

Contents

Contents	i
Glossary	iii
Acronyms	v
Symbols and Notation	vii
1 Introduction	1
1.1 Definitions	4
2 Background	7
2.1 Literature Review	7
2.1.1 On Spices	7
2.1.2 On Plants and Plant Names	9
2.1.3 On Food and Foodways	9
2.1.4 On Trade	9
2.1.5 On Medicine and Healing	11
2.1.6 On the Role of Spices Through Time	13
2.1.7 On Food and Language	13
2.2 Research Gap	14
2.2.1 Research Questions	15
2.3 Theoretical Framework	15
2.3.1 Wanderwörter	15
3 Methodology	17
3.1 Research Design Principles	17
3.1.1 Identification, Confusion, Adulteration, Clarification	18
3.1.2 Challenges in Spice Categorization	19
3.2 Data Collection	21
3.2.1 Collecting Spices	21
3.2.2 Collecting and Annotating the Names	22
3.2.3 Collecting Etymologies	25
3.3 Sources	25
3.3.1 Primary Sources	25
3.3.2 Etymological Dictionaries	26
3.3.3 Reference Dictionaries	26

3.4	Corpora	26
4	The Diffusion of Spices	29
4.1	The Geographic Distribution of Spices	29
4.2	The Spreadability of Spices	31
4.3	The Linguistic Diffusion of Spices	35
4.3.1	Borrowings: Loanwords and <i>Wanderwörter</i>	35
4.3.2	Spatial Trajectories: Tracing Spice Terms Around the Globe	37
4.3.3	Temporal Trajectories: The Attestation of Spice Words	39
4.4	The Donor Languages	46
5	The Names of Spices	49
5.1	Overview: Spice Names in Numbers	49
5.2	The Analysis of Spice Nomenclature	51
5.2.1	Analyzability and Structure	52
5.2.2	Spice Term Anatomy: Prototypes and Distinguishing Words	53
5.3	The Case of Star Anise	57
6	The Language of Spices	61
6.1	The Case of Pepper	61
6.1.1	The Distribution of Pepper	61
6.1.2	The Diffusion of Pepper	63
6.1.3	The Role of Pepper in English: A Brief Contemplation About Spiciness . . .	65
6.2	<i>Pepper</i> as a Lexical Item	66
	Conclusion	69
6.3	Future Studies	69
	Primary Sources	71
	Bibliography	73

Glossary

Ayurveda	traditional Indian medicine 13
bencao	本草, the Chinese term for <i>materia medica</i> , books that record the sources and applications of medicinal materials ¹ 12
Glottolog	comprehensive reference information for the world's languages, especially the lesser known languages 61
materia medica	an encyclopedic treatise of medicinal substances of the plant, animal, and mineral kingdoms 12
pharmacopeia	... 12
Shiwu Bencao	食物本草 [Materia Medica of Food] — Ming (1621) 32
taxon	taxonomic group or unit, esp. when its rank in the taxonomic hierarchy is not specified (back-formation from 'taxonomy', it refers to a group or species as a unit in biology.) 21
Wanderwort	a word borrowed from one language to another across a broad geographical area often as a result of trade or adoption of newly introduced items or cultural practices ² 3

¹Z. Zhao et al., [2018](#).

²Merriam-Webster, [n.d.](#)

Acronyms

BHL	Biodiversity Heritage Library 22
BNC	British National Corpus 36
CBETA	Chinese Buddhist Electronic Texts Association 27
CTP	Chinese Text Project 27
EHBC	English Historical Book Collection 27
FoC	Flora of China 22
GBIF	Global Biodiversity Information Facility 22
IPNI	International Plant Names Index 22
KSUCCA	King Saud University Corpus of Classical Arabic 27
MC	Middle Chinese 17
MW	Merriam-Webster's Unabridged Dictionary 4
OED	Oxford English Dictionary 4
POWO	Plants of The World Online 22
PWN	Princeton WordNet 19
QTS	Quan Tangshi 全唐詩 [Complete Tang Poems] 27
SCB	Serbian-Croatian-Bosnian 32
SkE	Sketch Engine 27
SS	Scripta Sinica 27
TCM	Traditional Chinese Medicine 12
TPL	The Plant List 22
WALS	The World Atlas of Language Structures 61
WFO	World Flora Online 22
WOLD	The World Loanword Database 52

Symbols and Notation

*	reconstructed form
<	developed from
>	developed into
<?	uncertain development
†	obsolete
a.	<i>ante</i> , attested before the year
ca.	<i>circa</i> , around the year/century
<i>fragrance</i>	italic: lexical item, a word or phrase
[fragrance]	square brackets: gloss, literal meaning
'fragrance'	single quotation marks: meaning, sense
FRAGRANCE	small capitals: a concept

Introduction

UNDERSTANDING the language of spices is a key to open a door to this world. A door that leads to the realization that our cultures—and our foods—are deeply interconnected, and that they have been so for thousands of years. I will try to demonstrate this by introducing these fascinating substances from a new perspective, the perspective of language. It is trendy nowadays to talk about *foodways*, a term that refers to “the eating habits and culinary practices of people, regions, or historical periods” (Allen et al., 2013, vol. 2, p. 289), and food history, a relatively young interdisciplinary academic field is starting to gain traction as well, but the connections between language and food are one of the most interesting examples of contemporary humanities research I have come across Jurafsky (see 2014). There is a segment of this topic—the spice domain—which encompasses products that have had profound effects of human imagination, culture, and history. Although overshadowed by the serious and heavy questions of nutrition, scientific research on spices was never a fringe field; it is enough to look at the many pharmacological studies that dive into the chemistry of these materials to see that people are still interested in their health effects, as much as their taste and aroma.

As spices are not a necessity to human survival, but rather constitute an enthralling phenomenon that can be studied from many angles, research on spices has been embraced by many historians, a few botanists and literary critics, and countless culinary enthusiasts. It may be so that spices are not vital for humans, but sustenance itself is just enough to maintain life, not to enjoy it or live it to the fullest. Spices today represent the excitement, the vigor, as it is so clear from expressions in our language: to *spice up* your life is to enliven it!

Original Contribution

This thesis aims to do a systematic investigation on spice names and related terminology, including products that were used (or still being used) medicinally, as incense, or as perfume. Aromatics that were at some point considered spices, have been traded and transported across long distances since antiquity and before, and the most coveted ones have slowly dispersed throughout the globe. Spices and the spice domain as a topic are usually discussed within the broad areas of history, botany, chemistry, and gastronomy, all concerned by very different aspects of these materials. To the best of my knowledge, there is no academic work that puts the field of linguistics in focus when discussing spices as a whole, and so this project is a unique contribution to our linguistic knowledge about the spice domain.

But why should anyone care about spices and their names? Because exploring the names of the products of the spice trade—traveling on vast networks of historic trade routes such as the Silk Road (small volume of trade), and its nautical counterpart the Maritime Silk Road (large volume of trade)—helps us to map and better understand linguistic contact and cultural exchange. These ever-

expanding trade networks, first regional, later connecting East and West were a precursor to today's globalized, interconnected world, and one of their most lucrative products was dried plant-matter. These aromatic substances were lightweight, easy to transport, and resistant to spoilage. And, of course, they were highly valued for their fragrant and pungent properties, and their reputed—both putative and real—benefits for the human body and soul. Exotic and rare spices and their role in rituals, medicine, and later cuisine made them sought after. The spice business inspired people to trade, travel, explore, and wage wars. Spices are important in world history as they are directly responsible for discoveries, colonization, and the birth of capitalism. We know a great deal about the nature of spices thanks to botanists and naturalist, their medicinal effects thanks to pharmacists and chemists, and their uses and culinary values thanks to experts of gastronomy. There is also a vast literature on the story and spread of spices thanks to researchers of history, but the careful study of their names is often neglected. This work was born due to a fascination with the global journey and etymology of spice words, in the “true sense” of the word etymology.

Problem Statement

Soon, my attention slightly shifted towards a problem that could be best described by a lack of consistent and comprehensive understanding of spice names. The absence of proper research regarding spice terminology results in a lack of a standard, and decline of trust in secondary literature. Authors often give misguided and contradicting information regarding the origins of a name, or speculate on their meaning. There are no two authors that use the same set of names when discussing a spice, which in itself is not a problem in most cases, but it leads to problems in case of lesser known or exotic items. There is a great deal of confusion on names and identities in the spice literature, especially in lay areas aimed at the general public, such as popular histories or guidebooks. The reasons for this are several. Firstly, the experts of herbs, spices and other aromatics are chiefly botanists, food industry professionals, chemists, chefs and food writers, merchants and historians. Most people in research related to spices focus on aspects of the products other than their names: from plant morphology, chemical composition, and pharmacological effects, to social and cultural histories, their symbolism in literature, not to mention the myriad of ways on how to buy, store, mix, and use spices in creative recipes discussed by the handy spice encyclopedias tailored for gastro-enthusiasts. Relatively few linguists devoted their time and attention to trace spice origins. In short, the topic of spices requires a highly multidisciplinary expertise, and when a plant taxonomist writes about linguistics, or a culinary writer approaches history, some mistakes are due.

Secondly, there is no agreed upon inventory or reference work of spice names to cover the multitude of spices that exist, and their many names in various languages; least of all a complete list of *all the spices*. Truthfully that seems rather impossible, or at least quite a daunting task to embark on. Although the internet nowadays is full of compact guides and indices of spices assembled by people who are fascinated with spices and their colorful uses listing their names in many languages, these are not always trustworthy, and often cite no sources. Similarly, blogs and articles are most often than not dubious, and almost always require fact checking, as many are just permutations of historically

inaccurate anecdotes and origin stories. Until today there is no comprehensive treatise on spice terms within academia, and no database that focuses on, clarifies, explains, or compares their names.

This is not to say that there is no work done on spice terminology, there are a number of high quality writings from philologists, linguists, and historians well versed in one or more relevant linguistic and cultural area. The problem is that this kind of research requires a highly specialized knowledge, and in result the information already out there is sporadic, less accessible, and grossly unorganized. Key pieces of information are often hidden between the pages of books on traditional philology, literary critique, botany, medicine, economic history, and archaeology of a given region. Not to mention the many old works that are the primary sources for the aforementioned publications. Consequently, since little effort have been made to collate the data, there is a chasm between the critically researched reliable information and what the end user—whether it is a fellow researcher or a spice zealot—can easily access.

Goals

The original goal in the beginning of this work was to gather and augment the existing information about spice names, their origins, and track their diffusion on spatial and temporal trajectories. This still constitutes the core of this thesis, and I hope to achieve this by combing through the existing literature and collecting the names of spices, amending the gaps, and correcting possible errors on the way. Doing so, the result should be a carefully researched compendium of spice names, grounded in philology and linguistics, but with the awareness of what spices are to botany, and what their role was in history. ?? presents this process and displays the data seriatim, in a linear manner.

This procedure shall manifest in a dataset of spice names, with complete lexicographical annotation including etymological information and attestation dates. This in turn, would allow me to trace the words and track the linguistic diffusion of spices through space and time, which is then can be discussed hand in hand with the physical spread of the materials. Eventually, the mapping of the spices will be the basis for a discussion on the implications of linguistic and cultural contact, and exchange, and it makes up chapter 4 This chapter ties well together with the concept of *Wanderwörter*, ‘wandering loanwords’, a phenomenon known in the field of historical linguistics related to the topic of borrowing and material culture.

In addition to this, the data of spice names will also be the basis of a linguistic analysis, focusing on the characteristics of terms themselves presented in chapter 5. This part will include a deep dive into how spice names are created or borrowed, how prototype items beget prototype words to generate new names for novel items of trade, and into the mechanisms and motivations of linguistic acculturation and spice name propagation.

Finally, spice names will be discussed according to their role in daily language, how spice words entered the lexicon and what is their role in metaphors and idiomatic expressions. This is to trace spices’ embeddedness in a culture, and to see how significant they are in the everyday human experience, as can be seen in chapter 6.

1.1 Definitions

The first step is to clarify what is meant by spices. According to the *Oxford English Dictionary* (OED), the definition of *spice* is as follows: “One or other of various strongly flavoured or aromatic substances of vegetable origin, obtained from tropical plants, commonly used as condiments or employment for other purposes on account of their fragrance and preservative qualities.” Similarly, the first meaning for *spice* as a noun in *Merriam-Webster’s Unabridged Dictionary* (MW) is “any of various aromatic vegetable products (such as pepper or nutmeg) used to season or flavour foods”. The Wikipedia entry on *Spice* gives slightly more information, hinting on which plant parts are frequently used as spices and mentions their food-coloring properties, while also—very appropriately—ventures beyond the culinary stance of usual dictionary definitions, stating that “spices are sometimes used in medicine, religious rituals, cosmetics or perfume production.” This notion is much more important than expressing it with a mere ‘sometimes’ could imply as we will see; before modern times, spices were much more important for the medicinal properties.

There is no universal definition on what a spice is; botany, pharmacology, gastronomy, and history all have different perspectives. However the idea about “spices” that the reader currently has in mind, is bound to be a culinary one. Some authors try to give a definition according to plant morphology, Czarra (2009, p. 9) writes about “an aromatic part of a tropical plant”, and goes on to mention bark, flower, root, and seed. Turner (2004, p. xix) adds gum and resin, fruit, and stigma to this listing. For a full picture, we must complement it further, as spices can come in many forms: dried tree barks (cinnamon, cassia); twigs (cassia twigs); flower buds (cloves); stigmas or styles (saffron); fruits (pepper, chili); fruit walls or pericarps (star anise); berries (allspice, juniper); seeds (nutmeg, coriander); seed coverings or arils (mace); seed pods (cardamom, vanilla); and roots and rhizomes (ginger, turmeric). Technically, every dried part of a plant can be referred to as spice, except the leaves. The green leaves — fresh or dried, but mostly used fresh — are considered herbs, and they are used for similar purposes to spices nowadays: flavouring, seasoning, garnishing. Dried leaves of herbs can be categorized as “spice herbs” (see van Wyk, 2014). The category of herbs can be problematic, because there is a botanical definition, and also a culinary definition, and the literature often confuses the two. Botanically, a herb is an annual?? plant that has a soft stem, while a culinary herb is is where the leaves are used in food preparation, similar to a medicinal herb...

O’Connell (2016, p. 9) backs this view in his informative compendium, but also cites Rosengarten (1975, p. 16, as cited in O’Connell, 2016), who maintained that it is “extremely difficult to determine where a spice ends and a herb begins”. According to him, culinary herbs are just one group of spices. Along these lines, Britannica (n.d.) for example treats herbs and spices in a single entry. The above distinction – that herbs are the greens and spices are every other (dried) parts of a plant – is essentially nonsense to a botanist since it echoes the needs of a chef. We can give examples for both spice and herb from the same species: coriander seeds and coriander leaves (also called cilantro or Chinese parsley in the US) are both from the plant *Coriandrum sativum*. Another often mentioned difference is that herbs are soft stemmed, annual plants that die each year, in contrast to woody, spice yielding trees or bushes. This, on the other hand, is a botanical definition, and not very useful for

somebody active in the culinary arts (Allen, 2012, p. 10). Moreover, most plants we consider herbs grow in temperate climates, while spices tend to grow in tropical regions (Turner, 2004), a further classification on botanical basis. Herbs can also be categorized into culinary and medicinal herbs, and in both cases, the leafy, green parts of foliage are used for their aroma and flavour, and supposed health benefits, respectively. Defining spices and herbs is difficult because the definitions vary by discipline, depending on the needs of the expert: the gardener, the herbalist, the chef. In the present study, we focus on dried – mostly plant-based – aromatic commodities that traveled long distances due to trade and were at certain points in history considered a desired commodity or even a luxury. This is basically the definition of the historian, where the implications of climate and remoteness translated as value; spices were a produce difficult to obtain, and thus obviously expensive. Long distance transportation was possible when the plant products were hauled across deserts and oceans in a dried form, making them lightweight and less susceptible to rot. Culinary and medicinal herbs had their value in their freshness, and thus were not ideal products of trade; they spread through naturalization and were generally available locally. Historically, anything rare and aromatic can be considered a spice, including incense for burning, coffee in the early days, fragrant perfumes, or even exotic fruits; anything “special” (even if today nobody would agree so). This is well observed in the origins of the English name: the word ‘spice’, via Old French *espice*, comes from Late Latin *speciēs* (plural) “spices, goods, wares” with the original meaning in Classical Latin being “kind, sort”. English ‘species’ and ‘special’ are obvious cognates of the same Latin etymon: *speciō*, which referred to anything observable: a sight, “spectacle” (cf. ‘inspect’), and also anything extraordinary, “specific” kind of item (Glare, 2012, pp. 1983-1984) This implies that in different periods, the meaning of the term ‘spice’ covered different substances, based on what products were considered special, desirable, and difficult to obtain; the definition constantly changed. From this point on, whenever spices are mentioned, we refer to this broad definition, using ‘spice’ as an umbrella term for any historic exotica. These definitions, and the differences between the terms spice, incense, herb, condiment, etc. will be explored in detail in the dissertation, as well as a shift in meaning considering spices.

