Why We Cook with Spices
Preventative Darwinian Medicine
Professor Paul W. Sherman, Cornell University, USA

In 408 AD, Alarich (leader of the Goths) laid siege to Rome; As ransom, he demanded: 5,000 pounds of gold and 3,000 pounds of pepper.
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Famed Early Explorers for Spices

- Marco Polo (Italy)
- Christopher Columbus, Hernando Cortez (Spain)
- Pedro Cabral, Vasco Da Gama, Ferdinand Magellan (Portugal)

“Spice” is not a scientific, but a culinary term

“Spices are ’any dried, fragrant, aromatic, or pungent vegetable or plant substance, in the whole, broken, or ground form, that contributes flavor, whose primary function in food is seasoning rather than nutrition, and that may contribute relish or piquancy to foods or beverages” (Farrell 1990, p.17).
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Why Are Spices Used?

Proximate
They enhance the flavor and palatability of food

Ultimate
Why do people find foods more tasty when they are flavored with plant secondary compounds? Why do such preferences vary from place to place?
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How Children Often Respond to Spices

How Women Early in Pregnancy Often Respond to Spices

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Ingredients
Chicken: 2 Lbs. (wash & cut into pieces)
Fresh green peas:
green and red bell pepper: 1/4 cup
Garlic: 4-6 cloves (minced)
Tomatoes: 4-6
Small baby potatoes: 7 boiled and peeled
Onion: 1 (chopped)
Ginger: 1 inch piece
Green chilies: 5
Coconut milk: 1 1/2 cups

Other Spices -
Cinnamon: 1 piece
Bay leaves: 2
Cloves: 2
Black peppercorns: 1 tsp.
Turmeric powder: 1/2 tsp.
Garam masala powder: 1/2 tsp.
Mustard seeds: 1/2 tsp.
Chili powder: 2 teaspoons
Garam masala: 1 tsp
A bunch of curry leaves (optional)
Salt to taste

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The Sample

We quantified the frequency of use of all spices (n = 43) in the meat-based cuisine of all countries (n = 36) for which we could locate "traditional" cookbooks. We analyzed 4,578 recipes from 93 cookbooks.
The Antimicrobial Hypothesis

Cooking with spices confers a health benefit: cleansing foods of pathogens before consumption

Predictions of the Antibiotic Hypothesis

1. Spices should kill or inhibit growth of food-spoilage microorganisms
2. Spice use should be heaviest where unrefrigerated foods spoil quickest (e.g., hot climates)
3. The most potent spices should be used where foods spoil quickest
4. Concentrations of spices in recipes should produce antibiotic effects; cooking should not destroy the effects
5. Spices used most frequently in a country should be particularly effective against local bacteria
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“Target” Bacteria (n=30)

Acinetobacter baumannii
Acinetobacter calcoaceticus
Acinetobacter nosocomialis
Acinetobacter pittii
Acinetobacter streetii
Acinetobacter weissei
Alcaligenes faecalis
Alcaligenes latus
Alcaligenes tolu GC
Bacillus circulans
Bacillus megaterium
Bacillus subtilis
Bacillus thuringiensis
Bacillus velezensis
Bacillus univitilis
Bacillus pumilus
Bacillus enterococci
Bacillus halodurans
Bacillus licheniformis
Bacillus subtilis
Bacillus tolu GC
Bacillus velezensis
Bacillus univitilis
Bacillus pumilus
Bacillus enterococci
Bacillus halodurans
Bacillus licheniformis
Bacillus subtilis
Bacillus tolu GC
Bacillus velezensis
Bacillus univitilis

Proposition of Bacteria

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Antimicrobial Hypothesis Corollary

Spice use should be heavier in meat dishes than vegetable dishes

- Meat is a better nutrient medium than vegetables; meat spoils faster
- Many vegetable dishes are protected from spoilage by phytochemicals in the ingredients
Antimicrobial Hypothesis Corollary #2:
Spice Use Should Be Heavier at Low Elevations than High Elevations

Foodborne pathogens are more diverse and numerous in lowlands (which tend to be hot and humid) than in mountainous regions (which tend to be cool and dry)
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Cooking with Spices
An Example of Preventative Darwinian Medicine
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