



# The UNECE Standard for Fresh Chilli Peppers

**Tomás González-Estrada**

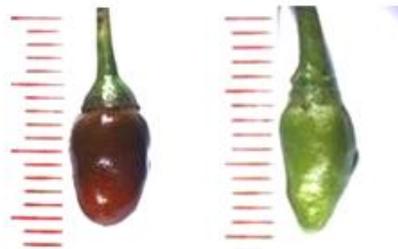
**International Harmonization Workshop on Standards for Fresh Fruits and Vegetables  
for Asian Countries**

**Chiang Mai, Thailand 14-17 November 2011**

# Content

- 1) **Genetic Diversity and Fundamentals on Pungency in *Capsicum* spp.**
- 2) **The UNECE Standard for Fresh Chilli Peppers**

# *Genetic Diversity of Capsicum spp.*



# Taxonomy of *Capsicum* spp.

- Solanaceae
- Genus *Capsicum*: 25-30 species.
- 5 cultivated species: *annuum*, *baccatum*, *chinense*, *frutescens* and *pubescens*.



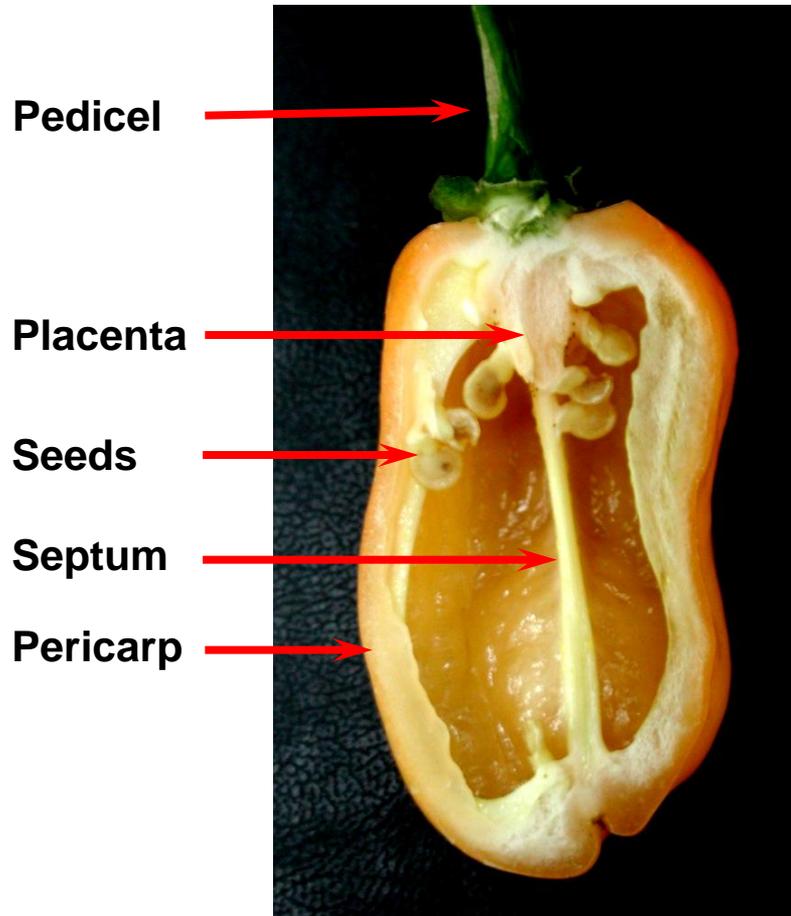
*C. annuum*



*C. chinense*

(Bosland & Votava, 2000; Moscone *et al*, 2003)