Salad herbs Potherbs Microgreens Culinary herbs Spice herbs Spices Spice mixtures Seasonings & Condiments Seasonings Condiments Sauces Dips Pickles and preservatives Essences Vinegar Herbal extracts and liqueurs Food coloring Garnish

Main uses: spice/herb/coloring/flavouring

herb (botanical) herb (culinary) spice (culinary) spice (historical)

1. Spices as *pharmacia* 2. Spices as *aromata* 3. Spices as *pigmenta* 4. Spices as *condimenta* (Halikowski Smith, 2001)

guide checklist index inventory

The main contribution of this thesis would be a working database of spice names that can serve as a basis for further study. Spices and aromatic products with varying importance and relevance in different places and in different times are essentially endless, so there is always a room (and need) to expand. This dataset is to be grounded in the following principles: correct botanical identification of a plant and the obtained substance; awareness of the substance’s physical and botanical properties, origin, spread, history, uses and cultural/religious significance; collection of names denoting the substance

#	Species	English	Chinese	Translit.	Arabic Translit.
1	<i>Pimenta dioica</i>	allspice	多香果	<i>duōxiāngguǒ</i>	فلفل إفرنجي <i>filfil ifranjī</i>
2	<i>Pimpinella anisum</i>	anise	茴芹	<i>huíqín</i>	ينسون <i>yansūn</i>
3	<i>Ferula assa-foetida</i>	asafoetida	阿魏	<i>āwèi</i>	حلتيت <i>hiltīt</i>
4	<i>Carum carvi</i>	caraway	葛縷子	<i>gělwǒzi</i>	كراويا <i>karāwiyā</i>
5	<i>Elettaria cardamomum</i>	cardamom	荳蔻	<i>dòukòu</i>	هال <i>hāl</i>
6	<i>Cinnamomum cassia</i>	cassia	肉桂	<i>ròuguì</i>	سليخة <i>salikha</i>
7	<i>Capsicum annuum</i>	chile	辣椒	<i>làjiāo</i>	فلفل حار <i>fulful hār</i>
8	<i>Cinnamomum verum</i>	cinnamon	錫蘭肉桂	<i>xīlánròuguì</i>	قرفة <i>qirfa</i>
9	<i>Syzygium aromaticum</i>	clove	丁香	<i>dīngxiāng</i>	قرنفل <i>qaranful</i>
10	<i>Coriandrum sativum</i>	coriander	芫荽	<i>yánsui</i>	كزبرة <i>kuzbara</i>
11	<i>Cuminum cyminum</i>	cumin	孜然	<i>zīrán</i>	كمون <i>kammūn</i>
12	<i>Anethum graveolens</i>	dill	蒔蘿	<i>shíluó</i>	شبت <i>shibitt</i>
13	<i>Foeniculum vulgare</i>	fennel	茴香	<i>huíxiāng</i>	شمر <i>shamar</i>
14	<i>Trigonella foenum-graecum</i>	fenugreek	胡蘆巴	<i>húlúbā</i>	حلبة <i>hulba</i>
15	<i>Zingiber officinale</i>	ginger	薑	<i>jiāng</i>	زنجبيل <i>zanjabīl</i>
16	<i>Piper longum</i>	long pepper	萆撥	<i>bìbō</i>	دار فلفل <i>dār filfil</i>
17	<i>Myristica fragrans</i>	mace	肉荳蔻皮	<i>ròudòukòupí</i>	بسباسة <i>basbāsa</i>
18	<i>Myristica fragrans</i>	nutmeg	肉荳蔻	<i>ròudòukòu</i>	جوز الطيب <i>jawz al-ṭīb</i>
19	<i>Piper nigrum</i>	pepper	胡椒	<i>hújiāo</i>	فلفل <i>filfil, fulful</i>
20	<i>Crocus sativus</i>	saffron	番紅花	<i>fānhónghuā</i>	زعفران <i>za'farān</i>
21	<i>Zanthoxylum bungeanum</i>	Sichuan pepper	花椒	<i>huājiāo</i>	فلفل سيتشوان <i>filfil sītshuwān</i>
22	<i>Illicium verum</i>	star anise	八角	<i>bājiǎo</i>	ينسون نجمي <i>yansūn najmī</i>
23	<i>Curcuma longa</i>	turmeric	薑黃	<i>jiānghuáng</i>	كركم <i>kurkum</i>
24	<i>Vanilla planifolia</i>	vanilla	香草	<i>xiāngcǎo</i>	فانيليا <i>fānīliyā</i>

Table 1.1 The set of 24 spices included in this project, white page references.

in the literature, including pre-modern periods; reviewable by marking sources and references. The fundamental idea is that these information can tell us a story from a new angle: by tracing the diffusion of spices and their names we can potentially find patterns in trade, contact, and blabla.

Besides this, a linguistic analysis on the names attributed to a spice product will shed light on blabla

An attempt to group and categorize the aromatic materials of the spice domain based on linguistic-cognitive features has not yet been made and constitutes an original approach. The quest for exploring patterns of spice diffusion and spice terminology could yield new insights and open possibilities for future research.

Background

2.1 Literature Review

KNOWLEDGE and familiarity about spices varies greatly from person to person. One can live a life of actively pursuing, disseminating, and creating knowledge about spices, while others die without caring or knowing a thing about them. However, presumably both kinds of people would use and consume similar amounts of these ingredients, depending on which culinary tradition they were born to. Spices are various, mainly plant-based substances that have played essential roles in human civilization for millennia. As I mentioned earlier, the assumed roles can be numerous: culinary, medicinal, cosmetic, and ritualistic, and different cultures display varying degrees of importance to different products. In this section, I will explore the different fields that have generated information about spices, review and evaluate the existing literature, and present the available, and appropriate sources for investigating these materials relevant to this project.

2.1.1 On Spices

When we hear the word ‘spices’, our imagination rushes through far-flung tropical islands, busy seaports, lush jungles, and arid deserts; it invokes the sight of massive ocean-going ships, oriental traders, and camel caravans. A quick internet image search on the ‘spice trade’ shows us antique maps in sepia and neatly arranged Moroccan spice markets in eclectic colors. We can almost smell the word ‘spice’. These envisioned, heavily stereotypical landscapes go hand in hand with stories of exotic peoples, fantastic creatures, prized commodities, and fables of exploration, and much less glorious accounts of colonization. What I described here is an exclusively westernized viewpoint. While most of the images in our minds are distorted under the influence of romantic orientalist paintings, and tales of triumphant discoveries retold over generations, the essence of the image is very true, and much more gruesome. Arguably the peoples living in the native habitats of a once overvalued plant species have different experiences etched in their collective memories. One could argue that Europeans imported spice, but often exported horrors. The spice trade and its romantic imagination gave birth to many books, from historical non-fiction on influential characters, such as *Nathaniel’s Nutmeg* (Milton, 1999), to popular histories, such as *The Spice Route* (Keay, 2006), and more popular science accounts, such as *Fruit From the Sands: The Silk Road Origins of the Foods we Eat* from paleo-ethnobotanist Spengler (2019a).

Today, spices are mostly discussed from a culinary point of view. The volumes of cookbooks and spice & herb companions are almost infinite. Gastronomy professionals, chefs, food writers, and hobbyists all participate in an endeavour to introduce spices to us in a fashionable manner, creating references for home cooks and health enthusiasts. Many authors tend to attempt an overarching collection, presented in encyclopedic directories (Craze, 1997; Farrell, 1985; Herman, 2015; Lakshmi,

2016; Norman, 2002/2015; O’Connell, 2016; Opara & Chohan, 2021).

On a more scientific note, we find authors from the plant sciences, such as plant taxonomist and ethnobotanist van Wyk (2014) who delivers an excellent compendium titled *Culinary Herbs and Spices of the World* where he introduces dozens of aromatic plants, with a clear explanation on their uses and categorization. In her *Food Plants of China* Hu (2005) describes hundreds of edible plants relevant to Chinese eating habits, with the precision of a true botanist. Agricultural ecologist and ethno-biologist Nabhan (2014) takes the reader on a “spice odyssey”, with his illuminating *Cumin, Camels, and Caravans*, discussing the materials in chronological steps of global trade—the Incense trail, Silk road, and the Spice trade.

Beyond general and introductory histories of spices, such as those offered by Turner (2004)’s *Spice: The History of a Temptation*, or Czarra (2009)’s *Spices: A Global History*, most historians and philologists approach the topic in depth, from their own areas of expertise. Culinary historian Krondl (2007) compartmentalized the story of spices, and writes about Venice, Lisbon, and Amsterdam, “the three great cities of spice” in his *The Taste of Conquest* and presents the story of spices through vying eyes of European powers. Spices in Greek mythology are explored in *The Gardens of Adonis* by an expert in ancient Greece, Detienne (1994), while Schivelbusch (1992), a cultural historian discovers the social history of spices, stimulants and intoxicants in his *Tastes of Paradise*. Freedman (2008), a historian and expert on medieval cuisine, in his book *Out of the East: Spices and the Medieval Imagination* explores how the European fascination with spices fuelled the quest for new lands and colonial expansion. The initial voyages to America by Columbus, Pizarro, and others were motivated by the search for spices, and the mirage of *La Canela*, a legendary valley abundant in cinnamon, equally promising to that of gold in El Dorado (Dalby, 2001). One of the most valuable works for us is Dalby (2000)’s *Dangerous Tastes: The Story of Spices*. Andrew Dalby is a linguist and historian, and besides Latin and Greek he has command of other languages, such as Sanskrit and Burmese, which allows him to present the topic of spices with the pen of a truly versatile philologist and convey authentic scholarly information on spice names bridging East and West. A thought-provoking volume titled *The Poetics of Spice* by Morton (2006) is a literary critical study that discusses how spices were represented in Romantic and Victorian era English literature, and how the topic connects to romantic tropes; ideologies, such as consumerism, capitalism; and ideas, such as abstinence and luxury. “Spice is a complex and contradictory marker: of figure and ground, sign and referent, species and genus; of love and death, epithalamium and epitaph, sacred and profane, medicine and poison, Orient and Occident; and of the traffic between these terms (Morton, 2006, p. 9).

Looking beyond holistic, comprehensive tomes on the history of spices attempting to gather all of them in a single book, some commodities have already been explored thoroughly in a more concentrated approach. The history of salt (Kurlansky, 2002), tea (Mair & Hoh, 2009), pepper (Shaffer, 2013), and vanilla (Rain, 2004) are worth mentioning, and treatises on other popular substances of trade (chocolate, sugar, tobacco, etc.) are abundantly available. Even more outstanding are the works that focus their investigation on a specific cultural area, whether it is the “biography” of the chile pepper in China (Dott, 2020)—retelling an unquestionably influential incorporation of a new item to a diet—or the allure of musk and perfume in the Islamic tradition (King, 2007). These works contain

valuable linguistic information as well, regarding the origins and spread of the names of spices, and they will help us to investigate their spread and diffusion.

Studies on specific spices are one of the most important sources for this thesis, and highly related to the project for example are the articles on the loanword status of ginger (Ross, 1952), on the diffusion of chile (Wright, 2007), on the identity and etymology of Sichuan pepper (Austin & Felger, 2008), and on the “trade-language origin” of turmeric (Guthrie, 2009). Recent advances regarding the name and identity of cinnamon and cassia in ancient vs. modern times published by Haw (2017), and the Eurasian itinerary of asafoetida (Leung & Chen, 2019) are crucial pieces of research in order to trace the products accurately. These and similar types of research will be highly influential in the preparation of this thesis.

For an overview about the concept, function, and uses of spices in the classical Islamic periods, please refer to Dietrich (2004); for the same in a Chinese cultural and historical context, please see Hu (2005, pp. 147–153).

2.1.2 On Plants and Plant Names

A brief section on botanical nomenclature.

2.1.3 On Food and Foodways

Literature on gastronomy and the culinary sciences is plenty, but high quality scholarly works are fewer. Reference works include Davidson (2014) and Katz (2003)’s *Encyclopedia of Food and Culture* other key publications are Toussaint-Samat (2009)’s *A History of Food*. Remarkable contributions to ancient and medieval culinary history were made by Dalby, focusing on the cuisines of Rome, Greece, and Byzantium (Dalby, 1996, 2003, 2010; Dalby & Grainger, 1996)

In the Chinese context the definitive work is still Chang (1977)’s *Food in Chinese Culture*, while in the Islamic tradition, medieval cuisine and recipes are explored in details by Zaouali (2007). A few works on the culinary history of the Middle East are also results of great scholarship, including the translation of Nawal Nasrallah, who made a 10th-century Baghdadi cookbook accessible for us in the *Annals of the Caliphs’ Kitchens* (Ibn Sayyār al-Warrāq, 2007), and Lewicka (2011) who introduced us the “*Food and Foodways of Medieval Cairenes*”.

2.1.4 On Trade

I must point out that that spices are mostly explored through their trade. And, as most spices originate in tropical Asia, our centre of attention will be directed towards the continent. The term *spice trade* loosely refers to the cross-cultural, economic, and diplomatic ventures of historic kingdoms, empires, and companies, agglomerating around the Indian Ocean, and other regions such as the Mediterranean, East Africa, Maritime South-East Asia, and by land Central Asia. The history of the spice trade is one of its own, covers hundreds of years and it is fundamentally connected with the history of globalization. Naturally, the story of spices is intertwined with trade routes and geopolitical events, involving contact between peoples, cultures, religions, ideas, and languages. See general works on economic history,

such as the *Spice Islands* (Burnet, 2011), on political history *The Scents of Eden: A Narrative of the Spice Trade* (Corn, 1998). Specific eras and regions related to our topic include the ancient Indo-Roman trade (Cobb, 2019; Sidebotham, 2011), the medieval Indian Ocean sea trade spanning from the Persian Gulf to China championed by Arab seafarers (Hourani, 1975; Pearson, 1996), and the Southeast Asian maritime trade (Donkin, 2003; Hall, 2010; Reid, 1988). Young scholars are also doing incredible work, I would like to highlight the thesis of Hoogervorst (2012), who combines historical linguistic and archaeological approaches in the research of Southeast Asia the in the ancient Indian Ocean world. Besides a degree of domestication and long-standing cultivation practices, the abundance of spices today are a result of long-distance trade and cultural exchange. New advances in the field of archaeobotany concerning Roman and Islamic times for example, helps us to map the routes of the materials and trade-connections better (see van der Veen & Morales, 2015; van der Veen, 2018).

One surprising fact that I have learned from my reading, is that the Silk Road, the trade network roads and desert pathways connecting Central Asia with China did not really feature spices. Valerie Hansen's well informed book based on unearthed documents of the region show a trade that is small in volume, and much less lavish in terms of luxury goods than I previously thought. Most of the trade covered short distances and whirled around every day goods and just a minute amounts of exotic perfumes and aromatics, especially musk. Silk often acted as a currency. The word *spice* only occurs two times in her book. This is not to say that spices did not exist at all—we know that many spices were introduced to China on the silk roads, and that traveling merchants carried pepper—but that the bulk of the spice trade did not happen overland.

Many of the contemporary works I mentioned that trace the initial steps of certain spices and other foodstuff relay accounts from primary sources. For example Spengler (2019b) writes that the black pepper of tropical India is first mentioned by Chinese sources in during the Han dynasty (202 BC–9 AD; 25–220 AD), in the *Hou Hanshu*, quoting Laufer (1919, p. 374). I noticed that in a lot of cases, the reports are thanks to a few giants, legendary scholars whose research we still use and reference. These are the people who laid down the groundwork for future studies by their hard work and language skills, including Berthold Laufer (1919) and his invaluable *Sino-Iranica*, which catalogues “Chinese contributions to the history of civilization in ancient Iran, with special reference to the history of cultivated plants and products”; and Edward H. Schafer, and the *The Golden Peches of Samarkand*, which lists luxury exotica that reached the Tang court, exploring cultural interactions with other regions. I would also like to mention Isaac Burkill (1935), who recorded every economically important plant and mineral under the sun of the Malay Peninsula, annotated with local names and traditional knowledge in his monumental *A Dictionary of the Economic Products of the Malay Peninsula*. Their command and knowledge in history, sinology, and botany is immeasurable.

Moving on to the study on spices, incense, and aromatics through the tools of Semitic philology, I should mention the recent addition of Amar and Lev (2017)'s *Arabian Drugs in Early Medieval Mediterranean Medicine*, and Lev and Amar (2008)'s *Practical Materia Medica of the Medieval Eastern Mediterranean According to the Cairo Genizah*, but we cannot leave out *Domestication of Plants in the Old World* by plant geneticist Zohary et al. (1988/2012), which supplies a great overview of the agronomic development of the region, or *Duke's Handbook of Medicinal Plants of the Bible* (Duke et al.,

2008).

Besides history, archaeology, and botany, progress in spice related research in recent times are predominantly from the field of medicine. There are uncountable pharmacological—clinical and in vitro—studies on the effects of various medicinal plants (Boy et al., 2018), and many of them are motivated by food and nutritional science research, such as Baker et al. (2013)’s survey on the effects of cooking with and ingesting cinnamon, nutmeg and cloves. In the dissertation I will try keep away from deep deliberations of scientific treatises from medical, biochemical, and pharmacological journals as much as possible, however, I might comment on issues related to folk uses and traditional knowledge if it is relevant for the greater cause.

