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FRONT MATTER: LETTER

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Why do people living in hot climates like their food spicy?

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,

This is a reply to the puzzle published in your recent editorial.[1] To begin we note that spices are defined as an aromatic or pungent substance used to season food or as a condiment, presumably to potentiate its flavor.[2,3] Among the most commonly used spices are onion, black and white pepper, chili pepper, garlic and ginger.[4] To initially address the question of why people in hot climates (compared to cooler climates) prefer their foods spicy (more zestful) we first will summarize the seminal study of Billing and Sherman.[5] They studied the spices used in recipes from traditional cookbooks of meat-based cuisines in 36 countries. They also compiled information on the temperature and precipitation in each country, the ranges of spice plants, and the antibacterial properties of each spice. They eliminated the following hypotheses: that spices provide macronutrients, disguise the taste and smell of spoiled foods, increase perspiration and thus evaporative cooling, or is not at all beneficial. They also showed that people use spices that are not grown locally. They concluded, that the reason more spices are used in hot climates is because of their antibacterial properties that rid foods of pathogens and thereby contribute to people's health, longevity and reproductive success.

Since bacterial growth is temperature dependent, the antimicrobial hypothesis is attractive[5]; at least in olden times. However, this hypothesis does not explain why this hot–cold eating pattern still persists in the age of refrigeration. Nor did it take into consideration that animal products are more liable to bacterial growth than plant products and cultures in hotter climates consume more plant products (rice, beans and corn) than persons in more northern climates that consume more animal products (meat and cheese). Here we propose that, even in this age of globalization, cultural considerations and the fact (for good reasons) that humans are hesitant to try new foods explain why persons that live in hotter climates spice their foods (with chili, ginger, etc.) to a greater extent than persons that live in cooler climates. For example, contrast the rather comparatively bland cuisines of England and Germany with the zestful and colorful cuisines of Mexico or southern India.

The persistence of this eating pattern can be best understood by noting that humans are omnivores also known as food "generalists." (An example of a food "specialist" is a panda that eats only bamboo leaves). In order to obtain sufficient nutrients our digestive systems permit us consume and digest a wide variety of foods. However, not all foods are safe to eat, thus we need to solve 2 problems, also known as the "paradox of the omnivore".[6] First, some foods might contain natural poisons (or get spoiled) and second, we need to keep constantly experimenting with novel foods to avoid food becoming boring. Evolution has helped address these problems by programming us to accept sweet tasting foods and avoid bitter tasting foods, many of the latter which may contain alkaloids (e.g., atropine, strychnine).[3] However, unlike most animals, we can even learn to eat foods that your body informs you are harmful. The best example is capsaicin, the pungent compound in chili pepper that produces pain. Indeed, your body responds to putting it in your mouth by increasing salivary secretions to dilute it and get rid of it.[7] Nevertheless, we learn to not only overcome our instinct to reject it, we learn to like and accept it.[4,6]

Our interaction with food is intimate since it involves the incorporation of external objects into the body. As noted by Elisabeth and Paul Rozin, "such an interaction must be both extremely satisfying and extremely threatening." So for any generalist animal species, like humans, trying *new foods* is a serious problem. Unlike animals who display a strong neophobic response to novel foods, that is until learning it is safe, human beings use a more sophisticated mechanism to solve the omnivore paradox -called *culture*. Our culinary culture determines not only what foods are allowed, but also how to prepare and season them. This knowledge is socially transmitted generationally and is resistant to change, although it maintains a gradual incorporation of novel food items, without losing the distinctive flavor that makes each culinary cuisine unique. It follows that the introduction of new foods into a culture must be done slowly. For example, the introduction of spicy foods into a culture not used to them is done with significantly lower amounts of spices than is found in the original culture.[4] This we have all experienced in going to Chinese or Mexican restaurants where the food isn't as spicy as it is in the native culture.

Finally, to avoid food from becoming boring humans use combinations of ingredients, most frequently spices. This gives a characteristic flavor to each culinary cuisine (for example the use of hot peppers "salsa" in Mexican cuisine, or garlic-olive oil combination in the Italian cuisine to name a few). This familiar flavor signature could prevent foods from becoming boring by permitting people to try foods but that are otherwise novel to their culinary culture.[6] Since this flavor is certified by the culture, it is considered familiar enough and safe to eat.[6] In summary, we suggest that the reason why people living in hot climates like their food spicy, is not presently for its historical antimicrobial properties, but because it is basically rooted in their culture.

References

[1] 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

[2] Prescott J, Stevenson RJ. Pungency in food perception and preference. Food Rev International 1995; 11:665-98; http://dx.doi.org/10.1080/87559129509541064

[3] Simon SA, de Araujo IE, Gutierrez R, Nicolelis MA. The neural mechanisms of gustation: a distributed processing code. Nat Rev Neurosci 2006; 7:890-901; PMID:17053812; http://dx.doi.org/10.1038/nrn2006

[4] Green BG. Chemesthesis: Pungency as a component of flavor. Trends Food Sci Technol 1996; 7:415-20; http://dx.doi.org/10.1016/S0924-2244(96)10043-1

[5] Billing J, Sherman PW. Antimicrobial functions of spices: Why some like it hot. Q Rev Biol 1998; 73:3-49; PMID:9586227; http://dx.doi.org/10.1086/420058

[6] Rozin E, Rozin P. Culinary themes and variations. Natural History 1988; 90:2-14.

[7] Carstens E, Iodi Carstens M, Dessirier J-M, O'Mahony M, Simons CT, Sudo M, Sudo S. It hurts so good: Oral irritation by spices and carbonated drinks and the underlying neural mechanisms. Food Quality Preference 2002; 13:431-43; http://dx.doi.org/10.1016/S0950-3293(01)00067-2

Ranier Gutierrez

Laboratory of Neurobiology of Appetite, Department of Pharmacology
CINVESTAV-IPN, 07360, Mexico City, Mexico

Sidney A. Simon

Department of Neurobiology Duke University Medical Center
Durham, 27710, NC, USA
sas@neuro.duke.edu