TEMPERATURE
2016, VOL. 3, NO. 1, 39–40
http://dx.doi.org/10.1080/23328940.2015.1111289

Taylor & Francis
Taylor & Francis Group

FRONT MATTER: LETTER

OPEN ACCESS

# Preference for hot pepper: A complex interplay of personal, cultural, and pharmacological effects

## Letter on: Romanovsky AA. Protecting western redcedar from deer browsing—with a passing reference to TRP channels. Temperature 2015; 2:142-9; http://dx.doi.org/10.1080/23328940.2015.1047078

Dear Editor-in-Chief,

Red or green hot pepper of the genus *Capsicum* (family *Solanaceae*) is the most used spice worldwide.[1] Hot peppers owe their pungency to the presence of capsaicin (8-methyl-N-vanillyl-6-nonenamide) and despite their irritating taste qualities, hot peppers are included in hundreds if not thousands of food recipes and as stand-alone food dishes in restaurants and household. The question "why do people living in hot climates consume more hot pepper than those living in the North?"[2] deserves another careful look. It has been suggested that *Capsicum* by virtue of its ability to induce gustatory sweating, lowering body temperature, provides people living in hot climate with a protective mechanism and that is why it is preferentially consumed in hot countries.[1] Gustatory sweating which begins in the face occurs in hot climate when hot spicy food or *Capsicum* rich meal is present in the oral cavity. Gustatory sweating, however, is unpleasant sensory experience, and thus is unlikely to account for the popularity of *Capsicum* in some countries. I am also not aware of studies in humans demonstrating decreased core temperature after a *Capsicum*-rich meal.

The evolutionary hypothesis by Sherman and Billing[3] suggests that spices were originally added by humans to meat-based recipes for killing bacteria and thus protect against food borne illnesses, a tradition that continued to this day. Spices including chilli were present in recipes from 36 countries with mean annual temperature between 2.8°C (Norway) to 27.6°C (Thailand) and in hotter countries, recipes contained more pungent spices.[3] The colorful *Capsicum* fruits (yellow, orange, red, green) are attractive to all of us. What makes the irritant and pungent *Capsicum* so popular? The hypothesis of masochism or thrill-seeking behavior has been suggested by Rozin and Schiller[4] to account for ingesting hot peppers among Mexican adults. This means the pleasure gained from being involved in a risky act or behavior; in this case ingestion of hot pepper, an irritant and burning food. The authors also strengthened a role for social settings in encouraging chilli intake and also as an indicator of being a grown up person.[4] The chemesthetic stimulus (the hot or burning taste sensation) evoked by *Capsicum* fruit in the oral cavity is due to activation of thermoreceptors, nociceptors and somatosensory recep-tors. Afferent information arising from these sensory receptors is relayed to the brain for information processing. Thus perceiving eating *Capsicum* as pleasurable by one, will lead to more frequent intake. Byrnes and Hayes[5] found a strong association between liking of spicy foods, frequency of chili consumption, and higher sensation seeking and sensitivity to reward traits. This highlights the importance of personal factors in spicy food liking.

Peppers, chilli or paprika are a native of the new world i.e., Mexico and Central and South America and were introduced to Europe only after Columbus. Later *Capsicum* arrived in Africa, Southern Asia, and the Far East.[1] A number of medical and surgical papyri (from the leafs of *Cyperus papyrus*) that survived thousands of years indicated that the use of herbs in treatment of different human aliments flourished in ancient Egypt. The "Ebers" medical papyrus" which dates to ~ 1550 BC lists many herbal prescriptions for treating numerous medical conditions.[6] *Capsicum* was not mentioned in any of these papyri, keeping in mind that Queen Hatshepsut (1473–1458

B.C.) commissioned an expedition to Somalia which returned laden with a variety of plants and trees. *Capsicum* species appear thus not indigenous to Africa.

Peppers are more sensitive to cool, wet weather and the fruit set of peppers fails at temperatures below means of 16°C (60°F) or when temperatures increase to above 32°C (90°F). Maximum set of bell peppers requires stable temperatures of 16°-21°C (60°-70°F). Thus, peppers grow well in warm climates and need a long growing season. Nowadays, they are cultivated in the tropical and subtropical areas of the world.[7] In 2004, the main producers of these edible pungent fruits were India, China, Bangladesh, Ethiopia, Pakistan, Vietnam, Myanmar, Mexico, Hungary, and USA. Interestingly, these countries were also major consumers of *Capsicum* in the world.[8]

*Capsicum* grows in warm climate, and the fruit for sure have been used there to add flavor to food, stimulate appetite or it might have been used in remedies in ancient communities living in China, Mexico, South and Central America. Inhabitants of warm countries might also have found that the edible *Capsicum* fruit helps swallowing, increases appetite, changes the taste quality and intensity of accompanying food, and these traditions persisted till today. In Egypt, where I live, and with a mean annual temperature of 25°C, sometimes above 40°C in summer time, red and green peppers grow well and are available most of the year. Both hot and sweet varieties are available, but people use the sweat pepper in cooking and hot peppers are added only for flavor or making food a little bit hot. Hot peppers are also consumed for stimulating appetite, killing bacteria, and/or laxative action but not for their oral burning sensory quality. They are usually are added to salad, sandwiches, fried in oil or pickled to avoid much oral irritation. It seems likely in this case that capsaicin concentrations are those eliciting warm and not hot or burning sensation. Thus, culture might have determined to a large extent the consumption pattern of hot pepper and the popularity of *Capsicum*-based foods in certain parts of the world and not the effect of capsaicin on thermoregulation. This might explain why cuisines of tropical countries contain more *Capsicum* than those in northern countries.

## References

[1] Lembeck F. Capsaicin: past, present and future. Acta Physiol Hung 1987; 69:256–73; PMID:2444065.
[2] Romanovsky AA. Protecting western redcedar from deer browsing—with a passing reference to TRP channels. Temperature 2015; 2:142–9; http://dx.doi.org/10.1080/23328940.2015.1047078
[3] Sherman PW, Billing J. Darwinian gastronomy: why we use spices. Spices taste good because they are good for us. Bio Sci 1999; 49:453–63; http://dx.doi.org/10.2307/1313553.
[4] Rozin P, Schiller D. The nature and acquisition of a preference for chili pepper by humans. Motivation and Emotion 1980; 4: 77–101; http://dx.doi.org/10.1007/BF00995932.
[5] Byrnes NK, Hayes JE. Personality factors predict spicy food liking and intake. Food Qual Prefer 2013 28: 213–21; PMID:23538555; http://dx.doi.org/10.1016/j.foodqual.2012.09.008.
[6] Leake CD. The Old Egyptian Medical Papyri, Logan Clendening Lectures on the History and Philosophy of Medicine, Second Series. 1952, Lawrence, KAN: University of Kansas Press.
[7] Yamaguchi M. Solanaceous Fruits: Tomato, Eggplant, Peppers, and Others. In: World Vegetables.The AVI Publishing Company, Inc. 1983, pp. 291–311.
[8] FAOSTAT statistical database. Food and Agricultural Organization of the United Nations, Rome, 2006. Available at http://faostat3.fao.org.

Omar M.E. Abdel-Salam

*Department of Toxicology and Narcotics*
*National Research Center, Tahrir St., 12311*
*Dokki, Cairo, Egypt*
omasalam@hotmail.com