2.1.5 On Medicine and Healing

Further moving away from history, we must briefly mention the fields closely knit with the food industry: chemistry and pharmacology. The authoritative *Handbook of Herbs and Spices* (Peter, 2012) and *The Encyclopedia of Herbs & Spices* (Ravindran, 2017) are for industry professionals. These works detail the physical and chemical properties of the materials, and the plants and their products are described in detail. Besides botanical information, the plants’ chemical compounds and volatile oils are in focus, but general knowledge about the origins, names, uses, and functions are also presented. The chemistry of spices is an interesting topic, scientific and popular books were both published on it.¹ The science behind how spices work is a fascinating one, there are two questions we should pose, one: “Why are spices spicy?”, and two: “Why humans like spices?”. The answer to the first question is that the pungency we feel—a mild rush of heat or minutes of tingling lips—is in fact a toxic shield, it is the plant’s evolutionary response to herbivores, bugs and pests (Turner, 2004, p. 21). However, this is not a crucial component in the organism’s life cycle; these substances (the volatile oils causing flavour and pungency) are so-called secondary metabolites, they are insignificant to the plant’s biology (Parthasarathy et al., 2008, p. 18). The heat to the chili is effectively the same as thorns to the rose. The spiciness of a spice is a weapon, and while bugs and insects would run amok trying to have a taste of the fruit of *Myristica fragrans* (the tree of nutmeg and mace), it made humans—quite ironically—sail to the end of the world to find it. No obstacle was great enough to stop mankind’s appetite for fragrant, pungent, and spicy flavours. In answering the second question, we can expect that if the spiciness of spices has a Darwinian explanation, the human desire for them should also sound like one. Sherman and Billing (1999) in their influential, and aptly titled article *Darwinian gastronomy* claimed that spices taste good because they help us fight hostile bacteria and microorganisms responsible for digestive issues such as food poisoning; they are beneficial for our health. The authors also compared cuisines of the world based on how much spice they use in their everyday cooking. The piquancy of some capsicums is essentially an irritation, Spence (2018) explores, why do so many people find the “oral burn” so appealing, Carstens et al. (2002) investigates the neural mechanism of oral irritation from spices and carbonated drinks, and we can learn about pungency and personal preference from Prescott and Stevenson (1995). The antibacterial and antioxidant effects

¹For a highly visual and novel take on a book introducing the chemistry of spices, see Farrimond (2018)

of spices are known for millennia, and recent research (Billing & Sherman, 1998; Nilius & Appendino, 2013; Yashin et al., 2017) shows that the old wise ones were not at all wrong compiling their *materia medicas* and *bencaos* to guide future generations on herbal healing. Of course, there were plenty of exaggerated claims on the potential healing effects of some products, from them being an antidote for snake venom to the cure for death itself.

Materia Medicas, Pharmacopeias, Bencaos

Materia medica (Latin for ‘medical material’) refers to a descriptive collection of knowledge about substances—plant-based, mineral, or from an animal source—with therapeutic properties, usually in the form of a book, often illustrated. It is a term from the history of medicine, named after the highly influential book of Dioscorides, a Greek physician and pharmacologist from the 1st century AD. The term *pharmacopeia* is closely related to this, but this refers to a more technical book that contains directions on how to combine different materials for effective healing remedies. Basically, it is a drug making manual.

Bencao (本草) [measure word for books-herb] is essentially the Chinese equivalent of *materia medica*. It refers to compilations of classical Chinese medicinal literature. The *Shennong Bencaojing* from circa 200 AD, although lost, is generally considered the first (see Nugent-Head, 2014; Yang, ca. 206 B.C.E.–220/1998). A great explanation of the *bencao* tradition can be found in the introduction of Wu (2005)’s *An Illustrated Chinese Materia Medica*, and Z. Zhao et al. (2018) offers a brief overview on the classification of *bencao* literature, and how it connects to traditional Chinese medicine. The most famous *bencao* however, is the *Bencao Gangmu*, 16th-century Chinese encyclopedia of *materia medica* and natural history written by Li Shizhen. It is probably the most important book of *Traditional Chinese Medicine (TCM)*, building on the knowledge of earlier Chinese pharmacological works. It is often translated to English as the *Compendium of Materia Medica*, and the first complete English translation project is currently under way headed by Paul Unschuld (2022). A modern, scientific example for a *materia medica* style compilation would be Duke (2002)’s *CRC Handbook of Medicinal Spices*.

In the Arabic context on the other hand, we must acknowledge the advances of Islamic medicine, and the fruitful decades of the Islamic Golden age that saw many scholars publish extensively, forwarding the tradition of the Greeks, building on the works of Dioscorides, Galen, and Hippocrates. The writings of philosopher and polymath Ibn Rushd (Averroes), physician and pharmacologist Ibn Juljul, botanist Ibn al-Bayṭār, and alchemist Abū Bakr al-Rāzī were all influential in the history of Western medicine and pharmacology. Maybe the most prominent of all was Ibn Sīnā (c. 980–1037; latinized as Avicenna) inspiring many future scholars for over centuries, such as Thomas Aquinas (1225–1274) (Smith, 1980). His book *al-Qānūn fī l-Ṭibb* completed in 1025 was used as a standard textbook at universities up to the 17th century (Musallam, 1987–2011). Scholars still discuss him and his contributions (Sajadi et al., 2009), and compare his findings with recent pharmacological studies. For example, on the traditional uses and health benefits of saffron (see Hosseinzadeh & Nassiri-Asl, 2013).

2.1.6 On the Role of Spices Through Time

I must also touch on the change in meaning on what spices once were, and what they are now. It can be now clear that in the past spices were more valued for their ceremonial or medicinal use, but I would like to make the shift in usage explicit.

For example, the ancient Romans imported and used cinnamon in large quantities, but they did not eat it or cook with it. They treasured it as incense and medicine instead. It is often repeated that emperor Nero have burned (as incense and offering) a year's supply of Rome's cinnamon on his wife's funeral (whom probably he himself have killed) in 65 AD (Toussaint-Samat, 2009, pp. 437–438). Even if we stopped burning cinnamon, is not because of these practices disappeared—the catholic church still uses 50 tons of frankincense a year (Ash, 2020)—it rather seems that most materials in question gradually gained more favour for their culinary appeal.

In the notion that the role of spices changed over time, there is a universally observable pattern: the gradual shift from their relevance in medicine towards gastronomy. Freedman (2015) writes on social and cultural implications of the role in spices and their importance in health and wealth during the Middle Ages. The shift is mainly due to the emergence of modern medicine and the marginalization of traditional folk medicine, especially in developed, western societies. What can be more telling than the term “alternative medicine”, clearly indicating the switch: what was the “only” medicine once, is now a secondary (and sometimes frowned upon) option, as opposed to just “medicine” or in some places “Western medicine”. In many cultures with strong roots in folk healing, the widespread use of medicinal plants, herbs, and spices are thriving and in recent years these practices are even gaining international popularity. We could think of Traditional Chinese Medicine, the Indian *Ayurveda*, or the Indonesian practice of *jamu*.² Besides this well-known shift regarding spices and the healing factor, it is important to point out that in the past the line between food and medicine were much more blurred, this can still be observed for example in modern Chinese food therapy, 食療 *shiliao*, rooted in ancient dietetic traditions (Engelhardt, 2001).

2.1.7 On Food and Language

One of the best examples for a linguistic study related to gastronomy is *The Language of Food: A Linguist Reads the Menu* by Jurafsky (2014). Dan Jurafsky, a computational linguist and authority in the field of Natural Language Processing (NLP), explores our connection to food and eating in a series of interesting studies. From tracing the historic and linguistic origins of ketchup, macaroni, or salami, to what the wording of a restaurant menu can tell us about prices. From a Chinese perspective, food and menus are explored by Yao and Su (2019), while the topic of fruit-words is presented by Depner (2019).

This thesis will involve sensory words—nouns, verbs, and adjectives of gustation, olfaction—surrounding spices and other aromatics, and in this aspect, previous studies of linguistic synaesthesia will definitely prove useful (see Huang & Xiong, 2019; Q. Zhao et al., 2019). Some cognitive studies on

²*Jamu* is the name for the traditional medicine of Indonesia, encompassing practices or herbal healing with Javanese origins, usually in the form of mixing ingredients in drinks and potions. For more, see Beers (2012)

sensory information have been conducted involving spices, most interesting are the ones that explore cross-modality relations. For example, an fMRI experiment concluded that reading words with strong olfactory associations, such as ‘garlic’, ‘jasmine’, or ‘cinnamon’ activates the olfactory regions of the brain (González et al., 2006). Another unique study looked at the possible corresponding sound attributes to spiciness/piquancy, and a series of experiments found that fast tempo, high pitch, and distortion are indeed linked to the sensation (Wang et al., 2017). On a more linguistic note, Zhong and Huang (2020) explored taste, examining the sensory lexicon around the realm of desserts. They showed that “mouthfeel”, a multi-sensory concept plays more important role than the quality of “sweetness”. Bagli (2021)’s *Tastes We Live by* is a very recent publication that deals with the linguistic conceptualization of taste in the English language.

2.2 Research Gap

I have started this chapter with discussing the literature on spices through the eyes of different disciplines. I mentioned gastronomy, botany, history, trade and economics, and after a brief touch of classical medicine I have circled back to philology, and finally landed on research combining language and food, and the sensory modalities. So far, we saw that studies on spices—specific or in general—are available, most notably in the form of historical works focusing on some aspect of the spice trade or tracking the story of the material itself. Besides history, the availability of literature from food and nutritional science, biology and medicine is satisfactory, quenching the need of industry professionals. In this field we see a more rapid development, new studies and findings are relatively frequent, especially about popular spices.

What we also have seen is the obvious lack of linguistic studies themed around spice. A handful of scholars have investigated questions related to language, almost exclusively from a historical linguistic point of view—trying to unearth etymologies. The few available findings however are not collected, knowledge on spice names and related terminology is found sporadically in many disciplines. In the face of such scarcity of linguistic studies on spice terminology it is not surprising that the *Handbook of Herbs and Spices* of Peter (2012)—a standard reference work for chemistry and food industry professionals—often relies on an online blog to list spice names! This online blog created in the early 2000s is a personal website of one Gernot Katzer, who currently rules over the internet with his exhaustive collection of spice information, also including spice names in numerous languages. Katzer (2012b) supplies a massive amount of valuable information to the public, but his lists on spice names are often inaccurate, and—since he is an individual writing about his own travels and empirical experiences and not aiming at academia—sparsely cited.

Up to date, a comprehensive study on spices from a linguistics perspective is lacking. The information already out there is sporadic and unorganized, and as I have introduced above it was botanists, historians, chefs, and historical linguists who contributed to the research on aromatic products, their origins, and their place in the human culture and lexicon. In a few cases, findings happen to be misinformed, thanks to some authors making presumptions along erroneous lines, which only adds to the confusion. This is bound to happen when botanists attempt venture into the lands of etymology,

or when food writers choose to sail the high seas of historiography. For a good illustration of this problem, see the criticism of Haw (2017) on Austin and Felger (2008)’s attempt to trace the etymology of *fagara* (Sichuan pepper) where the authors with a background in botany have made questionable assumptions related to Classical Arabic phonology and morphology. We must be careful and not make similar mistakes, never give in to the temptation of baseless speculations, especially outside the realm of linguistics and philology. With that being said this dissertation would fill the gap that exists regarding research on spice terminology.

2.2.1 Research Questions

In order to do so, I will now try to formulate the questions I aim to answer. The first two questions arise from the investigation on the “diffusion of spices” and are more related to the philology component of the thesis. The third and fourth questions are more related to the corpus linguistic component of the study, investigating the “language of spices”.

- Q1 Does the propagation of *Wanderwörter* within the domain of the spice trade follow the diffusion of the materials?
- Q2 Is there any underlying pattern behind the mechanisms of spice diffusion, considering both the materials and the nomenclature?
- Q3 Is there any underlying pattern behind the language use surrounding spices, in terms of sensory words and synaesthetic properties?
- Q4 Do the presence or absence of various spice related lexical categories in a language show their level of embeddedness in a culture?
- Q5 Would the different patterns of spice name propagation and linguistic-cognitive characteristics correlate or show differences in any way?

2.3 Theoretical Framework

TODO

- wanderwort
- loanword haspelmath
- prototype theory
- sensory modalities (higher senses-lower senses)

2.3.1 *Wanderwörter*

Methodology

REALIZING that there is little work done on building a spice name database, or on analyzing spice nomenclature from historical and linguistic-cognitive perspectives, I have set out to assemble one that would facilitate this kind of analysis. To introduce very briefly, I have built a database of spices and spice terminology by combing through secondary and primary literature, botanical databases, encyclopedias and dictionaries, and searching for the spices in contemporary and historical corpora. I then used a few selected features of these materials (region of origin, spreadability, etc.) and the corresponding terms (borrowed status, word formation, etc.) and looked at the set of spices as a whole, trying to find patterns and make some interesting observations about the diffusion, naming, and other aspects of spices.

3.1 Research Design Principles

To achieve these aims, I first needed think of an ideal way to compile and arrange these very complex pieces of information, data that are highly interdisciplinary in nature. From the very beginning of the design of this study, the following principles were kept in mind regarding the database of spice names:

(1) The database must be grounded in the close study of the materials—the plants and their products—especially from a historical and botanical standpoint. Awareness of the material’s physical journey will help us to contextualize some of the ways the associated names spread. Take for example the Sanskrit term referring to asafoetida (the dried oleoresin gum from *Ferula assa-foetida* et al.): हिङ्गु *hingu*, which is the etymon of both Chinese 興蘂 *xīngqú* (*Middle Chinese (MC)* /hiŋ giʌ/), and English *hing*, but they took very different paths: while the Chinese term is a learned loan from during the spread of Buddhist scriptures on the overland Silk Road, the English word is a late 16th-century borrowing via the sea trade with Mughal India. And if we study the source of the materials and learn about the plants, we will also realize that all the hing that was exported from India in the early modern period was in fact imported from Persia and Afghanistan.

(2) The database must be thoroughly cited; every word, statement, date, or other piece of information should be carefully referenced. I have already explained the motivation and necessity behind this practice in chapter 1, it is enough to say that currently no one is citing sources for the names they give (except philologists), and sometimes it hard to find the motivation and inspiration behind a term. It is always a good scholarly practice to record where we found certain pieces of information, and when it comes to spice etymologies, this should make it easier for experts to verify or refute the findings on a specific item or stage.

(3) The database should be easily expandable. Because of the limited time, it is impossible for me to include *every* spice. Therefore, I try to create a pipeline, where a new material and its names can be easily added to the fold, and quickly analyzed. This in principle can also accommodate for the future inclusion of incense, perfume, and herbs, which I will mention in section 6.3 when discussing future

plans to expand on this research.

3.1.1 Identification, Confusion, Adulteration, Clarification

The ideal first step of all types of research related to spices, herbs, incense, and other aromatics is to identify the product exactly. In the case of spices and incense, this is overwhelmingly a botanical question, while in the case other exotic aromatics, such as musk or ambergris, we must involve the animal kingdom. Medical, pharmaceutical, and food industry studies are heavy on the hard sciences—chemistry, biology—but they sometimes also contain valuable information about both common and scientific names. All medical studies must start with the proper identification of the substance, in fact, there is a range of studies about various techniques on identification and differentiation (cf. Ford et al., 2019). The reasons for this are twofold.

Firstly, in many cases it is not a straightforward task to tell the substances apart, different spices can have very similar physical qualities. E.g., the fruits of Chinese star anise (*Illicium verum*) and Japanese star anise (*Illicium anisatum*) basically look the same, but the latter is toxic; see the excellent points made by Small (1996) on the confusion of their common names. Uncertainty in nomenclature and identity poses a further challenge to clinical trials if the origins of a substance is not properly identified. Take for example Oketch-Rabah et al. (2018), who writes on the confusion of cinnamon and cassia nomenclature and its implications in pharmaceutical research. Consider first cinnamon (*Cinnamomum verum* syn. *C. zeylanicum*). Common names include *true cinnamon* and *Ceylon cinnamon*. However, the cinnamon sold in the US and in the UK markets are generally not the same spice: most of the product labelled as cinnamon on American shelves is in fact cassia (*Cinnamomum cassia* syn. *C. aromaticum*) (Oketch-Rabah et al., 2018), which is sometimes called ‘fake cinnamon’ or ‘bastard cinnamon’. In retrospect, the Latin scientific name of the former makes bit more sense now: *verum* means ‘real, true, genuine’. But why is cassia fake cinnamon? This is due to historical reasons, from when the introduction of the much cheaper cassia pushed down the cinnamon prices drastically in the 19th century (Wijesekera & Chichester, 1978). Most scholars consistently refer to *C. zeylanicum* as cinnamon, and to *C. cassia* as cassia but it is not uncommon in everyday language use to confound the two, especially in referring to cassia as cinnamon, out of innocent ignorance. For more detail and on the identity of cinnamon and cassia please see ???. Uncovering confusions from under heaps of synonyms lead us to interesting historical events that sometimes explain the vernacular names of a particular product, such as the case of cinnamon and cassia shows.

Secondly, adulteration and contamination are rampant in the industry. Saffron (*Crocus sativus*)—the most expensive spice by weight nearing the price of gold—is famous for being knocked up (and substituted) with the much cheaper flowers of safflower (*Carthamus tinctorius*). Even their names reflect these practices: although the two are very different and unrelated plants, their similar dyeing properties and constant confusion have left its mark. *Safflower* has been influenced by the French word for saffron, even if they have different origins (both ultimately from Arabic). And, on account of the adulteration, safflower have also came to be known as *bastard saffron*, attested in 1548.