# Anatomy of Habanero Pepper Fruit



2 locules

3 locules

4 locules

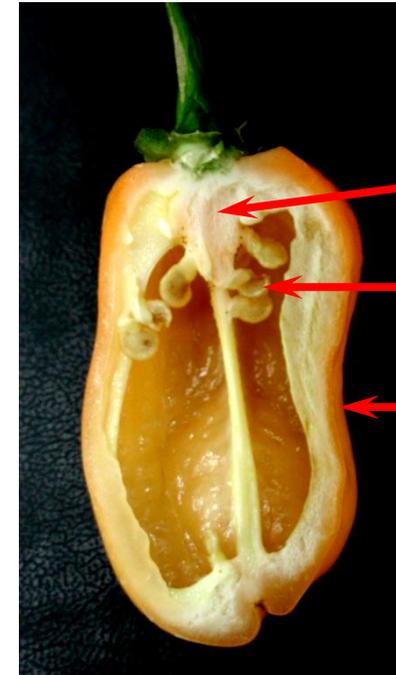
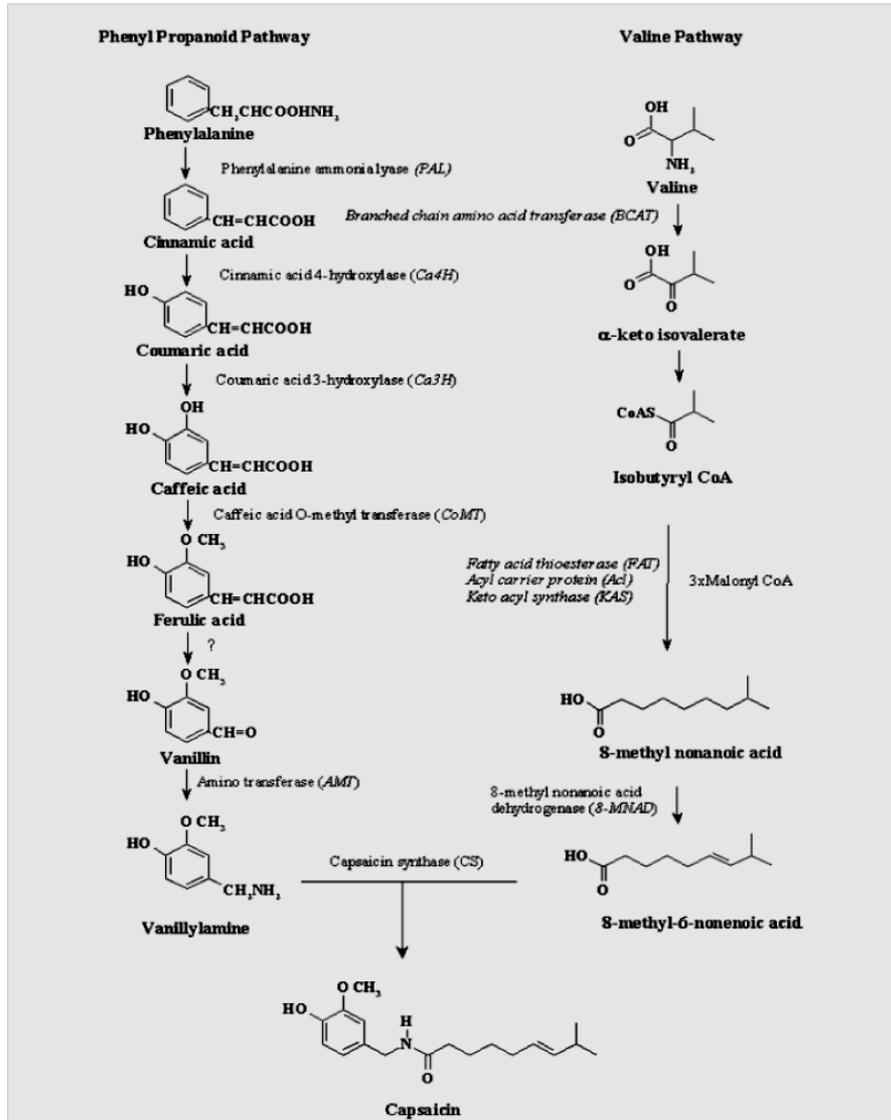


