

## History/Traditional Use

**Capsicum** is a genus of flowering plants in the nightshade family Solanaceae. Its species are native to the Americas, where they have been cultivated for thousands of years. Following the Columbian Exchange, it has become cultivated worldwide, and it has also become a key element in many cuisines. In addition to use as spices and food vegetables, *Capsicum* species have also been used as medicines and lachrymatory agents. Capsicum has its beginning since the beginning of civilizations. It is a part of human diet since 7500 BC. The genus Capsicum is one of the first plants being cultivated in the New World with beans (*Phaseolus* sp.), maize (*Zea mays* L.), and cucurbits (*Cucurbitaceae*) [47]. In the sixteenth century, *Capsicum annuum* and *Capsicum frutescens* were widely distributed from the New World to other continents via Spanish and Portuguese traders while the other species are little distributed outside South America [48]. Capsicum was used as a colourant, flavourant, and/or as a source of pungency.



# Capsicum

## *Capsicum* spp.

	Capsaicin content	Dihydrocapsaicin content	Calculated Scoville heat units	Scoville heat units according to manufacturer
Red pepper-based sauce	0.228 mg/mL	0.122 mg/mL	3,420	2500 to 5000
Jalapeno-based sauce	0.069 mg/mL	0.037 mg/mL	1,035	600 to 1200
Habanero-based sauce	0.479 mg/mL	0.067 mg/mL	7,185	7000 to 8000
Cayenne-based sauce	0.046 mg/mL	0.030 mg/mL	690	747
Red pepper-based sauce	0.266 mg/mL	0.039 mg/mL	3,990	3600
Habanero-based sauce	0.323 mg/mL	0.098 mg/mL	4,845	Not stated by manufacturer

Table 1. Results of HPLC analysis of capsaicin and dihydrocapsaicin.



## Pharmacology

The main source of pungency in peppers is the chemical group of alkaloid compounds called capsaicinoids (CAPS), which are produced in the fruit. Capsaicin (C<sub>18</sub>H<sub>27</sub>NO<sub>3</sub>, trans-8-methyl-N-vanillyl-6-nonenamide), is the most abundant CAPS, followed by dihydrocapsaicin, with minor amounts of nordihydrocapsaicin, homocapsaicin, homodihydrocapsaicin, and others. Capsaicin is a white crystalline, fat-soluble compound formed from homovanillic acid that is insoluble in water, odourless, and tasteless [48].

## Chemistry

The red colour of mature pepper fruits is due to several related carotenoid pigments, including capsanthin, capsorubin, cryptoxanthin, and zeaxanthin, which are present as fatty acid esters. The most important pigments are capsanthin and its isomer capsorubin, which make up to 30–60% and 6–18% respectively, of the total carotenoids in the fruit [73]. It is also important for its flavor in many products in addition to its color. Dried chilli is also valued for its contribution to flavor in chilli sauces and chilli powders. The flavoring principle is associated with volatile aromatic compounds and color. As a general rule, when the color of paprika or chilli powder fades, the flavor also disappears [72]. Both volatile and non-volatile substances contribute to its use as flavoring agent [74].

## Botany/Preparation

Capsicum species can be eaten raw or cooked. Those used in cooking are generally varieties of *Capsicum annuum* and *Capsicum frutescens* species [50]. *Capsicum annuum* and *Capsicum frutescens* species contained a wide range of nutritional components and pharmacologically active metabolites. Both species exerted a wide range of pharmacological activities.

## The Scoville Heat Scale

Click each hot pepper to learn more.

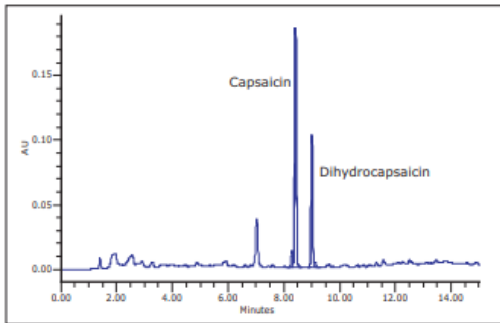
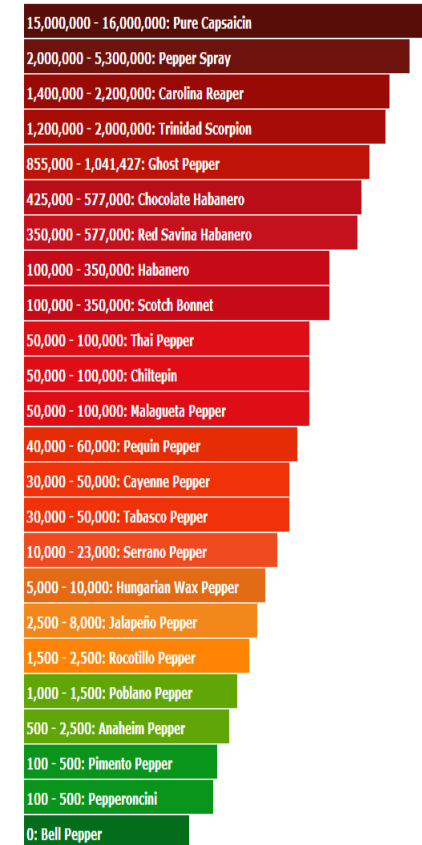


Figure 4. HPLC separation of capsaicin and dihydrocapsaicin from a red pepper-based hot sauce.

## References

<http://www.waters.com/webassets/cms/library/docs/720002753en.pdf>

[https://www.researchgate.net/publication/313678758\\_THE\\_PHARMACOLOGICAL\\_IMPORTANCE\\_OF\\_CAPSICUM\\_SPECIES\\_CAPSICUM\\_ANNUUM\\_AND\\_CAPSICUM\\_FRUTESCENS\\_GROWN\\_IN\\_IRAQ](https://www.researchgate.net/publication/313678758_THE_PHARMACOLOGICAL_IMPORTANCE_OF_CAPSICUM_SPECIES_CAPSICUM_ANNUUM_AND_CAPSICUM_FRUTESCENS_GROWN_IN_IRAQ)