We do not need to lurk modern pharmacological studies to find examples of confusion, the identity

of saffron was also elusive in ancient China, where at its introduction in the early Middle Ages, it was confused with safflower, and both were casually called 紅花 *honghua*. It is said that Buddhist monks picked up saffron in Kashmir on their way from India to China, but the knowledge about it was not clear until the Yuan dynasty, when it was actually used and imported (Laufer, 1919). During Tang times, it was also connected with the—also strongly yellow—turmeric. Turmeric came first, and got the name 鬱金 *yujin* [yü-gold], and later saffron was named 鬱金香 *yujinxiang* [yü-gold-aromatic] (Schafer, 1985). The confusion of saffron and turmeric (and truthfully every other yellow spice used as a dye) is also observable in Classical Arabic, *kurkum* ‘turmeric’, historically also ‘saffron’ (etymon of the word *curcuma*), and the perceived “similarity” of Sanskrit कुरकुम *kuṛkuma* ‘saffron’ did not help to clear the waters either (Guthrie, 2009, see).

Keeping all this in mind, I feel I must lean on rudimentary botanical identification in the investigation, linking the plants and plant parts to the products and their vernacular names. This is important, as it can clear up some of the confusion when two or more products are used interchangeably, and it will highlight problematic cases from the start.

3.1.2 Challenges in Spice Categorization

One of the most challenging parts of this project, is to chose a meaningful way to categorize spices and spice names. The design should make sense on multiple dimensions: botanically, historically, and maybe even gastronomically, but at all times keeping in mind the linguistic focus. The main goal is to assign a spice name to the appropriate product/material, which is correctly identified on a botanical level. This is not always straightforward, as some materials can have multiple botanical sources, one plant can yield multiple differently used plant products, and the same names can be used for different substances. We have already discussed the question of spice names vs. plant names in ??, but there are are several other issues.

One problem arises from the fact that many terms can have a meaning on different levels of specificity, depending on context and intent. Spice words are rich in senses. For example, according to the *Princeton WordNet (PWN)* *black pepper* can be both a hypernym and a hyponym to *pepper*, depending on if it refers to the plant, or the dried fruits with the husks on. In this specific case, *black pepper*#2 and *white pepper* are sister terms, but *white pepper* is also a subordinate to *black pepper*#1. This situation is then further complicated with the fruit of the *Capsicums*, that also have the name *pepper*. Thus, it is not immediately clear if we should treat black and white pepper as two different spices, or two manifestations of the same spice. There are many other examples, where a term can be understood on different levels: as a plant, a family of similar plants, a specific spice, or a group of spices. In an everyday setting, lexical semantic hierarchies are not always adhered to, and people organize spices in their heads according to their own convictions. One author might mention white pepper under the heading black pepper on account of their biology (a botanically driven categorization), while another might separate them and discuss them as different spices based on their different uses (a culinary approach). As for the historian, mentioning white pepper might be just not at all important. The reasons for these variations are usually determined by what is the intention of the categorization,

and who is the target behind the treatise. For us layman however, spice entities are most prominently structured by way of their names: the words are the handrails to cling to if we are not familiar with an item.

Even more challenging for categorization, is when we are not sure which spices were meant under certain names in different times. Cinnamon and cassia are a great example for this, as we saw in ???. But, parallel to the question of identity, we also have seen that it does not always matter. Attitudes differ from place to place: while Europeans do sometimes differentiate, in China and the United States the concept of cinnamon is singular. For the analysis, I had to decide if I treat them as one item, or make a distinction. In a few cases, a spice name became obsolete and got “lost”, meaning that it cannot be identified with certainty, and we have to guess what the name referred to based on botanical and historical data, and categorize accordingly; as it is the case with *amomum*. The most extreme situation is when a spice goes extinct, as it happened to silphium in antiquity. At present, this thesis does not contain such items. In these cases, we need historical knowledge to say anything about the identity of said spices and where they belong in between the others.

Our knowledge or lack thereof also determines the concept we have of a certain item. For example, most people who know that nutmeg and mace come from the same fruit of the same plant and from the same place will always connect the two in their heads, the two spices are literally inseparable (until harvest, of course). From historical records however, it is clear that the knowledge regarding these substances was spiked with misunderstandings and inaccuracies, even among people who were in the spice business. According to an anecdote, during the Dutch monopoly of the Banda islands, an officer back home have written an angry letter to the colony on the Spice islands, ordering them to plant more mace trees, because there was a higher demand for it than nutmeg — a request that must have raised some eyebrows on the plantations. This shows that botanical organization is accessible to those with botanical knowledge.

Lastly, we must also mention that the language and words we use for these materials also defines our understanding of them. Analyzable, descriptive names help us to identify certain materials, while loanwords with forgotten original meanings (cf. *mace*) might not say much. For example, no Chinese would have the above misconception of mace, when faced with its name: 肉豆蔻皮 *roudoukoupi*, which means the ‘skin/cover of the nutmeg’, which is what it actually is. On the converse, the Chinese initially confused some cardamoms and nutmeg (unrelated plants), simply because they were both round, and sourced from the same region. Today, both are 豆蔻 *doukou*, with modifiers attached to distinguish between them.

Another point to make is the myriad of “fake” spices that feature especially in English. False peppers, false cardamoms, bastard cinnamon, and bastard saffron, are a reflection of historical economic attitudes, often pointing at the problem of adulteration. Names, such as *true pepper* and *true cinnamon* summon a sense of originality. This however, is highly subjective to a culture and language, after all, bastard cinnamon is just “normal” cinnamon for others, and false cardamoms are just cardamoms to those who have a different prototype for what is a cardamom. In a sense, it all boils down to translation, which can be arbitrary. Who decides if Chinese 桂 *gui* should be rendered *cinnamon* or *cassia* in English?

To avoid getting lost in the details of lengthy binomial names or botanical genera, I have opted to use a set of common names of the spices to be used for identification, under which the various spice names belong. These IDs are sometimes arbitrary (e.g.: all spicy, red, hot, chili peppers of the *Capsicum* genus and their names go under “chile”), but always clear cut and explained in the data chapter. I have therefore grouped some spices and spice names into larger categories, trying to find a smallest common denominator within the three languages. This only affects a few items: various false cardamoms in the *Amomum* genus will be grouped under the umbrella term: false cardamom. One better way would have been to divide the categories on a purely botanical basis, but I prefer this solution to make this set of closely related spices more accessible to the reader and avoid these items to fritter away in the crowd. Also, they constitute a linguistics and conceptual category as well, using similar prototype words in all three languages in their names. Using common names as identifiers also facilitates for a linguistically driven comparison, and so the IDs are essentially the same as the set of spices determined earlier: allspice, anise, asafoetida, black cardamom, caraway, cardamom, cassia, chile, cinnamon, clove, coriander, cumin, dill, false cardamom, fennel, fenugreek, ginger, long pepper, nutmeg, pepper, saffron, Sichuan pepper, star anise, turmeric, vanilla.

3.2 Data Collection

The data collection for this project was conducted in three stages. One for assembling the set of spices, one for gathering their names, and one for researching etymologies. The result of these three stages are open for inspection in the electronic files `spices.csv`, `names.csv`, and `etymologies.csv`, available on the corresponding GitHub page. ?? will introduce and explain the data in all three levels. Where is that?

3.2.1 Collecting Spices

In the first stage, after I have assembled the set of spices, I collected information about them from encyclopedic handbooks written by experts in the plant sciences and spice industry professionals. I have made great use of van Wyk (2014), Peter (2012), and Hu (2005) at the start, especially when matching plant products to plants. At this stage, I have focused on the identity and characteristics of spices including geographical distribution and native habitats, especially where I saw any room for confusion. As I collected scientific names, I also recorded the common/vernacular names for each spice as an initial exploration, and I linked them to a botanical database that can supply further information. I have also collected information regarding their basic uses especially in traditional medicine.

Surprisingly, the abundance of synonyms is also palpable in the scientific nomenclature, sometimes one plant species has dozens of binomial *taxa*. In an attempt towards standardization of taxonomic data, collaborative efforts have sprung across numerous authoritative institutions to assemble and link their respective databases and sources. These online projects are usually run by a consortium of leading botanical institutions worldwide, among the key entities are the Royal Botanic Gardens at Kew and Edinburgh, the Missouri Botanical Garden, the Harvard University Herbaria &

Libraries, Geneva Conservatory and Botanical Garden, the Muséum National d'Histoire Naturelle in Paris, the South African Biodiversity Institute, the Australian National Botanic Gardens, and the Kunming Institute of Botany, just to name a few.

When it comes to botanical information, navigation in the ocean of scientific binomial names hiding the identity of a plant can be overwhelming. To alleviate this, I turned to a range of botanical databases for the purposes of correct identification, and information gathering. I used databases such as *The Plant List* (TPL) (<http://www.theplantlist.org>), which was recently superseded by the *World Flora Online* (WFO) (<http://www.worldfloraonline.org>); the *International Plant Names Index* (IPNI) (<http://www.ipni.org>); *Plants of The World Online* (POWO) (<http://www.plantsoftheworldonline.org>); the *Global Biodiversity Information Facility* (GBIF) (<https://www.gbif.org>); the *Flora of China* (FoC) hosted on eFloras (<http://www.efloras.org/index.aspx>) and the *Biodiversity Heritage Library* (BHL) (<https://www.biodiversitylibrary.org/>). TPL for instance claimed to be “a working list of all known plant species”, now under WFO it is “an online flora of all known plants”, and as such also connects different plant checklists and biodiversity databases using the nomenclatural and publishing information. In my dissertation I will frequently refer to POWO, which contains botanical descriptions and geographic data (native and introduced habitat), besides the usual taxonomic and botanical information.

In addition to online databases, I will occasionally also turn to reference books from the field of food technology and nutritional science, such as the *Handbook of Herbs and Spices* (Peter, 2006, 2012), and *The Encyclopedia of Herbs & Spices* (Ravindran, 2017). These encyclopedias, although aimed at chemistry-focused food industry professionals, also contain holistic information on the plant-based products and discuss the origins and vernacular names, besides the usual particulars on usage and medicinal qualities. It is also worth noting that various dictionaries usually mention the scientific names of plants.

Regarding traditional medicine systems, I frequently consulted modern inventories of TCM to identify materials and extract Chinese names, including the the connecting databases of Hong Kong Baptist University: the HKBU Medicinal Plant Images Database¹, the HKBU Chinese Medicinal Material Images Database² HKBU Chinese Medicine Specimen Database³; and the PolyU Chinese Herbal Medicine Database⁴. Armed with the botanical knowledge, we shall have an ideally clear picture on the spices, and a firm base to connect linguistic data to.

3.2.2 Collecting and Annotating the Names

In the second stage, I have collected the names of spices by combing through the published literature and online databases; whether botanical as described above, historical, or culinary. Always, prioritizing the existing linguistic and philological treatises, of course. I have linked the collected spice names to the respective spices and the result of this is an inventory of nearly 400 spice names that link to the

¹<https://library.hkbu.edu.hk/electronic/libdbs/mpd/index.html>

²<https://library.hkbu.edu.hk/electronic/libdbs/mmd/index.html>

³<https://libproject.hkbu.edu.hk/was40/search?channelid=44273>

⁴<https://herbaltcm.sn.polyu.edu.hk/>

initial set of 24 spices. For each spice, I tried to collect their names in the three languages, and it was also my goal to record where I have found these names. Therefore, thorough citations are available in the dataset pointing towards books, journal articles, databases, dictionaries, or sometimes even Wikipedia. As a preparatory step for the linguistic analysis, I have added some annotations.

Conventionalized Terms

First and foremost, I have checked the words against dictionaries to see if their use is conventionalized or not, and I have marked words that appear in a dictionary. If a word occurs in multiple dictionaries, I only recorded the one that I deem the most authoritative or reliable, unless they are both extremely interesting entries or contradict each other.

Present Status of the Terms

Then, as an internal operational measure, I have assigned the names into categories regarding their lexicographic status as spice words: default, alternative, historic, archaic, and obsolete. This was mostly for myself to better orientate after the terms started to accumulate, and I used the following scheme:

“Default” marks the names the spices are mostly prevalently known by today, that most people are familiar with. They comprise the words that should be most commonly found in a dictionary, or most frequent in a corpus. These are also the names what you see as section-headers in the thesis. These names also act as keys in my datasets. The term “default” as an indicator is somewhat arbitrary, since there is no reason for one item not to have several equally relevant synonyms (e.g., *chili* vs. *chili pepper*), but I needed to chose one main term to represent one spice. The reasons for this are the following: (1) I needed a convenient way to “call” each item, so they can be efficiently compared across the three languages. (2) I needed an identifying key for all of the other names of the same spice, and (3) I wanted to avoid any possible confusion between item that have overlapping common names (i.e. *pepper* vs. *pepper* is problematic, so I settled with *pepper* vs. *chile*⁵). The rationale behind the default set of names in further explained in chapter 5.

“Alternative” refers to any other current name that a spice can be known by, regardless of popularity, context, or reason. For example, *aniseed* is an alias for *anise* (the default term), and *Chinese parsley* is an alternative name for *coriander*.

“Historic” refers to once important terms that were the at a certain point in history would have been considered default, and—due to their role and popularity in the past—still relevant today. This category especially includes cases where spice was attested under a different name from what it is known by now. For example, *badian* is now a chiefly historical term and was attested before the now standard *star anise*.

“Archaic” refers to historic words that are rare and not relevant today, but still recognizable, such as *Guinea pepper*, anno an early name for Cayenne pepper, but referring to one of three African spices today.

⁵In my dataset and code, I use the more botanically affiliated term, *chile*, to avoid confusions/errors due to spelling.

“Obsolete” refers to names that are essentially dead, cf. *amomum*, which was last used for a specific spice in the 19th century. If a dictionary uses these remarks, (e.g., obsolete), I comply with the dictionary. I have identified a few more cases that could be best characterized as “speculative”, this refers to spice names that are not attested anywhere, and I assume them to be the author’s invention/translation.

I have highlighted the so-called default items as they also act as a keys or identifier (ID) to the rest of the alternative names corresponding to the same spice.

Borrowed Terms

In my analysis, I have marked spice terms according to their borrowed status. Based on data from dictionaries, etymological dictionaries, primary and secondary literature and my own judgment, I have indicated if the name is a borrowing or not, or whether it needs further checking. I have annotated spice names with ‘yes’, ‘not’, and ‘maybe’. Whenever available, I relied on word origins from general and etymological dictionaries for this information, but for a number of words I could not find existing entries or published research (see section 3.2.3). Whenever this was the case, I used historical corpora to find the earliest records, and in a handful of times where even this attempt failed, I resorted to estimation based on circumstantial historical sources. These are all marked in the relevant dataset.

On a deeper level, I have also annotated the nature of the borrowing: whether it is a phonetic loan, calque (loan translation/semantic translation), learned loan, or phono-semantic matching, and marked folk etymologizations.

Meanings, Literal Meanings, Glosses

For every term in Arabic or Chinese, I added a gloss, so the literal meanings could be decoded, and most names also have written notes and comments on their logic, formation, origin, or any other remarkable aspect. Sometimes a short explanation is needed to understand the emergence of a term, or the grounds for its existence. Soon, the dataset of spice names was populated with terms corresponding to the botanically informed binomial names and the materials they represent, and based on the information from stage one, the names were also annotated with the macro-areas of their native geographic origin.

Attestation

I have also recorded the details concerning attestation where available, noting a date, approximate date, century, and period (i.e. early Old English, Tang dynasty, etc.). For this information I used dates from the [OED](#), in English, and historical corpora for Arabic and Chinese where available. The source of the attestation dates are noted in the dataset. I have also tried to gather the pre-modern documents where each name was recorded, with the title and author of the historical works for future reference.

3.2.3 Collecting Etymologies

In the third stage, I have collected detailed etymological information on selected names: the terms that were marked as default, and a few historic and highly relevant alternative names (aliases). Doing so, I now have a parallel set of spice nomenclature of the three languages for 24 spices, and I can compare them in terms of borrowed status, and their etymological development and origins. The etymologies will be discussed in the next chapter in detail, under every spice, and I also highlighted them using dedicated environments called *Etymology boxes* (see for example Etymology ??).

In terms of representation and storage, I deviated from the usual text format, and I have recorded etymological data in a way that it is machine-readable, but still easy to grasp and edit for the human eye as well. I have separated etymological stages, and types of information for each word, creating large spreadsheets that is relatively easily accessible and modifiable for both man and machine. Doing so, I enabled a way to extract only specific information when needed (sources, attestation dates, donor languages, etc.). I also facilitated for geospatial plotting that can be found in chapter 5, which gives a visual representation of the etymological stages the words have embarked on.

