fruit in any lot may be below the remaining requirements of this grade, but not more than one-half of this amount, or 5 percent, shall be allowed for decay, stylar end breakdown, and broken skins which are not healed, including not more than one-half of 1 percent for decay at shipping point: **Provided**, That an additional tolerance of 2-1/2 percent, or a total of not more than 3 percent, shall be allowed for decay en route or at destination.

#### **Unclassified**

##### **§51.1003 Unclassified.**

"Unclassified" consists of Persian limes which have not been classified in accordance with any of the foregoing grades. The term "unclassified" is not a grade within the meaning of these standards but is provided as a designation to show that no grade has been applied to the lot.

#### **Application of Tolerances**

##### **§51.1004 Application of tolerances.**

(a) The contents of individual packages in the lot, based on sample inspection, are subject to the following limitations: **Provided**, That the averages for the entire lot are within the tolerances specified for the grade:

- (1) For packages which contain more than 3 pounds and a tolerance of 10 percent or more is provided, individual packages in any lot shall have not more than one and one-half times the tolerance specified. For packages which contain more than 3 pounds and a tolerance of less than 10 percent is provided, individual packages in any lot shall have not more than double the tolerance specified, except that at least one decayed fruit may be permitted in any package; and,
- (2) For packages which contain 3 pounds or less, individual packages in any lot are not restricted as to the percentage of defects: **Provided**, That not more than 10 percent of the packages may have more than one decayed fruit.

#### **Standard Pack**

##### **§51.1005 Standard pack.**

(a) Fruit shall be fairly uniform in size, and when placed packed in crates or cartons, the fruit shall be arranged according to the approved and recognized methods.

(b) All packages shall be well filled but the contents shall not show excessive or unnecessary bruising because of over-filled packages.

(c) "Fairly uniform in size" means that not more than 10 percent, by count of the fruit in any container may vary more than four-sixteenths of an inch in diameter.

(d) In order to allow for variations, other than sizing, incident to proper packing, not more than 5 percent of the packages in any lot may fail to meet the requirements of standard pack.

## **Definitions**

### **§51.1006 Firm.**

"Firm" means that the fruit is not soft or flabby.

### **§51.1007 Fairly well formed.**

"Fairly well formed" means that the fruit shows normal characteristic shape for the Persian variety and is not materially flattened on one side.

### **§51.1008 Fairly smooth texture.**

"Fairly smooth texture" means that the fruit is comparatively free from lumpiness and that pebbling is not abnormally coarse. Coarse pebbling is not objectionable as it is indicative of good keeping quality and is characteristic of the fruit, especially that from young trees.

### **§51.1009 Styler end breakdown.**

"Styler end breakdown" is a physiological breakdown starting at the base of the nipple as a grayish tan water-soaked spot. A brownish discoloration develops in the rind. As it progresses the color of the affected area becomes darker and usually sinks below the healthy surface, but the area remains firm unless infected with secondary organisms that cause soft decay.

### **§51.1010 Damage.**

"Damage" means any defect which materially affects the appearance, or the edible or shipping quality of the fruit. Any one of the following defects, or any combination of defects the seriousness of which exceeds the maximum allowed for any one defect, shall be considered as damage:

- (a) Dryness or mushy condition which extends into all segments more than one-eighth of an inch at the stem end, or more than the equivalent of this amount, by volume, when occurring in other portions of the fruit;
- (b) Sprayburn which changes the color to such an extent that the appearance of the fruit is materially affected, or which causes scarring that in the aggregate exceeds the area of a circle one-fourth inch in diameter;
- (c) Exanthema (ammoniation) which materially detracts from the appearance of the fruit, or which occurs as small, thinly scattered spots over more than 10 percent of the fruit surface, or as solid scarring (not cracked) or depressions which in the aggregate exceed the area of a circle one-half inch in diameter;
- (d) Scars which are dark, rough, or deep and in the aggregate exceed the area of a circle one-fourth inch in diameter, or scars which are fairly light in color, slightly rough, or of slight depth and in the aggregate exceed the area of a circle one-half inch in diameter, or scars which are light colored, fairly smooth, with no depth and aggregate more than 10 percent of the fruit surface;
- (e) Thorn scratches when the injury is not well healed, or when dark colored, rough or deep and in the aggregate exceeds the area of a circle one-fourth inch in diameter, or when light colored, fairly smooth and concentrated and in the aggregate exceeds the area of a circle one-half inch in diameter, or light colored and scattered thorn injury which detracts from the appearance of the fruit to a greater extent than the aggregate area of one-half inch permitted for light colored concentrated injury;
- (f) Scale when the appearance of the fruit is affected to a greater extent than that of a lime which has 10 medium to large California red or purple scale attached;