5 locules

6 locules

8 locules

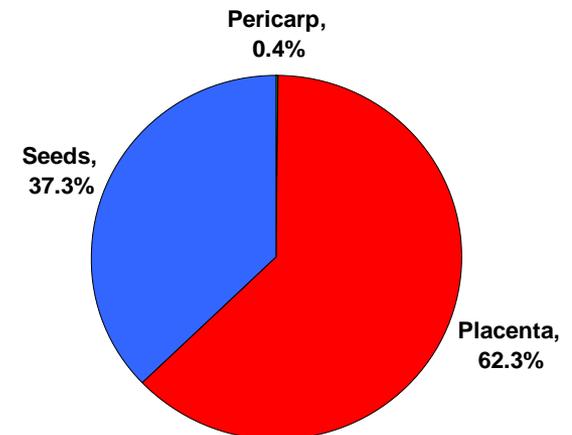
# Biosynthesis of Capsaicinoids



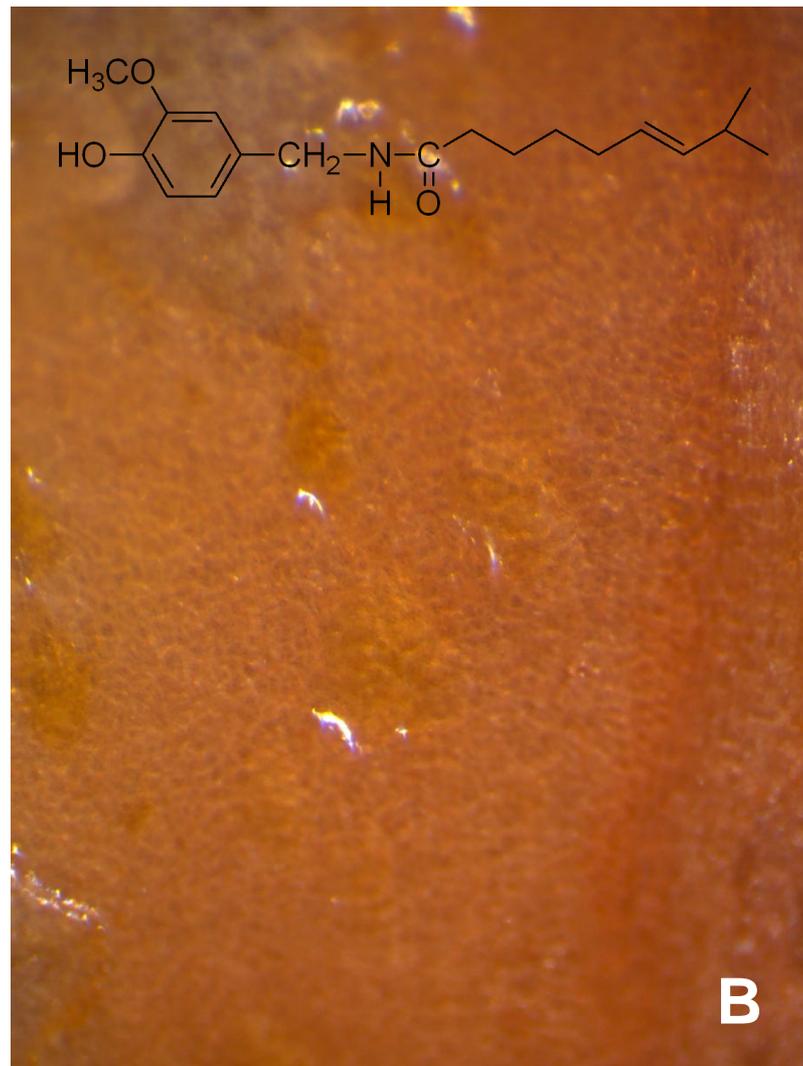
Placenta

Seeds

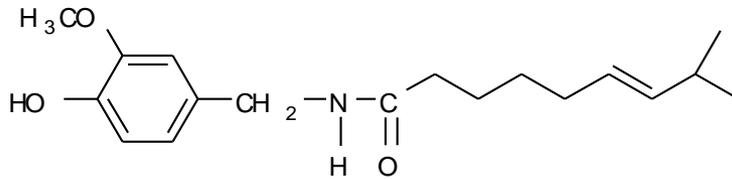
Pericarp



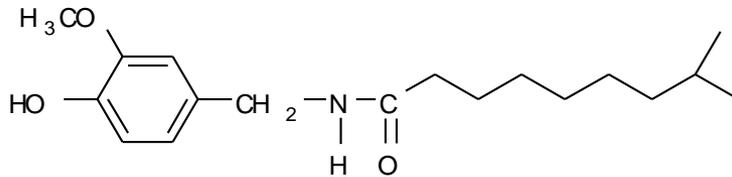
# Placental Tissue in Chilli Peppers



# Pungency and capsaicinoids



Capsaicin



Dihydrocapsaicin

Capsaicinoid	%
Capsaicin	69
Dihydrocapsaicin	22
Nordihydrocapsaicin	7
Homocapsaicin	1
Homodihydrocapsaicin	1