3.3 Sources

3.3.1 Primary Sources

One core component of this study is philological research. Philology is the meticulous study of literary texts, primarily of historical documents, to study language, history, philosophy, literature, culture, religion, or any traditional knowledge of exceptional importance strongly connected to a society, primarily through the analysis of historic texts (sometimes written in now dead languages). Modern philological research relies on two types of sources: primary and secondary literature. Primary literature denotes historical texts, the so-called classics, for example, the already mentioned *De Materia Medica* of the Greek physician Dioscorides (c. 40–90 AD) (Dioscorides, [ca. 50–70/2005](#)), books of Roman historians, such as Pliny the Elder (23/24–79 AD) and his *Naturalis Historia* (Pliny the Elder, [77/1855](#)) are good examples, not to mention the 1st-century AD cooking book by Apicius (Apicius, [1977](#)). There also available *materia medicas* from the Islamic scientific golden-age, such as the *al-Qānūn fī l-Ṭibb* [*Canon of Medicine*] of Ibn Sina/Avicenna (980–1037) (Ibn Sīnā, [1025/1329](#)) and fantastic miscellanies from the Tang dynasty era, such as the *Youyang Zazu* [*Miscellaneous Morsels from Youyang*] from the 9th century (Duan, [ca. 860](#)). Indeed, we must not forget the Bible or Quran, as they are also rich historical and linguistic sources for our topic. A number of these primary texts are available in their original form through museums' and libraries' online databases, as transcribed editions in historical corpora, and of course published English translations. A vast number of classical texts (Greek and Latin) can be accessed through the Perseus Digital Library (Crane, [n.d.](#)). Critical editions of a classical text, such as that of the famous *Periplus Maris Erythraei* by Casson ([1989](#)), or de Goeje ([1870](#))'s *Bibliotheca Geographorum Arabicorum* series are also considered primary. Ancient and Classical dictionaries, such as the *Shuowen Jiezi*, or the *Lisān al-ʿArab* are also an integral part of philology. Secondary literature is everything else building on these works, monographs, histories

reviewing a multitude of authentic texts, published in recent times.

3.3.2 Etymological Dictionaries

Besides the literature itself discussed earlier, a core part of the philology component in this research are etymological dictionaries. Etymological thirst, the seeking of word origins was one of the cardinal thrills for early thinkers ever since Plato, and we will make use of the advances made in the past centuries. The OED has detailed etymological information based on previous works on English and for other languages, a couple of works to be mentioned are for Greek Beekes and van Beek (2010), Hebrew, Klein (1987), Old Chinese Schuessler (2007) and Chinese Liu et al. (1985). Unfortunately, Arabic lacks an authoritative etymological dictionary for many reasons⁶, but we can still turn to essential reference works such as the *Encyclopaedia of Islam*⁷ (Bearman et al., 1960–2005) or the *Encyclopaedia Iranica*⁸ (Foundation & Yarshater, 1996–present).

3.3.3 Reference Dictionaries

Key dictionaries were consulted throughout the data collection process, the following is an enumeration of the general or historical dictionaries I used:

Note 3.3.1. References to dictionary entries are made very frequently in this dissertation, and so I made the decision to use a compact way of citing dictionaries. Instead of following the standard APA 7th guideline and referencing every entry separately, I will indicate the entry as a page number or headword and reference every dictionary just once. This would save us from the pain of reading (Oxford University Press, n.d.-a) (Oxford University Press, n.d.-b) (Oxford University Press, n.d.-c) and its endless permutations. This minor deviation from the APA style will make the number of dictionary entries in the bibliography less oppressive, and the running citations more reader-friendly. I will also use footnote citations whenever I reference a dictionary, and I stick to this practice throughout the dissertation to make reading more comfortable.

3.4 Corpora

The second major component of this study is corpus linguistics, and I will use corpora from three major languages: English, Arabic, and Chinese. I chose these languages for two reasons. One, they represent three influential civilizations in the history of spices, as well as powers actively participating in trade throughout history, each having its zenith at slightly different historical periods, as I described previously.

For modern corpora, I will use the English Web 2020 (enTenTen20, circa 36.5 billion words), the

⁶For a brief overview on the matter, see Blažek (2006)

⁷Limited access online at <https://referenceworks.brillonline.com/browse/encyclopaedia-of-islam-2>

⁸Accessible online at <https://iranicaonline.org/>

language	type	period	corpus	size
English	web	modern	enTenTen20	36,5billion words
Arabic	web	modern	arTenTen12	7,5 billion words
Chinese	web	modern	zhTenTen17	13,5 billion words
English	books	historic (15–19 th c.)	EHBC	826 million words
Arabic	books	historic (7–12 th c.)	KSUCCA	47 million words
Chinese	books	historic (–20 th c.)	Chinese Text Project	25 million characters
Chinese	books	historic (–20 th c.)	Scripta Sinica	797 million characters
Chinese	books	historic (–20 th c.)	CBETA	? million characters

Table 3.1 The list of corpora consulted in the thesis.

Arabic Web 2012, preprocessed with the Stanford tagger (arTenTen12, ca. 7.5 billion words), and the Chinese Web 2017, Simplified version (zhTenTen17, ca. 13.5 billion words), all hosted on the *Sketch Engine* (SkE) (<https://www.sketchengine.eu/>) (Kilgariff et al., 2004, 2014). Enormous web corpora such as the above contains billions of words, therefore I will certainly have enough instances even for spices more rare.

In terms of historical corpora, I have consulted a few collections. For English, I relied on the *English Historical Book Collection* (EHBC) (EEBO, ECCO, Evans) hosted on the Sketch Engine, that is around 826 million words and contains books published between 1473–1820, with a vast majority written around 1600. English also has a good coverage on the Google Books project ???. For Arabic, I have settled on using the *King Saud University Corpus of Classical Arabic* (KSUCCA), which is around 47 million words containing literature on various genres between the 7–11th centuries, ranging from books on medicine, geography, law, history, and religious texts (Alrabiah et al., 2013; Alrabiah et al., 2014). As for Chinese, I have frequented the *Chinese Text Project* (CTP) (Sturgeon, 2021, n.d.) which has base of 25 million characters pre-modern Chinese documents, not including the community edited texts. I also used the *Scripta Sinica* (SS) (around 754 million words), containing classics ranging from ancient times up until 1949 (Academia Sinica, 1993–2008); the *Quan Tangshi* 全唐詩 [*Complete Tang Poems*] (QTS) [Tang poetry collection], which contains around 48,900 poems; and the *Chinese Buddhist Electronic Texts Association* (CBETA) project, which contains the Chinese Buddhist Canon, also known as the Chinese Tripitaka (Ch'en, 1964, pp. 365–386). Thus, accommodating textual heritage from ancient times up until the 20th century.

The Diffusion of Spices

IN this chapter, I will present the findings on the diffusion of spices, by looking at the distribution of spice plants and their primary names. First, an overview about the spices' geographical distribution will be presented, then, a discussion on their spread and *spreadability* will ensue. Lastly, I will present my findings on the diffusion of wandering spice names along spatial and temporal trajectories, and how it relates to the botanical reality. The aim of this chapter is to have an understanding of how spices spread around the globe as informed by their names and etymologies, but at the same time supported by the evidences and current state of their physical diffusion.

4.1 The Geographic Distribution of Spices

In general, it is true that spices come from the hot and humid tropical regions, especially Asia. However, there are number of aromatic plants that originate from more temperate regions, here we should think about the umbelliferous plants of the West and Central Asia: asafoetida, fennel, cumin and caraway, and others, and we must not forget the three American spices: chile, vanilla, and allspice. Figure 4.1 shows the macroareas where the 24 spices originate.

Botanical databases, such as [POWO](#), often show distribution and give us the regions where a plant is *native* to, and where it has been *introduced*. “Introduced” means that the plant is not native in the area, but now grows wild due to human intervention—whether the plant escaped cultivation, or became naturalized after accidental introduction—or due to natural spreading. Looking at this information reflects on the plants' ability to adapt and grow in new places, but also hints on how human usage and transmission affected habitats. I have collected this information and used it to compare the spices in question. I have simply counted the native and introduced regions, and added them up. In figure 4.2, you can see the spices ranked by the total number of the regions they grow in, including both native and where the plants were consequently introduced. I would like to highlight that the highest ranks are occupied by aromatic plants that are also herbs, both in the botanical and in the culinary definition. This makes sense, since these plants—e.g., fennel, coriander, dill, fenugreek, etc.—are not only cultivated for their seeds, but the leafy green parts are made use of as well, so it is without question that the whole plant “travels” to new places, not only its product. People transplant their ingredients whenever they can, unless the primary goal of cultivation is purely profit.¹

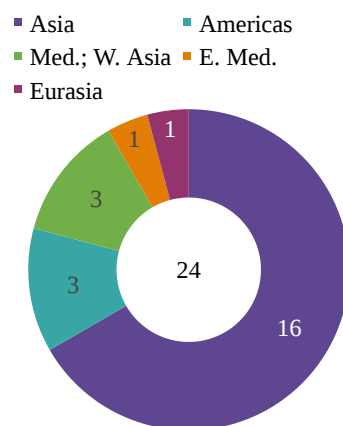
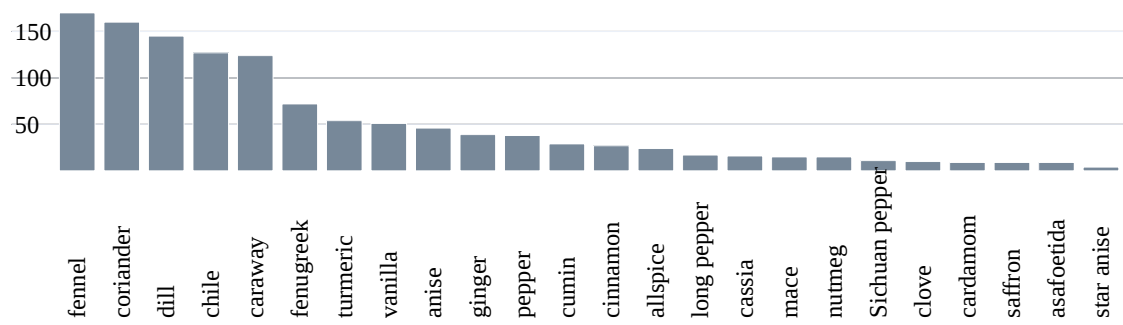
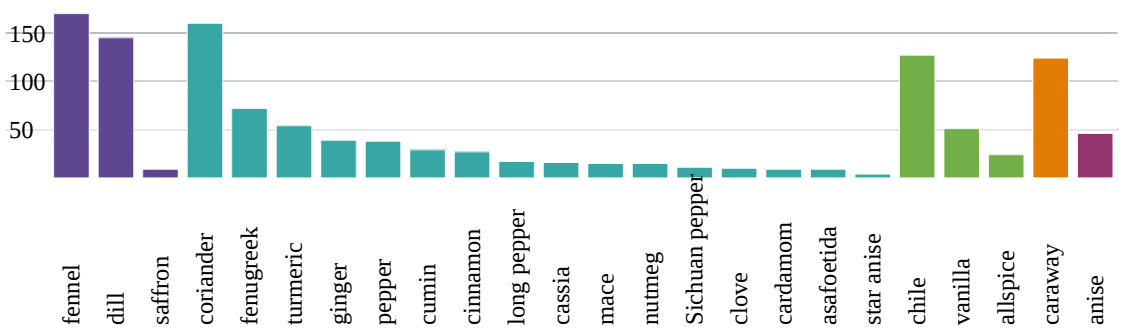


Figure 4.1 The distribution of spice plants by the macroarea of their native habitat.

¹The Dutch for example actively destroyed plant habitats, and wiped out whole islands—including the population—in the Spice Islands of Indonesia to generate scarcity and ramp up value during their monopoly rule in the 17th century.

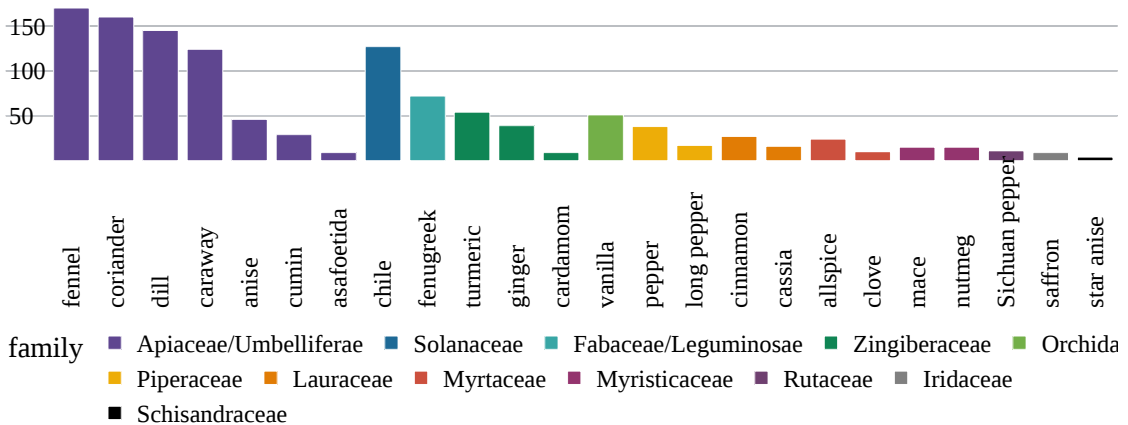


(a) Total number of growing regions.



macroarea ■ Med.; W. Asia ■ Asia ■ Americas ■ Eurasia ■ E. Med.

(b) Spices by total number of growing regions, grouped by macroarea.



(c) Spices by total number of growing regions, grouped by family.

Figure 4.2 Spices ranked according to the total number of regions they grow in, both native and introduced.

The far side of the ranking also shows the spices that do not grow extensively across many regions, regardless of how valuable or popular they are. Of course, behind this, are the complex issues of plant biology, ecology and the many factors that decide a plant's resistance to transplantation and if it can grow in new, alien environments. However, there is another point to notice here: labor. The lower ranks feature spices that are highly labor intensive to cultivate and harvest, including star anise,

cardamom, and saffron, but the collection of asafoetida is cumbersome as well, and this also affects prices. Interestingly—and of course, closely related what was just said—all of these are products that are very specific plant parts, the pericarps (star anise, Sichuan pepper), dried oleo-gum-resin, (asafoetida), stigmas (saffron), and dried flower buds (cloves). Figure 4.2 also shows a grouping by macroarea and by plant family as well.

4.2 The Spreadability of Spices

When it comes to spices of commerce, there is a factor that greatly weighs in on their diffusion: their ability to spread. I have noticed that while some spices were very expensive at some point in time (or still are) others, with the same levels of demand, were never particularly costly. Related to the ideas of supply and demand, the answer to this question was scarcity; or in this case, the lack thereof. To put it simply, a spice was expensive if it was rare or its supply was tightly controlled (not unlike diamonds today). Spices that could be easily grown anywhere were transplanted early on and were therefore not considered for their lavish returns, however venerated and influential they were. The two best examples for this are ginger and chili.

If you have ever left a knob of fresh ginger on your kitchen counter for weeks or even months, you might have noticed that it does not rot, it will eventually sprout and start growing a plant (similarly to an onion or a potato). And if you want more ginger root later, you should put it into a pot of soil. This was the secret of ginger's prehistoric success, which is most well known in connection with Austronesian expansion that began around 5000 years ago, populated the Pacific, and generally believed to have unfurled out of Taiwan (Mirabal et al., 2013). The early Austronesians carried ginger everywhere on their migrations into Maritime Southeast Asia and the Pacific on their outrigger boats (a native Austronesian invention that enabled people to reach as far as Hawaii and Madagascar), as it was a valuable source of nutrition with added medicinal value (see Dalby, 2000, pp. 21–25). Ginger with its numerous health benefits strengthens the immune system, and was therefore an invaluable crop to carry on long ocean voyages and was a constant feature onboard ships of maritime Asia (compare the “discovery” of lemon's effectiveness against scurvy by British naval doctor James Lind in 1747 (Allan, 2021)). Accordingly, there is a reconstructed Proto-Oceanic term for ginger, **laqia* (Bellwood et al., 2006, p. 52), and a Malagasy term for ginger seems to correspond to a Sanskrit etymon: *sakarivo* < *śṛigavera* (Adelaar, 1994, p. 41). More recent genetic and archaeobotanical studies support the Austronesian expansion theory, which in the past two centuries was solely standing on linguistic grounds and reconstruction. The names of ginger are among the linguistic clues that helped anthropologists, ethnographers and linguists establish a chronology. But there is a botanical clue as well that this is a very ancient spice and a long-term product of trade: it is not found in the wild anymore (Ravindran & Nirmal Babu, 2005). Although it is naturalized in India, it is believed to originate in Southeast Asia (Ravindran & Nirmal Babu, 2005). The ease of ginger rhizomes' transportation over long distances means that it has spread to other tropical and subtropical regions at a very early time, making the primary center of domestication hard to locate. It was hence called the most widely cultivated spice (Lawrence, 1984), which I am almost certain today would be the chili pepper. Dalby

(2000) also points out that because humans propagate ginger for millennia by splitting the rhizome, it has also lost its ability to be grown from seeds.

