



FACULTY OF ARTS  
Charles University

Department of psychology

Psychophysics

Hot peppers

# SCOVILLE HEAT SCALE

NO, TO SOME, HEAT.



What heat?

HEAT, BUT COMFORTABLE



Oh, that heat.

STARTING TO SWEAT



Uh ohh...

THAT'S QUITE HOT ENOUGH NOW



Ha ha... ha...

ABSURD



THE SCOVILLE SCALE IS THE...

OF A CHILI PEPPER, THE FRUIT OF THE CAPSAICIN WHICH STIMULATES NERVE ENDINGS IN THE SKIN. THE # OF SCOVILLE UNITS INDICATES THE AMOUNT OF CAPSAICIN PRESENT. THE GREATER THE #, THE HOTTER THE PEPPER.

100-500	500-1,000	1,000-1,500	1,500-2,500	2,500-5,000	5,000-15,000	15,000-30,000	30,000-50,000	50,000-100,000	100,000-500,000	
BELL PEPPER	CUBANELLE	ANANEIM	POBLANO ANCHO PASILLA	CASCABEL	JALAPEÑO (MILD) RED FRESNO	JALAPEÑO (HOT) HUNGARIAN HOT WAX	SERPANO DE ARBOL	CAYENNE TABASCO	THAI	HABANERO



ANANEIM PEPPERS \$2.99 CALIFORNIA PULP #4571

YELLOW CAYENNE PEPPERS \$5.99 CALIFORNIA PULP #4772

POBLANO PEPPERS \$2.19 CALIFORNIA PULP #4705

LOCAL FLAVOR \$6.99 CALIFORNIA PULP #4822

SMALL HOT BELL PEPPERS \$3.99 CALIFORNIA PULP #4705



# SHU (Scoville Heat Units)

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Scoville heat units	Examples
1,500,000–3,000,000+	Most law enforcement grade pepper spray, <sup>[20][21]</sup> Pepper X, <sup>[22]</sup> Carolina Reaper, <sup>[23]</sup> Dragon's breath <sup>[24]</sup>
750,000–1,500,000	Trinidad moruga scorpion, <sup>[25]</sup> Naga Viper pepper, <sup>[26]</sup> Infinity chilli, <sup>[27]</sup> Ghost pepper <sup>[28]</sup> <b>VICNIC- 1313</b>
350,000–750,000	Red savina habanero <sup>[29]</sup>
100,000–350,000	Habanero chili, <sup>[30]</sup> Scotch bonnet pepper, <sup>[30]</sup> Peruvian white habanero <sup>[31]</sup>
50,000–100,000	Byadgi chilli, Bird's eye chili (a.k.a. Thai chili pepper), <sup>[32]</sup> Malagueta pepper <sup>[32]</sup>
25,000–50,000	Guntur chilli, Cayenne pepper
10,000–25,000	Serrano pepper, Aleppo pepper, Cheongyang chili pepper
2,500–10,000	Espelette pepper, Jalapeño pepper, New Mexican varieties of Anaheim pepper <sup>[33]</sup>
1,000–2,500	Anaheim pepper, Poblano pepper
100–1,000	Pimento, Banana pepper
0–100	Bell pepper, Cubanelle

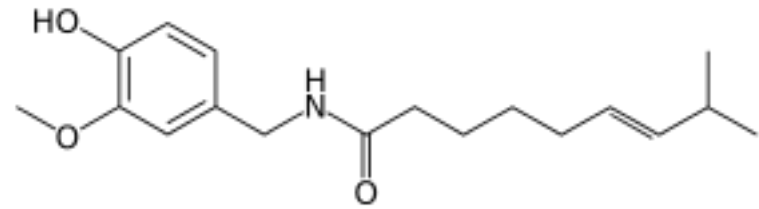
# Hottest peppers

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- Carolina Reaper  
record 2017 - 1,6M SHU (average)
- Pepper X  
Probably 3,18M SHU



# Capsaicin



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- Soluble in alcohol and fats
  - In mammals produces a sensation of burning in any tissue with which it comes into contact
  - Binds to vaniloid receptors
    - Peripheral nervous system, also activated by temperatures above 43C and acids
    - Pain
  - Pure capsaicin corresponds to 16M SHU
  - Today the concentration measured directly (chromatografy, but also other compounds exist...)