<p>Capsaicin + Dihydrocapsaicin = &gt;90% total caps</p>
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## DEFINITION OF PRODUCE

This standard applies to chilli peppers<sup>1</sup> of varieties (cultivars) grown from *Capsicum* subsp., to be supplied fresh to the consumer, chilli peppers for industrial processing being excluded.

<sup>1</sup> Chilli peppers presenting a minimum pungency of 900 Scoville Index.  
For levels of pungency see the annex.

# DEFINITION OF PRODUCE



## PROVISIONS CONCERNING QUALITY

The purpose of the standard is to define the quality requirements for chilli peppers at the export-control stage after preparation and packaging.

However, if applied at stages following export, products may show in relation to the requirements of the standard:

- a slight lack of freshness and turgidity
- for products graded in classes other than the “Extra” Class, a slight deterioration due to their development and their tendency to perish.

## **PROVISIONS CONCERNING QUALITY (cont.)**

The holder/seller of products may not display such products or offer them for sale, or deliver or market them in any manner other than in conformity with this standard. The holder/seller shall be responsible for observing such conformity.



## Minimum Requirements

In all classes, subject to the special provisions for each class and the tolerances allowed, the chilli peppers must be:

-intact, the stalk (stem) may be missing, provided that the break is clean and the adjacent skin is not damaged;





Not intact – peduncle and calyx missing, adjacent flesh damaged



Not intact – peduncle damaged

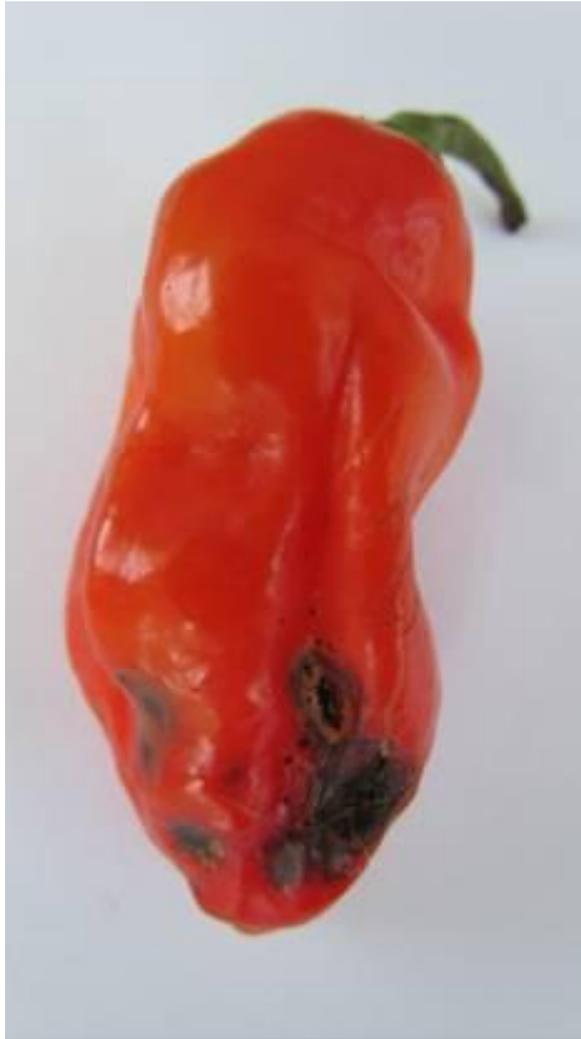
- sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;