Chili on the other hand can reproduce from seeds, and easy to grow in temperate areas as well. So much so that the American spice became an integral part of many European, African, and Asian cuisines in less than a hundred years since its introduction by the Portuguese, and many often forget that it in fact came from the New World. The red peppers were introduced to Hungary by the Ottomans soon after their conquest marked by the Battle of Mohács in 1526, hence the initial name *törökbors* [turkish-pepper (of *Piper nigrum*)], but Hungarian *paprika* (attested in 1748, a borrowing from *Serbian-Croatian-Bosnian* (SCB))² soon came to be an integral part of Hungarian cuisine and identity. Chilies reached Asia soon as well, Dott (2020) in his well researched book about the cultural history of the chili in China writes that an 1614 Korean encyclopedia noted “Now it is grown everywhere [in Korea]”, which means it has been introduced to Korea before, and even in 1621, some Chinese *bencao* author believed it to come from Sichuan! “It comes from central Shu [Sichuan]. Now it is found everywhere.”—reports the *Shiwu Bencao* (Dott, 2020, pp. 24, 28).

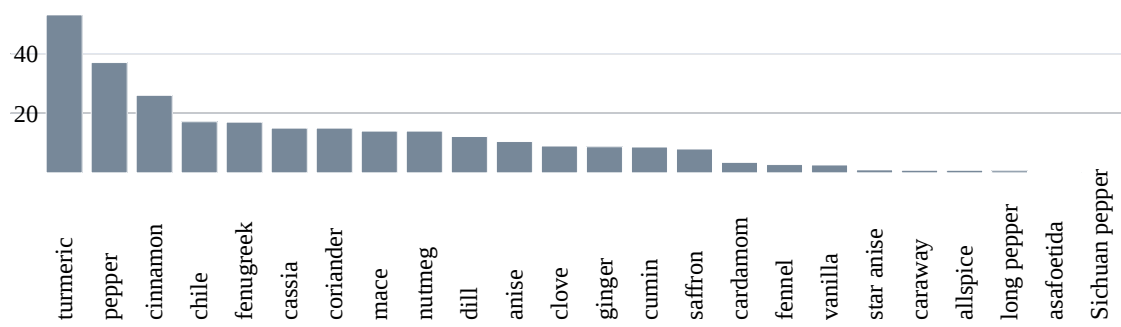
And so, it is clear that some spices spread more easily than others, affecting trade patterns, prices, and the diffusion of names. But how to compare this? How to measure it? To have a basic understanding of what effect spices’ ease or difficulty to spread can have on their diffusion, value, and global popularity, I created a rudimentary metric based on geographical-botanical data from POWO (POWO, 2022). I will call this *spreadability*. I have simply divided the sum of the introduced regions with the sum of the native regions to serve as a crude indicator of how “well” a spice plant have spread. Intuitively, this index is about spice plants’ ability and “ecological willingness” to spread to new regions, whether it is a result of human hands (by trade and transplantation) or nature (self-seeding, spread by birds, etc.) into neighboring areas.

$$\frac{\sum region_{introduced}}{\sum region_{native}} = spreadability\ index$$

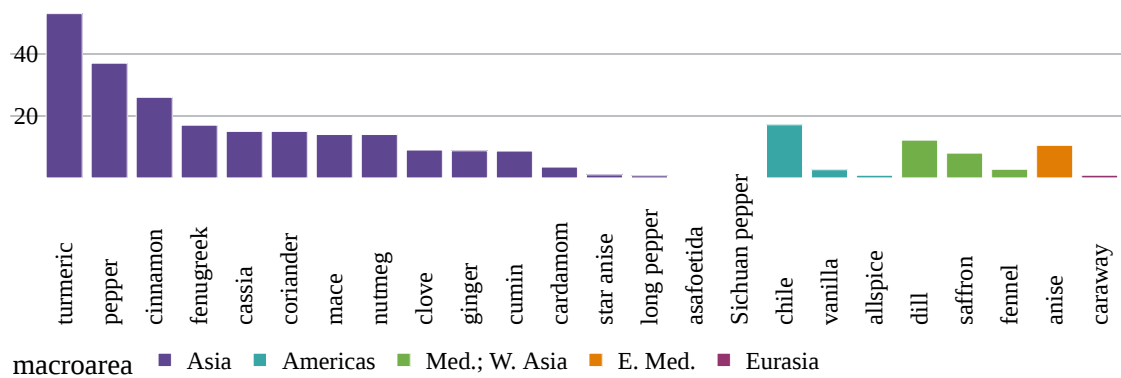
This metric accounts for the initial difference between if a spice was minimally distributed (i.e. only found in one or two regions), or well distributed before being introduced to either a few, or many new places. Figure 4.3 shows the spices ranked by their spreadability index. The figure shows for example tumeric, originally from “one region” (India), is now found in 53 other regions, resulting in the highest score of 53. On the far side of the plot, we can find Sichuan pepper, whose main source, *Zanthoxylum bungeanum* is indigenous to 10 geographical zones in China, but only have been introduced to one region (Uzbekistan), getting a low score of 0.10.

The results of this graph—like any other—greatly depend on the data we feed to it, and like any other quantitative analysis, has its limitations. Although the regions in the POWO database are uniform, they are not clear-cut ecological zones, but rather based on administrative divisions of countries, and it is not perfect. While some large countries are divided to broad areas that represent different biodiversity zones, the borders are arbitrary. For example, the United States, Australia, Russia, and China are divided by states, provinces, or greater geographical areas (e.g., New South

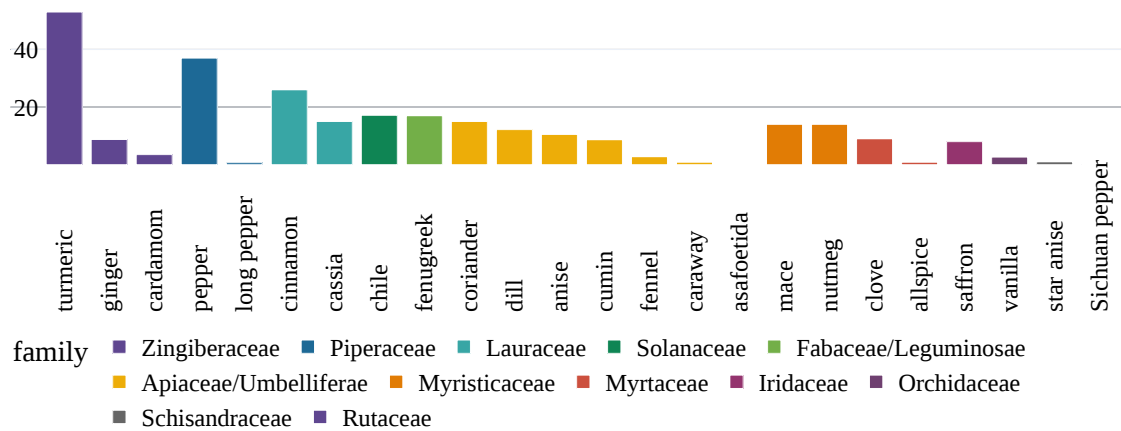
²Zaicz, 2006, paprika.



(a) Spices ranked by spreadability.



(b) Spices ranked by spreadability, grouped by macroarea.



(c) Spices ranked by spreadability, grouped by family.

Figure 4.3 Spices ranked by their spreadability index, showing which spice plants spread to more regions, taking into account the initial state of their distribution.

Wales, Central European Russia, China South-Central) India is just one unit, explaining the very high score of turmeric.³ Nonetheless, in terms of general usefulness the index has some merit. If we look at the distribution map of turmeric,⁴ we will see that it did indeed spread far and wide, from Southeast

³Another limitation might be the age of this database as we find zones named Yugoslavia, or Czechoslovakia, but I doubt the biodiversity changed as much as political borders.

⁴*Curcuma longa* on POWO: <https://powo.science.kew.org/taxon/796451-1#distribution-map>

Asia through West Africa to the Caribbean, and compared with Sichuan pepper⁵—which is still mostly limited to China—is much more well known globally. Figure 4.3 (b) and (c) also show the spices ranked by their spreadability index, broken down by macroarea and plant family. I have included the plant family groupings because it can be very interesting to those with affinity to the plant sciences. But truthfully, this particular grouping would be much more exciting when including more plants in these analyses.

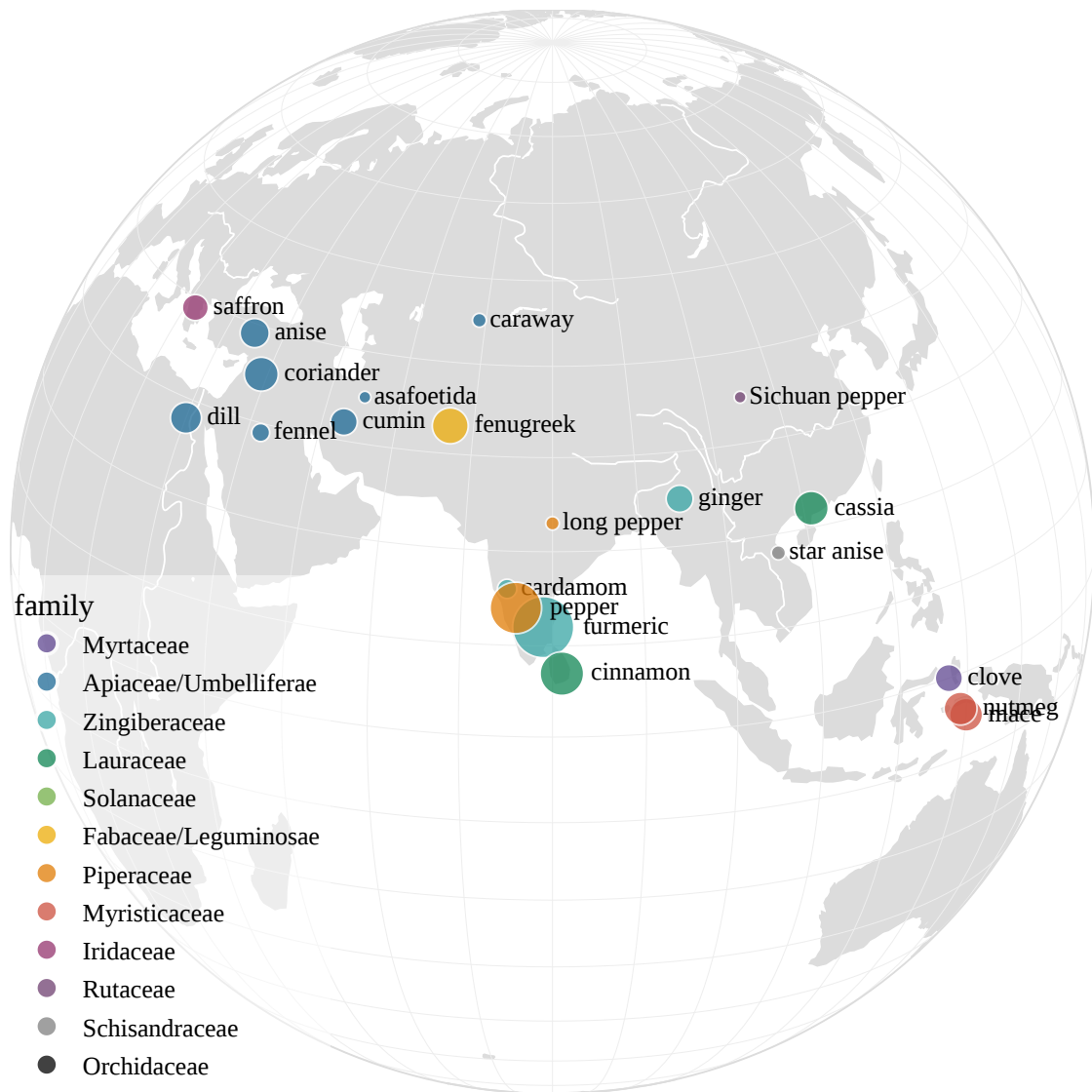


Figure 4.4 The approximate geographical origins of the spices in this thesis; size represents their spreadability index. For a full interactive version, please visit https://htmlpreview.github.io/?https://github.com/partigabor/phd-thesis-viz/blob/main/spices_map.html

Based on my readings and data from the botanical databases, I have tried to approximate the geographical origins of each spice in the thesis. Figure 4.4 shows this attempt, plotted onto the globe. In cases, where a spice's supposed native area includes a large number of expansive regions, I have opted

⁵*Zanthoxylum bungeanum* on POWO: <https://powo.science.kew.org/taxon/775625-1/#distribution-map>

for a geospatial mid-point as a compromise. Therefore, you can see caraway placed in the middle of Eurasia, because I used the coordinates for Eurasia, as it is marked native everywhere in Eurasia in the database. Most spice plants *fortunately* do not have so extensive native areas, and in many cases the exact origins can be pinpointed. For example, see the case of cinnamon, nutmeg, or cloves neatly situated on tiny islands of the Moluccas in present day Indonesia. The size of the data-points correspond to the their spreadability values, and they indicate very clearly that South Asian spices had a tremendous “success” in terms of global diffusion.

What we can know about the diffusion of spices beyond the botanical evidence, is in the history of their names. In most cases, the spice names spread with the materials, and have left a trace. Moreover, these linguistic traces—together with the close study of their history—can help us match or reconstruct the exact routes the materials took, accounting for important communities and cultures that have played important roles in their dissemination. The following section will focus on this phenomenon.

4.3 The Linguistic Diffusion of Spices

At last, turning towards the language element of spice diffusion, I will now illustrate the linguistic diffusion through the investigation of spice terminology and their spread on spatial and temporal dimensions, by tracing loanwords and analyzing attestation timelines. Before introducing the etymological findings, I must touch upon the terms’ borrowed status, which I have previously introduced briefly in section 3.2.2. Accordingly, this chapter focuses on the borrowed elements of spice terminology.

4.3.1 Borrowings: Loanwords and *Wanderwörter*

In order to accurately compare the itineraries of loanwords and *Wanderwörter* in a trilingual setting, I had to determine which spice names are in fact borrowed, and which are native derivations/inventions. In most instances, it is rather obvious if a word is a borrowing or not, while in others, it was not so easy to determine. For example, I initially assumed that *Sichuan pepper* (which does not occur in English dictionaries) is an English construction and therefore not a borrowing, but after trying to find its source, I learned that it is a calque (loan translation) from Chinese 川椒 *chuanjiao* [Sichuan pepper]⁶, devised in the field of herbal medicine (Hooper, 1929, p. 140). In short, I analyzed the names based on their borrowed status to find loanwords. The result of this analysis on the default names of the 24 spices can be seen in table 4.1.

The most important finding is that English has by far the most loaned terms in the spice domain—according to our modest sample of spices—followed by Arabic, and finally Chinese. Out of the 24 default names, there are 21 borrowings in English, 17 in Arabic, and 8 in Chinese. Figure 4.5 show the ratio of borrowings concisely. Of course, this figure alone can be misleading, since the difference in ratio between the languages is not representative only of the spice domain; the English lexicon has a

⁶Which uses the prototype spice word in Chinese, prefixed with the second character of Sichuan province (originally meaning ‘river’).

#	English	Borrowed	Arabic	Borrowed	Chinese	Borrowed
1	allspice	-	fulful ifranjī	-	duōxiāngguǒ	+
2	anise	+	anīsūn	+	huíquín	-
3	asafoetida	+	ḥiltīt	+	āwèi	+
4	caraway	+	karāwiyā	+	gěilǚzi	+
5	cardamom	+	hāl	+	dòukòu	?
6	cassia	+	salikha	-	ròuguì	-
7	chili	+	fulful ḥārr	-	làjiāo	-
8	cinnamon	+	qirfa	-	xīlánròuguì	+
9	clove	+	qaranful	+	dīngxiāng	-
10	coriander	+	kuzbara	+	yánsuī	-
11	cumin	+	kammūn	+	zīrán	+
12	dill	?	shibithth	+	shíluó	+
13	fennel	+	shamar	+	huíxiāng	-
14	fenugreek	+	ḥulba	-	húlúbā	+
15	ginger	+	zanjabīl	+	jiāng	-
16	long pepper	+	dārfilfil	+	bìbō	+
17	mace	+	basbās	+	ròudòukòugānpí	-
18	nutmeg	+	jawz al-ṭīb	+	ròudòukòu	-
19	pepper	+	fulful	+	hújiāo	-
20	saffron	+	za‘farān	+	fānhónghuā	-
21	Sichuan pepper	+	fulful sītshuwān	-	huājiāo	-
22	star anise	-	yānsūn najmī	-	bājiǎohuixiāng	-
23	turmeric	+	kurkum	+	jiānghuáng	-
24	vanilla	+	fāniliyā	+	xiāngcǎo	-

Table 4.1 Spice nomenclature, showing if the terms are borrowed (+), not borrowed (-), or maybe borrowed (?).

large number of loanwords in general. Dictionaries especially have a high amount of loanwords, but everyday communication features them greatly as well. For example, out of the top 1000 most frequent words in the *British National Corpus* (BNC), more than half are borrowed (usually from French and Latin) (Durkin, 2014, p. 38). We should always approach the percentage of loanwords in a language with caution and I will not cite numbers, but from my studies I know that the percentage of loanwords in English is certainly higher than it is in Arabic, and Chinese, which *prefer* to coin words using native elements.

