TEMPERATURE
2016, VOL. 3, NO. 1, 50–51
http://dx.doi.org/10.1080/23328940.2015.1131033

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FRONT MATTER: LETTER

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It remains a mystery why people living in hot climates consume spicier food

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

Dear Editor-in-Chief,

I am writing this Letter in reply to the puzzle in your recent editorial[1]: "Why do people living in hot climates like their food "hot" (spicy) whereas most cuisines under more temperate climates are relatively bland?" Chili pepper is one of the oldest domesticated plants cultivated in present day Latin America. Archeological evidence discovered `in the Valle de Tehuacan (an early settlement in Mesoamerica) indicates that the consumption of chili peppers dates back to the 7th millennium BC, long before the cultivation of maize and beans. Ancient ancestors of native people cultured the wild chili piguin and selected the varieties known today.

During his first expedition to the New World (1492-1493), Columbus noted that the natives added a colorful red fruit called *aji* or *axe* to most of their dishes. Chili peppers were introduced to Europe by the Spanish sailors, from where it rapidly spread to China, India, Thailand, Korea and Turkey. Chili consumption is on the rise worldwide. Between 1991 and 2001, global consumption of dry chilies had more than doubled. Yet, striking geographical differences exist in chili consumption. The daily consumption of chili pepper can be as high as 15 g per person in Mexico and Korea. At the other end of the spectrum are the Northern European countries where the daily red pepper consumption is less than 1 g per person. Of note, approximately 3 mg of capsaicinoids are present in 1 g of dried red chili pepper.

Upfront, one has to emphasize that there is no evidence-based scientific explanation to answer the question addressed in the title of this paper. Indeed, there may be more than one answer. My suggestions are the following:

Historically, humans eat plants that can easily be grown in their habitat. Chili peppers were domesticated in Mexico and they favor a hot and arid environment. Of course, later people were able to set these conditions at other places for pepper cultivation by human activities like irrigation, changes of chemical composition of soil, fertilization, and growing the plants in green houses.[2] In countries where chili peppers are abundant, they are introduced to the diet at a young age and become part of the staple food.

From the clinical practice, it is well-known that a good equilibrium exists between the amounts of consumed quantities of food components and healthy human adaptations. Lactose consumption is a very simple and broadly recognized example of this principle. Most adults tolerate lactose well; however, in a small percentage of the population this food component can produce very unpleasant clinical symptoms (such as bloating and diarrhea) in a relative short time after cessation of lactose consumption. Interestingly, this lactose intolerance can disappear upon gradual increase of lactose intake. This process can be characterized by enzyme adaptation. One can speculate that people living in tropical climates tolerate chili pepper much better (past of staple food from an early age) than those who experience spicy food for the first time much later in life.

Although capsaicin is the major pungent principle in hot peppers, these plants also contain a number of capsaicin homologues (dihydrocapsaicin, nordihydrocapsaicin, homodihydrocapsaicin, and homocapsaicin) and analogs (nonanoidacid vanillyamide and decanoidacid vanillylamide), collectively referred to as "capsaicinoids." In addition, non-pungent capsaicin congeners (so-called "capsiates") contribute to the flavor of the pepper pod.

Interestingly, we have no concrete knowledge of the exact chemical composition of capsicum plants in hot versus cold climates.[3,4] Therefore, it is not impossible that chili peppers grown in the tropics taste better than those cultivated in cold environment.

From the pharmacological research it is well known that capsaicinoids dose–dependently modify the function of capsaicin-sensitive afferent nerves: at low doses they cause stimulation (perceived as a burning or itchy sensation), meanwhile at higher doses they produce inhibition (traditionally referred to as "desensitization"). If so, one may argue that people in hot climates have to eat more pepper because their oral mucosa is perpetually desensitized due to the constant exposure to capsaicin.[5]

In experimental animals, capsaicin acutely lowers the body temperature. There is some evidence that it may also be true in humans ("gustatory sweating"). A subjective cooling effect would be clearly beneficial for people living under hot climates.[6,7]

In summary, this puzzle remains unsolved. Combined, the above mentioned factors may shed some light to this mystery of capsaicin.

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