# Measuring SHU (Scoville organoleptic test method)

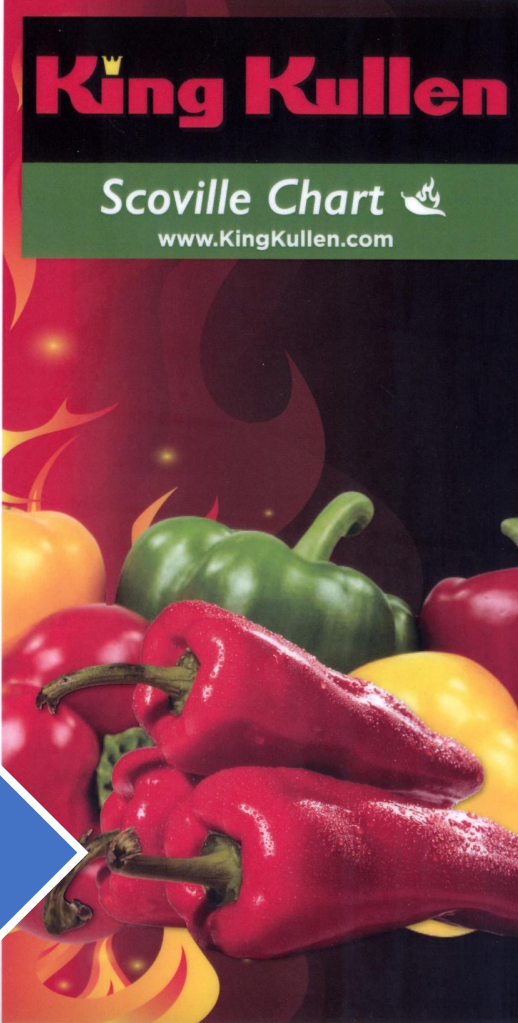
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- Solution of peppers/sugar/water
- Tasters ( $\geq 5$ ), 6x/day!
- SHU the highest dilution of a chili pepper extract at which heat can be detected by a taste panel
- Described 1912, used until 70-80'
- *Sweet pepper* = 0
- *Tabasco* = 2000
- *Jalapeño* = 2500-10000  
i.e. 1 g in 2,5-10 l
- *Kapsaicin* = 16M (1g in 16m<sup>3</sup>)

# How to lower the hottness

- With acid (food, drink)
- With fat (cream, cheese)

Other "pepper" scales exist



Scoville Heat Units	Heat Rating	Pepper Varieties
15-16,000,000	🔥🔥🔥🔥🔥🔥🔥	Pure Capsaicin
2-5,300,000	🔥🔥🔥🔥🔥🔥	Standard U.S. Grade Pepper Spray
2,200,000	🔥🔥🔥🔥🔥🔥	Carolina Reaper
2,009,231	🔥🔥🔥🔥🔥🔥	Trinidad Moruga Scorpion
1,463,700	🔥🔥🔥🔥🔥🔥	Trinidad Scorpion Butch T
800,000-1,001,300	🔥🔥🔥🔥🔥🔥	Bhut Jolokia or "Ghost Pepper"
350,000-575,000	🔥🔥🔥🔥🔥🔥	Red Habanero
250,000-400,000	🔥🔥🔥🔥🔥🔥	White Bullet Habanero
150,000-325,000	🔥🔥🔥🔥🔥🔥	Orange Habanero
100,000-300,000	🔥🔥🔥🔥🔥	Datil
50,000-100,000	🔥🔥🔥🔥🔥	Thai
15,000-50,000	🔥🔥🔥🔥🔥	Pencil Hot
12,000-30,000	🔥🔥🔥🔥🔥	Manzano
8,000-22,000	🔥🔥🔥🔥🔥	Serrano
5,000-15,000	🔥🔥🔥🔥🔥	Hungarian Wax Pepper
5,000-15,000	🔥🔥🔥🔥🔥	Caribe
2,500-10,000	🔥🔥🔥🔥🔥	Red Fresno
2,500-8,000	🔥🔥🔥🔥🔥	Jalapeno
2,500-5,000	🔥🔥🔥🔥🔥	Cherry Bomb
1,000-5,000	🔥🔥🔥🔥🔥	Hatch Chile
500-2,500	🔥🔥🔥🔥	Anaheim
500-2,000	🔥🔥🔥🔥	Padron
1,000-2,000	🔥🔥🔥🔥	Poblano
500-1,000	🔥🔥🔥🔥	Santa Fe
100-1,000	🔥🔥🔥	Italian Long Hot
100-1,000	🔥🔥🔥	Shishito
100-500	🔥🔥🔥	Pepperoncini
0-1,000	🔥🔥	Cubanelle
0 (NO HEAT)	✘	Gypsy Pepper
0 (NO HEAT)	✘	Bell Pepper

# Sources

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- [https://en.wikipedia.org/wiki/Scoville\\_scale](https://en.wikipedia.org/wiki/Scoville_scale)
- <http://people.brandeis.edu/~sekuler/SensoryProcessesMaterial/scovilleScale.html>
- <https://www.thoughtco.com/scoville-scale-organoleptic-test-607386>
- <https://www.fieryfoodscentral.com/2012/01/17/wilbur-scoville-and-the-organoleptic-test-centennial/>