Word formation in Arabic most often happens internally by utilizing the possibilities of the highly productive root system, but it seems that in the spice domain, loanwords entered the the Arabic vocabulary at high rates as well. Thankfully, the semitic root system and the rules of Arabic word patterns make it easy to spot loanwords. For example, if we take the words *zanjabīl* ‘ginger’, *za‘farān* ‘saffron’, or *qaranful* ‘cloves’, we can be sure that these are loanwords for the following reasons: There are no native quinqueliteral (five letter/consonant) roots in Arabic, the few existing ones are borrowings. Furthermore, there are no true “broken plural”, or related verbal forms for these words. Interestingly, a large amount of Persian (and other) loanwords in the domain of plants, fruits, and

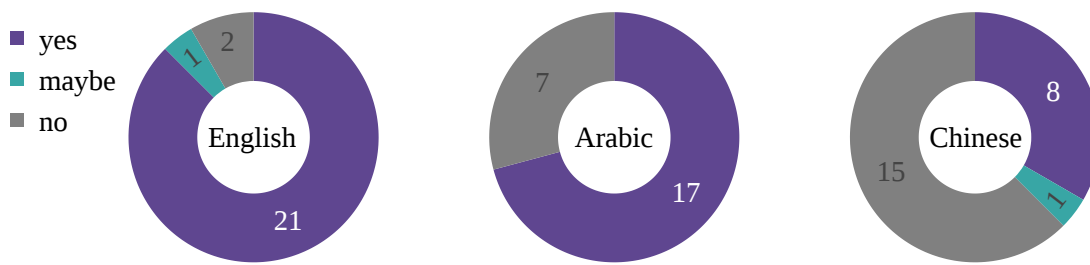


Figure 4.5 Ratio of borrowed terms in the spice nomenclature across the three languages, based on table 4.1.

vegetables have five-consonant roots, including eggplant, cauliflower, parsley, and oranges.

My knowledge on Chinese word formation is rather limited, but I would like to mention some phenomena. Firstly, it is well known that while Classical Chinese operated with monosyllabic, single-character words, modern Chinese has a strong tendency to prefer disyllabic words, mainly to to disambiguate homophones. Therefore, only the most ancient spices would have a monosyllabic etymon, Sinograms that convey the meaning of the spice on their own (e.g., *jiao* ‘pepper’, *jiang* ‘ginger’, *gui* ‘cassia’). In modern Chinese, ginger is the only one that still can stand alone, pepper and cassia are always affixed with modifiers to distinguish them from other items, and to fit the disyllabic trend. Loanwords will also often conform to this trend (e.g., *awei* ‘asafoetida’, *bibo* ‘long pepper’, ‘*ziran*’), and become disyllabic in Chinese when integrated. Tri-syllabic loanwords are often historical in this domain and not a common feature in day-to-day usage; they are not an integral part of the conventionalized vocabulary (e.g., *zafulan* ‘saffron’ *huluba*, ‘fenugreek’, *geluzi* ‘caraway’) Secondly, I want to highlight the curiosity of phono-semantic matching. In Chinese, loaned elements are sometimes incorporated by words that are phonetically similar and semantically related, thus hiding the word’s or morpheme’s borrowed quality. For example, *husui*, a name for coriander literally meaning ‘barbarian coriander’ is supposed to be a phono-semantic matching of an Iranian term (**koswi*, **košwi*, **gošwi*), according to Laufer (1919). I will discuss the naming of newly introduced items in more detail in the next chapter.

The fact that English has many loanwords in the spice domain is not surprising if we consider that all of these aromatic products are *exotic*, they are not from anywhere near England, or the Saxon homeland. As for Arabic, we know from the history of the spice trade that virtually all materials from Asia passed through the Arabian Peninsula, and the names of many spices with origins in West Asia predate the Arabic expansion of the 7th century and therefore in Arabic, many are loanwords from other Semitic languages. Loanwords in Chinese in the spice domain are much fewer in number, with most of the historic words being Silk Road terms, or contemporary creations for those introduced in modern times.

4.3.2 Spatial Trajectories: Tracing Spice Terms Around the Globe

In order to present the findings in a convenient, reader friendly, and interesting way, I turned to geospatial mapping. The plots seen in this section are made possible by utilizing the etymological

data on spice terminology, collected and introduced for each spice in ??, and justified in section 3.2.3. When creating these visualizations, I have included relevant historic names beyond the 24 default terms (such as *amomum*, *dārṣīnī* ‘cinnamon’, or *xīngqu* ‘hing’), and I have also left out terms that are not borrowings. Therefore, you will not find words on the plots such as *allspice*, *qirfa* ‘cinnamon’, or *hujiao* ‘black pepper’.

Spices Flow Into Europe: The Case of English

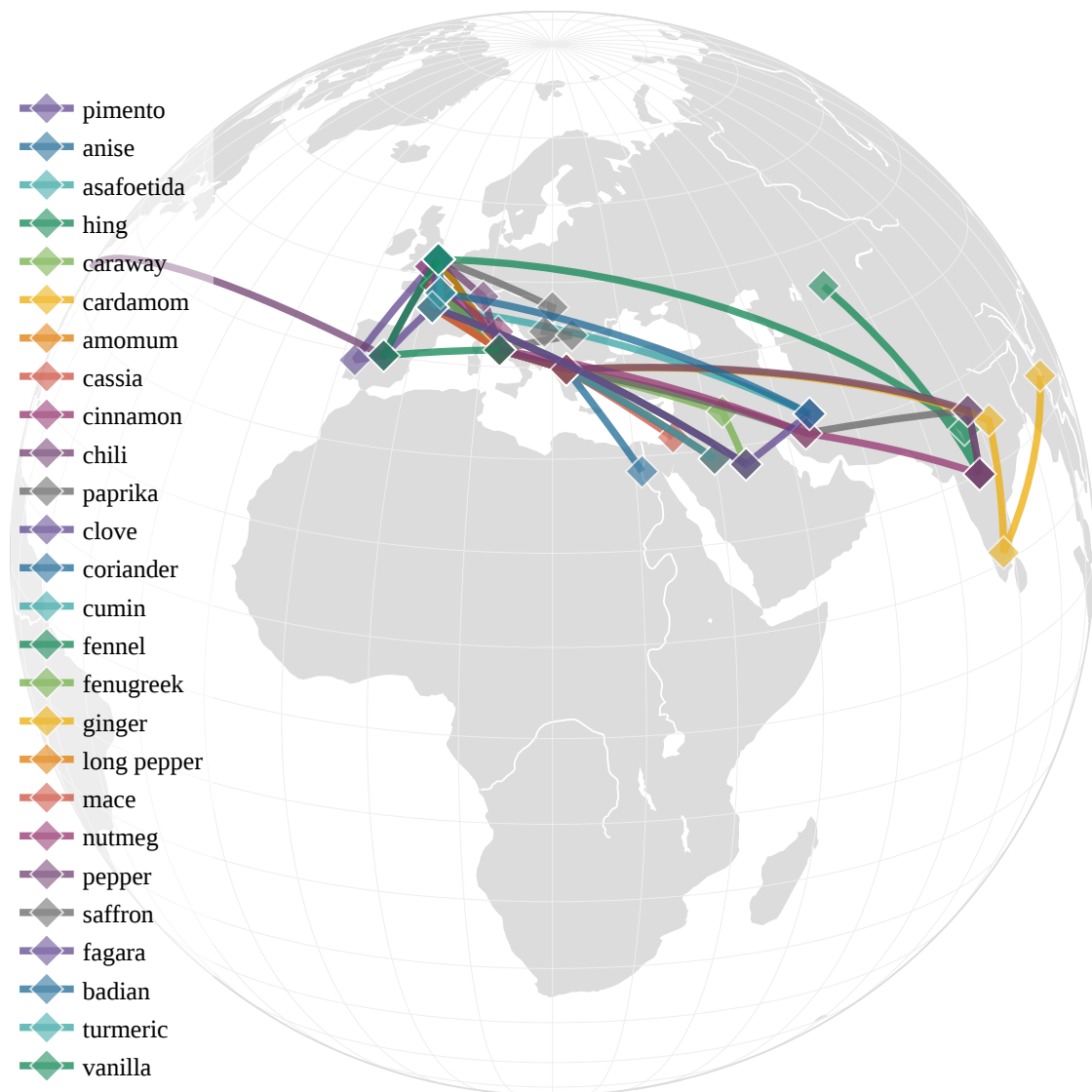


Figure 4.6 The diffusion of spice terminology in English, focusing on loanwords and Wanderwörter. For a full interactive version, please visit https://htmlpreview.github.io/?https://github.com/partigabor/phd-thesis-viz/blob/main/diffusion_en.html

Figure 4.6 shows the diffusion of spice names viewed from the progression of the words’ etymological stages into English. Words that were coined in English (i.e. not loanwords), are not present. What we see here, is a very clear trend in the dispersion of English spice terminology to have an East-to-West

directionality. Besides the few spices that came from the Americas, all via Spanish (*chili*, *pimento*, *vanilla*, where *chili* is represented by the single line crossing the Atlantic Ocean pointing to a Nahuatl etymon) after the 15th century, the majority of spice terms are oriental in origin, and have long histories reaching into times of antiquity and beyond.

Note 4.3.1. The geospatial plots in this section (fig. 4.6, 4.7, and 4.8) are a static version of interactive graphs available online via clicking the links given in the captions. I highly recommend examining these visualizations, as they supply further details on the words' histories, and most importantly, the traces can be isolated by double clicking on an item in the legend allowing for a clearer view and comparisons.

As far as space and distance go (and probably time as well), the most remote *Wanderwort* seems to be *ginger*, whose source can be traced back to a Dravidian language of South India, but even that has been identified as a loanword from an unknown Southeast Asian language⁷ (cf. ??). Based on the cognates in surrounding unrelated languages (Khasi, Thai, Old Chinese), we can assume that ginger in a very early *Wanderwort* of the region going back to a Proto-Tibeto-Burman reconstructed form, /*kjaŋ/ (Matisoff, 2003, p. 302). Even more exciting is the fact that besides English, the Arabic and Chinese words for ginger originate in the same etymon as well (cf. ??). Besides the extreme case of *ginger*, we should take note that words from India have passed through Persia and Arabia, and in the final stages, almost every loanword have arrived via French and/or Latin.

Spices through Arabia: The Case of Arabic

Arabic loanwords in the spice domain reflect where the Arab merchants sourced their spices from; either overland via Persia or by sea from India (e.g., *fulful* 'pepper', *dārṣīnī* 'cinnamon', *dārfilfil* 'long pepper', etc.). Regional Semitic borrowings are also present, these include spices that originate relatively close to Arabia and the people of the region knew and used them already; e.g., *kammūn*, *shibitt* 'dill', *shamar* 'fennel' traced back to Akkadian.

Spices in the Middle Kingdom: The Case of Chinese

4.3.3 Temporal Trajectories: The Attestation of Spice Words

After the investigation of how spice names reached English, Arabic, and Chinese on spatial trajectories, let us now look at how they have spread across time. One of the most exciting part of this thesis is the data that was collected regarding dates of attestation. In other words, I tried to find the earliest possible mentions for each spice, and then combine this information in a way that enables us to see the diffusion of spices span throughout the history of a language and culture. This information is a valuable indicator, as it shows the approximate times of the earliest contact and introduction of the materials. In essence, we can grasp the history of the spice trade in the words: when they

⁷OUP, n.d., ginger.

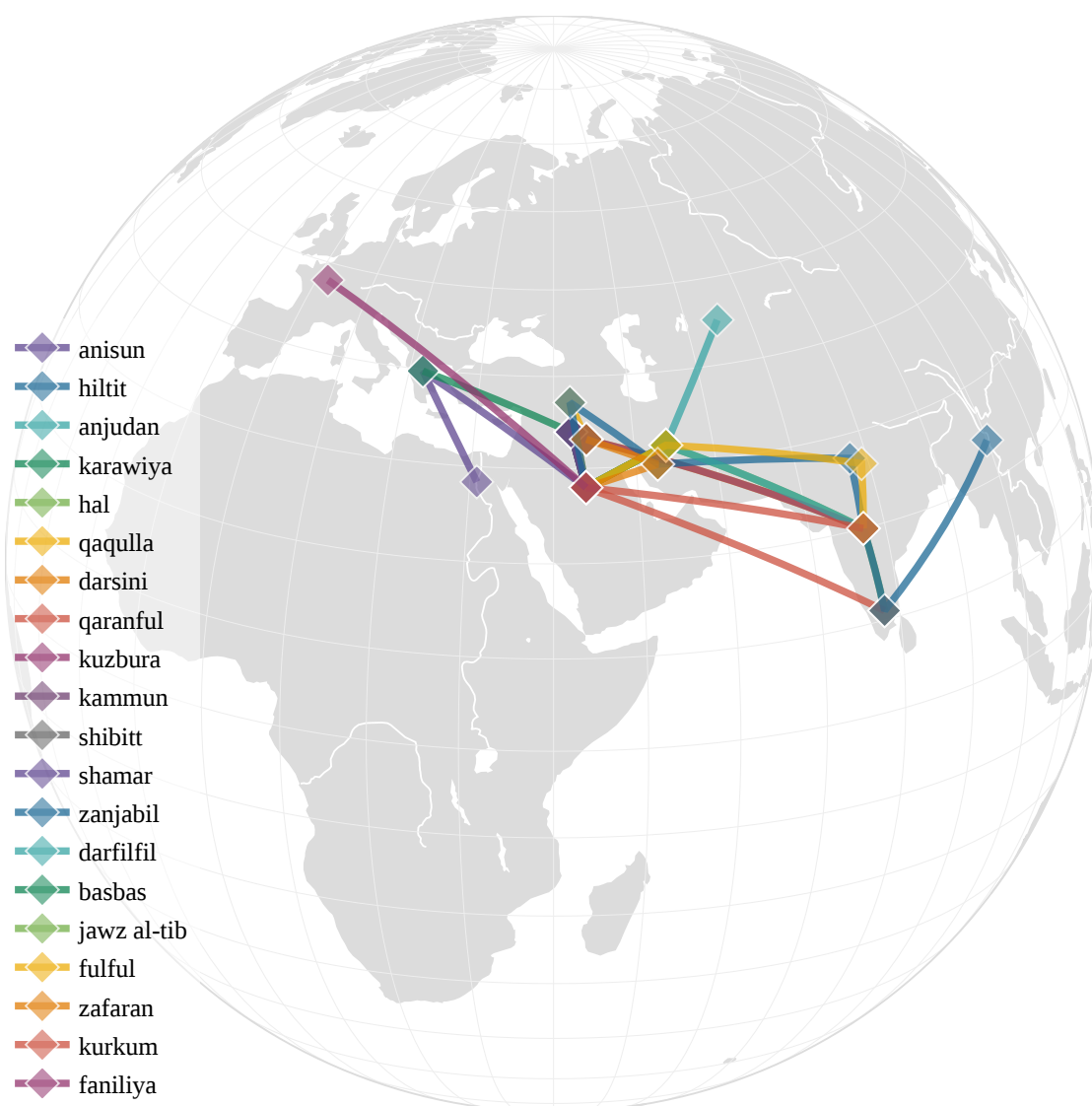


Figure 4.7 The diffusion of spice terminology in Arabic, focusing on loanwords and Wanderwörter. For a full interactive version, please visit https://htmlpreview.github.io/?https://github.com/partigabor/phd-thesis-viz/blob/main/diffusion_ar.html

arrived, which spices were the earliest to be recorded, and which ones make the latest additions to our vocabularies and spice cabinets. Here as well, from the nearly 400 names, I have used the selected few that—for lack of a better word—I marked with “default”. To make the attestation visualizations easy to read, I only used the default terms, and a small number of historic terms that precede the contemporary default ones. This allows for a less packed and cleaner plot and offers a way to compare the attestations in the three languages.