Not sound – fungal and bacterial infection



Not sound – fungal infection



Not sound – bacterial infection



Not sound – physical damage

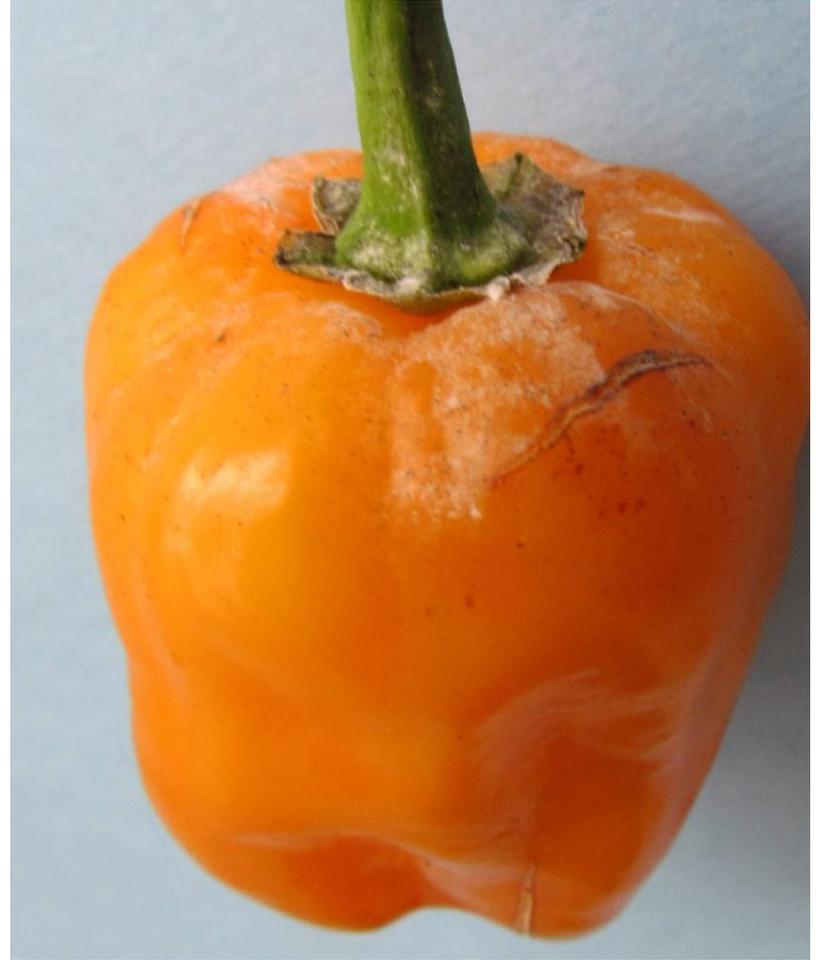


Not sound – physical damage and bacterial infection



Not sound – physical damage and bacterial infection

-clean, practically free of any visible foreign matter;



Not sound – visible chemical residues on surface



Not sound – soil on surface

-clean, practically free of any visible foreign matter;



- practically free from pests
- free from damage caused by pests affecting the flesh;



Not sound – insect damage



Not sound – insect damage

- free of damage caused by low and/or high temperatures.



Not sound - Excessive shrivelling/dehydration



Right – not fresh in appearance

- Intact, the stalk (stem) may be missing, provided that the break is clean and the adjacent skin is not damaged
- Sound, produce affected by rotting or deterioration such as to make it unfit for consumption is excluded
- Firm
- Clean, practically free of any visible foreign matter
- Practically free from pests

- Free from damage caused by pests affecting the flesh
- Free of abnormal external moisture excluding condensation following removal from cold storage
- Free of any foreign smell and/or taste
- Free of damage caused by low and/or high temperatures.

# **“Extra” Class**

Chilli peppers in this class must be of superior quality. They must be characteristic of the variety and/or commercial type.

They must be free from defects, with the exception of very slight superficial defects affecting an area of up to 0.5% of the product surface, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.