- (g) Sunburn which causes appreciable flattening of the fruit, drying of the skin, material change in the color of the skin, appreciable drying of the flesh underneath the affected area, or which affects more than 5 percent of the fruit surface;
- (h) Scab which materially affects the shape or texture;
- (i) Blanching when more than 25 percent, in the aggregate, of the fruit surface shows a whitish to yellowish green area or areas because of shading, resting on the surface of the ground, or contact with other fruit on the tree. Such areas are not to be confused with limes which are turning yellow due to the ripening process;
- (j) Yellow color when plainly visible and caused by the ripening process;
- (k) Discoloration caused by rust mite, melanose or other means, when fairly smooth and more than 10 percent of the fruit surface is affected, or when slightly rough and in the aggregate exceeds the area of a circle one-half inch in diameter; and,
- (l) Buckskin when more unsightly than the maximum discoloration allowed, or the fruit texture is materially affected.

**§51.1011 Good green color.**

"Good green color" means that the skin of the lime is of a good green color characteristic of the Persian variety.

**§51.1012 Fairly firm.**

"Fairly firm" means that the fruit is not soft or excessively flabby.

**§51.1013 Badly deformed.**

"Badly deformed" means that the fruit is seriously misshapen from any cause.

**§51.1014 Excessively rough texture.**

"Excessively rough texture" means that the skin is badly ridged or very decidedly lumpy.

**§51.1015 Serious damage.**

"Serious damage" means any defect which seriously affects the appearance, or the edible or shipping quality of the fruit. Any one of the following defects, or any combination of defects the seriousness of which exceeds the maximum allowed for any one defect, shall be considered as serious damage:

- (a) Dryness or mushy condition which extends into all segments more than one-fourth of an inch at the stem end, or more than the equivalent of this amount, by volume, when occurring in other portions of the fruit;
- (b) Sprayburn which changes the color to such an extent that the appearance of the fruit is seriously injured or which causes scarring that in the aggregate exceeds the area of a circle one-half inch in diameter;
- (c) Exanthema (ammoniation) which occurs as small spots over more than 25 percent of the fruit surface, or as solid scarring (not cracked) or depressions which aggregate more than 10 percent of the fruit surface;
- (d) Scars which are dark, rough, or deep and aggregate more than 5 percent of the fruit surface, or scars which are fairly light in color, slightly rough, or of slight depth and aggregate more than 10 percent of the fruit surface, or scars which are light colored, fairly smooth, with no depth and aggregate more than 25 percent of the fruit surface;
- (e) Thorn scratches when the injury is not well healed, or when dark colored, rough or deep and aggregates more than 5 percent of the fruit surface, or when light colored, fairly smooth and concentrated and aggregates more than 10 percent of the fruit surface, or light colored and

scattered thorn injury which detracts from the appearance of the fruit to a greater extent than the 10 percent light colored concentrated injury;

(f) Scale when the appearance of the fruit is affected to a greater extent than that of a lime which has a blotch the area of a circle one-half inch in diameter;

(g) Sunburn which causes decided flattening of the fruit, marked drying or dark discoloration of the skin, material drying of the flesh underneath the affected area, or which affects more than 10 percent of the fruit surface;

(h) Scab which seriously affects shape or texture;

(i) Blanching when more than 50 percent, in the aggregate, of the fruit surface shows a whitish to yellowish green area or areas because of shading, resting on the surface of the ground, or contact with other fruit on the tree. Such areas are not to be confused with limes which are turning yellow due to the ripening process;

(j) Yellow color when plainly visible and caused by the ripening process;

(k) Discoloration caused by rust mite, melanose or other means, when fairly smooth and more than 50 percent of the fruit surface is affected, or when slightly rough and more than 25 percent of the fruit surface is affected; and,

(l) Buckskin when more unsightly than the maximum discoloration allowed, or the fruit texture is seriously affected.

**§51.1016 Diameter.**

"Diameter" means the greatest dimension measured at right angles to a line from stem to blossom end of the fruit.