Extra Class



Extra Class



Extra Class



Extra Class



Extra Class





Turning colour – not a colour defect



Turning colour – not a colour defect

## **Class I**

Chilli peppers 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:

- a slight defect in shape
- a slight defect in development
- a slight defect in colouring
- slight skin defects affecting an area of up to 2.0% of the product surface



## Class I

slight defect in shape



Class I

slight defect in shape



Top typical shape, bottom: slight shape defect at the tip

# Class I



slight skin defect  
(fine cracking)

# Class I



slight skin defect  
(fine cracking)

# Class I

Slight skin defects



## **Class II**

This class includes chilli peppers that do not qualify for inclusion in the higher classes but satisfy the minimum requirements specified above.

The following defects may be allowed, provided the chilli peppers retain their essential characteristics as regards the quality, the keeping quality and presentation:

- defects in shape
- defects in development
- defects in colouring
- skin defects affecting an area of up to 3.0% of the product surface.



Class II - slight defect in shape



**Class II shape defect ?**



Class II skin defects



Class II skin defects



Out of grade – shape defects



Out of grade skin defects

Size is determined by length of the chilli pepper in accordance with the following table:

<b>Size code</b>	<b>Length (in centimetres)</b>
1	$\leq 4$
2	$4 < 8$
3	$8 < 12$
4	$12 < 16$
5	$> 16$

# QUALITY TOLERANCES



## **“Extra” Class**

5% by number or weight of chilli peppers not satisfying the requirements of the class, but meeting those of Class I or, exceptionally, coming within the tolerances of that class.

# QUALITY TOLERANCES (cont.)



## **Class I**

10% by number or weight of chilli peppers not satisfying the requirements of the class, but meeting those of Class II or, exceptionally, coming within the tolerances of that class.

# QUALITY TOLERANCES (cont.)



## **Class II**

10% by number or weight of chilli peppers satisfying neither the requirements of the class nor the minimum requirements, with the exception of produce affected by rotting or any other deterioration rendering it unfit for consumption.

# SIZE TOLERANCES



For all classes: a total tolerance of 10 per cent, by number or weight, of chilli peppers not satisfying the requirements as regards sizing is allowed.

# UNIFORMITY



The contents of each package must be uniform and contain only chilli peppers of the same origin, variety or commercial type, quality and size.

# UNIFORMITY



However, a mixture of chilli peppers of distinctly different commercial types may be packed together in a sales package, provided they are uniform in quality and, for each commercial type concerned, in origin.

# PACKAGING



The chilli peppers must be packed in such a way as to protect the produce properly.

# MARKING



Identification, nature of produce (pungency), origin and commercial specifications

## Official control mark (optional)



## LEVEL OF PUNGENCY

<b>Pungency</b>	<b>Scoville Units</b>	<b>Total Capsaicinoids (micrograms/gram dry weight)</b>
Mild	900 - 1,999	60 - 133
Medium	2,000 - 19,999	134 - 1,333
Hot	20,000 - 100,000	1,334 - 6,600
Extra Hot	>100,000	>6,600

# INTERNATIONAL STANDARDS FOR PUNGENCY DETERMINATION

INTERNATIONAL  
STANDARD

**ISO  
3513**

Second edition  
1995-05-01

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**Chillies — Determination of Scoville index**

*Piments enragés (dits "de Cayenne") — Détermination de l'indice Scoville*

INTERNATIONAL  
STANDARD

**ISO  
7543-1**

First edition  
1994-12-15

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**Chillies and chilli oleoresins —  
Determination of total capsaicinoid  
content —**

**Part 1:**  
Spectrometric method

*Piments et leurs oléorésines — Détermination de la teneur en  
capsaïcinoïdes totaux —  
Partie 1. Méthode par spectrométrie*

INTERNATIONAL  
STANDARD

**ISO  
7543-2**

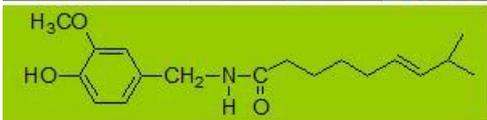
First edition  
1993-07-15

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**Chillies and chilli oleoresins —  
Determination of total capsaicinoid  
content —**

**Part 2:**  
Method using high-performance liquid  
chromatography

*Piments et leurs oléorésines — Détermination de la teneur en  
capsaïcinoïdes totaux —  
Partie 2. Méthode par chromatographie en phase liquide à haute  
performance*



Thank you !