The following figures should give a bird’s eye view of the history of the spice domain, and its mark on vocabulary. In figures 4.9 to 4.11, you can see the timeline of the spice nomenclature language by language. Not surprisingly, these figures will show that the native spices that are to be found the closest to the homeland of the ancestors of English, Arabic, and Chinese speakers, have been recorded

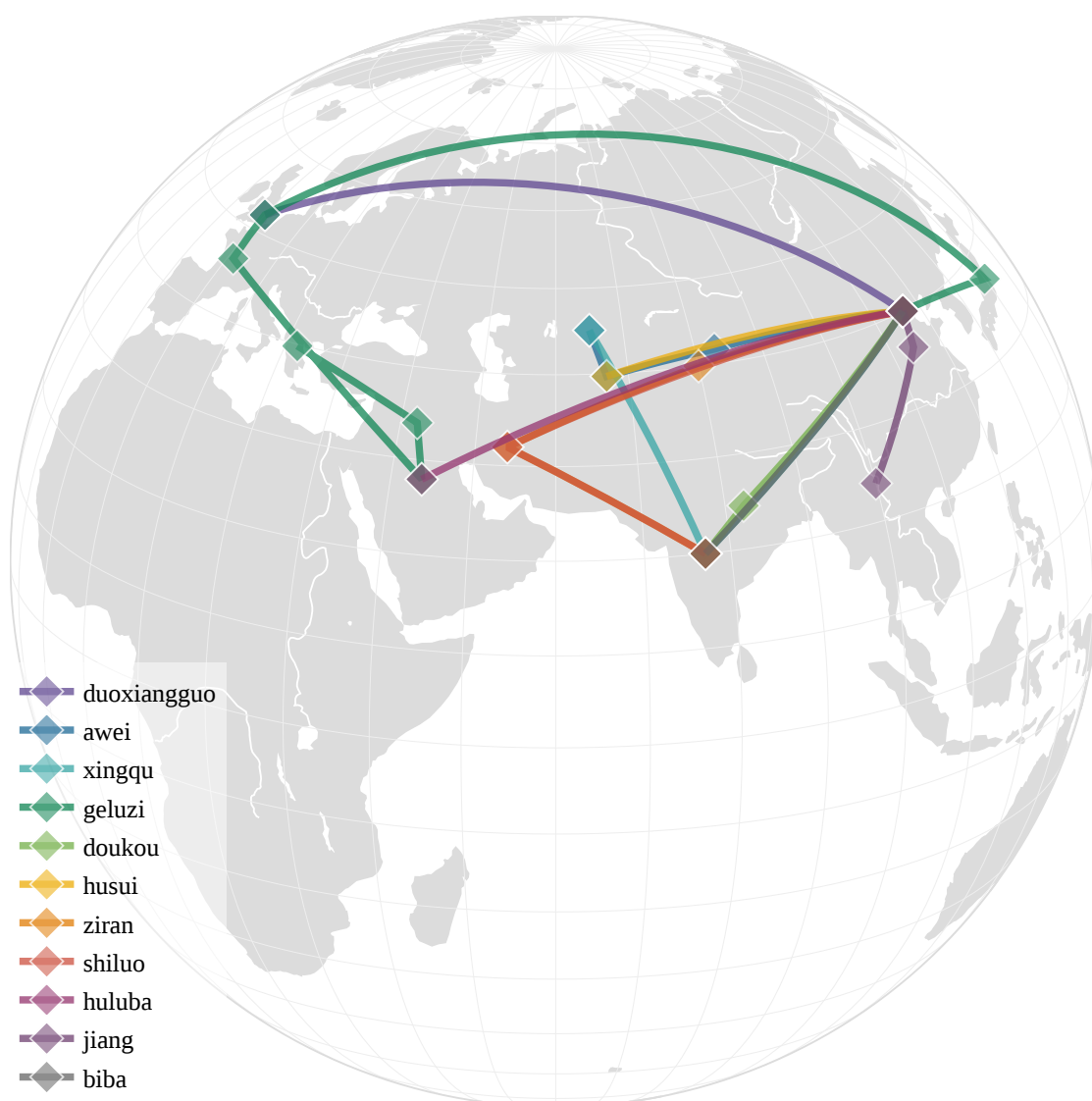


Figure 4.8 The diffusion of spice terminology in Chinese, focusing on loanwords and Wanderwörter. For a full interactive version, please visit https://htmlpreview.github.io/?https://github.com/partigabor/phd-thesis-viz/blob/main/diffusion_zh.html

first. See dill and fennel in English, saffron and fenugreek in Arabic, and Sichuan pepper and cassia in Chinese. If we reflect back to the geographical origins of the spices (figure 4.4) the figures also show which are the earliest products of transnational trade, those that spread first despite their origins were distant and unknown to the early recipients. Primarily, these include pepper and ginger, which we already discussed were ideal candidates because of their resistance to long-haul transportation and high scores of spreadability.

In the final trilingual plot in ?? I have produced a compact version of the same data, arranged by language. There is a chance to compare the main attestation periods for these items, and I added an accompanying histogram to better see which periods have seen the emergence of new spice words, indicating both flourishing periods of literature and trade.

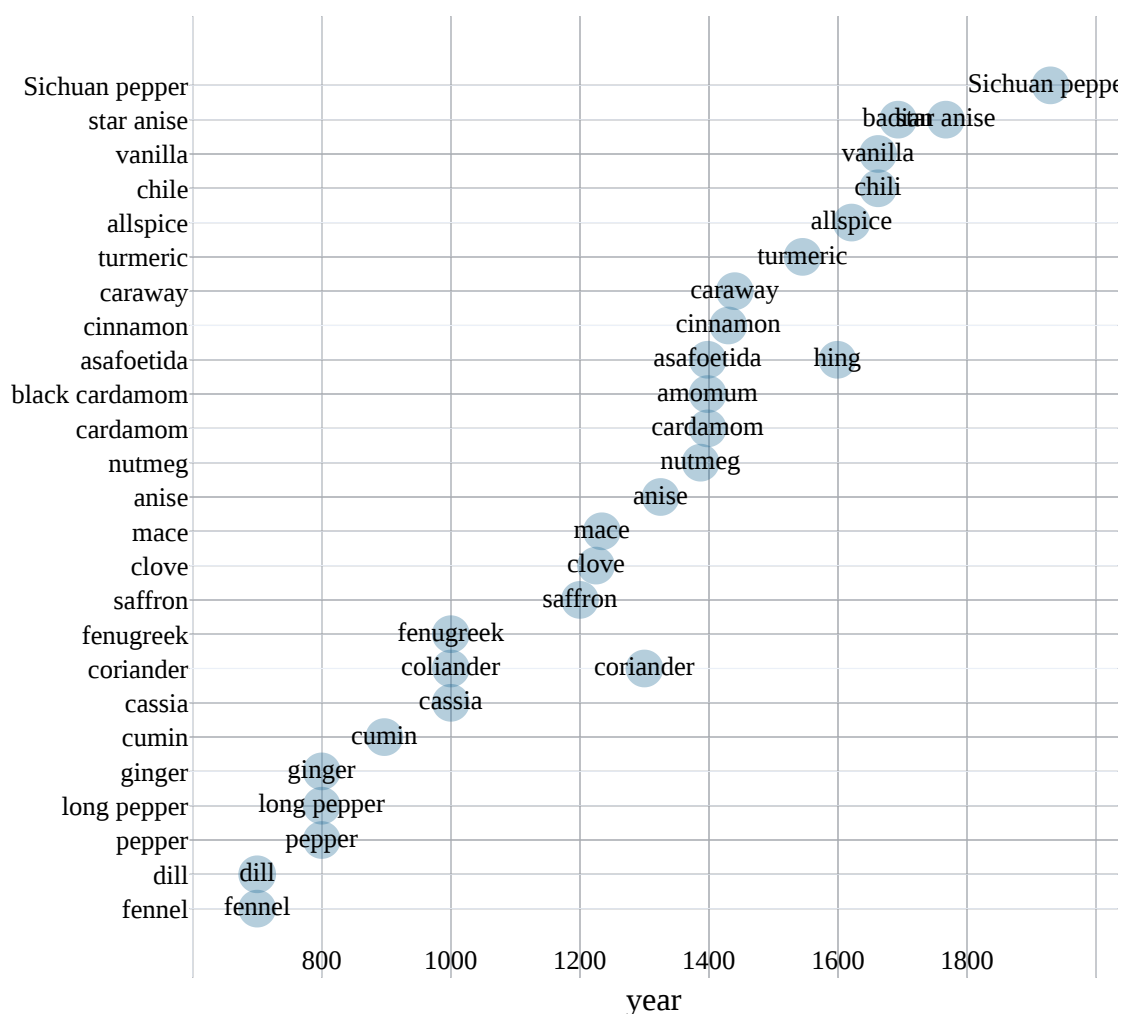


Figure 4.9 Spice terms attested in English.

Looking at figure 4.12, we can observe a few trends off glance. First of all, it is clear that Chinese—the language with the longest literary tradition out of the three languages—has the earliest attested spice words, primarily *jiao* ‘pepper’, originally referring to the indigenous Sichuan pepper, but now also used to denote the black pepper and chili pepper especially. In this sense, *jiao* is the equivalent of English *pepper*, and Arabic *fulful*. *Jiao* is followed in time by *gui* and *rougui*, referring to the spice we know and use as cinnamon (but actually cassia), a tree native to the South of China, in the immediate proximity of the ancient Chinese heartland. As for *jiang* ‘ginger’—also attested at a very early date—I have already mentioned the reasons for its early diffusion and consequent inclusion into the medicinal and culinary traditions of ancient people *worldwide*. The attestation dates of other spices distribute evenly starting from the 4th-5th century, which marks the introduction of Buddhism into China from Central Asia along the Silk Roads, entering through the Gansu corridor. Besides monks carrying saffron, and asafoetida, we must not forget the many nomads and traveling traders, who likely introduced pepper as well (literally (nomadic) barbarian-pepper in Chinese), before the emergence of the Sogdians responsible for the introduction of many articles of trade during the Tang

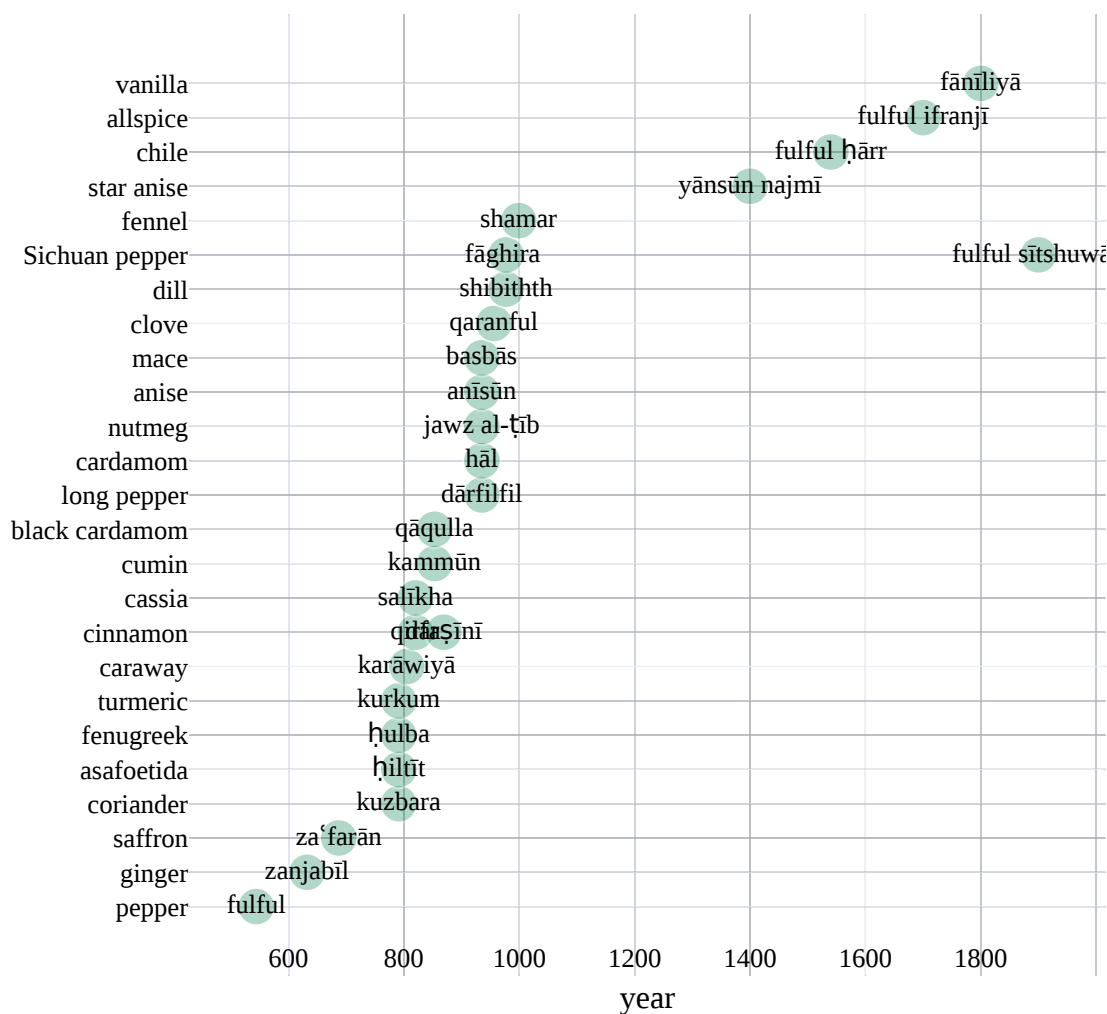


Figure 4.10

dynasty. The attestation of many spice names in the modern period is worth noting, these include spices that were known before but not distinguished (caraway seeds were not considered a separate spice from cumin, but were surely known in the Western Regions), or spices that were (are?) not used traditionally (allspice, anise, Ceylon cinnamon).

Secondly, there is an obvious jump in the attested Arabic terms in the 8th century, which is considered the start of the Islamic Golden Age. During this time, science and literature flourished under the Abbasid caliph Harun al-Rashid, and the “House of Wisdom”⁸ in Baghdad, the largest city in the world at the time (Gutas, 1998). It is worth noting that many of these terms became part of the Arabic vocabulary certainly much earlier than the attestation dates, but since the Arabic literary tradition begins with the compilation of the Quran (shortly after the death of Prophet Muhammad ﷺ

⁸The House of Wisdom (Arabic: *Bayt al-Ḥikmah*) refers to a large library and/or academy famous for the voluminous translation work that produced an output of scientific literature from all sources and traditions including Greek, Roman, Persian, Indian, and the Arabic literature that built on and advanced the various sciences. Recently it has been suggested that the House of Wisdom was not an actual library but rather a metaphor referring to the active scientific community as a whole during early Abbasid dynasty. The library—if it existed—perished during the total destruction of Baghdad in 1258 by the hands of Hülegü and the Ilkhanid Mongols, thus little archeological evidence remains.

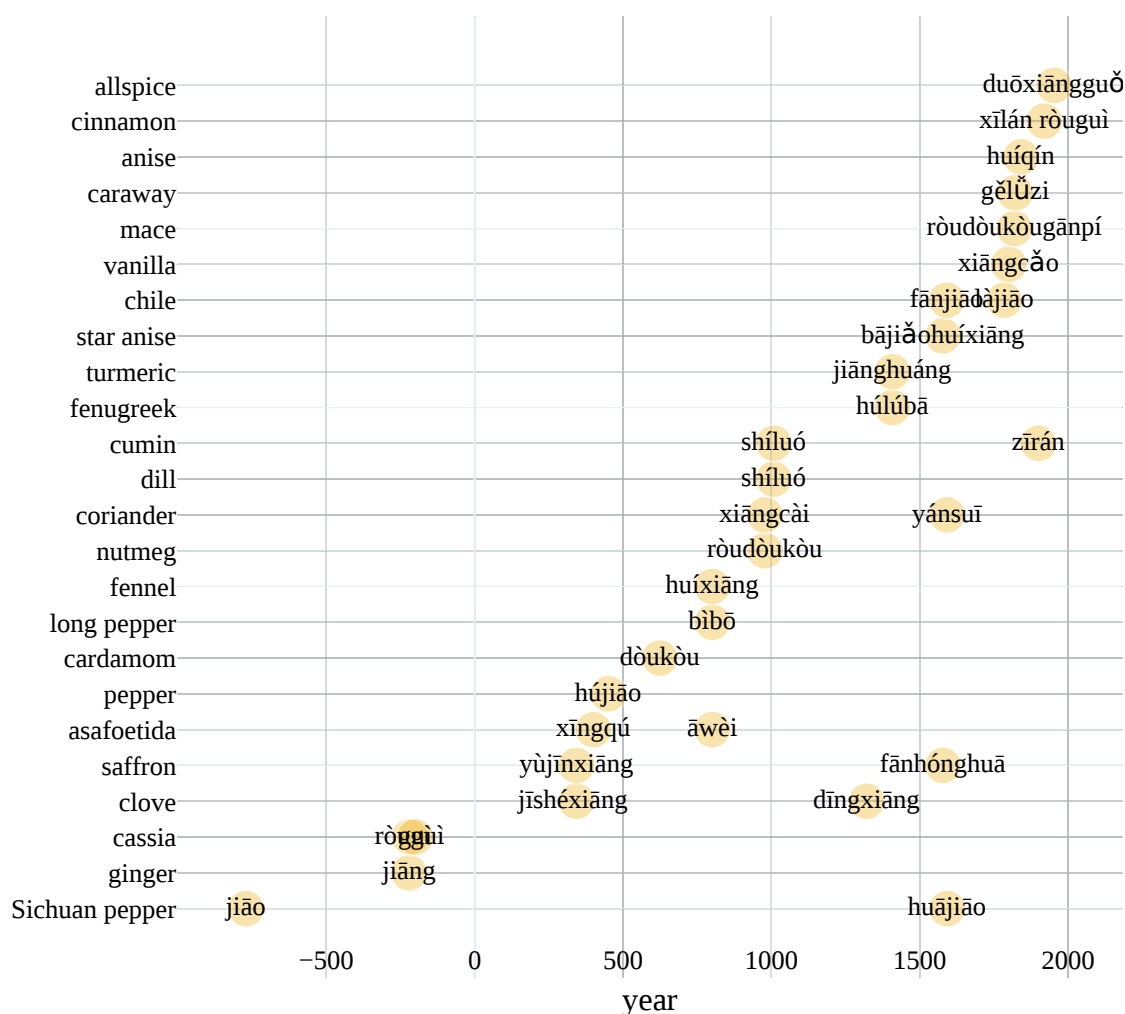


Figure 4.11

in 632), we have little early documentary evidence. The earliest example would be from the *Jahiliyya*⁹ era poet Imru' l-Qays, whose poetry features the word *fulful/filfil* 'pepper'.

Thirdly, English features a set of spices that were attested in Old English, many known to the Romans since Biblical times, such as... But we can also see the time when Europe became acquainted with further oriental spices after the Crusades, when the westerners who have acquired a taste for lavish eastern flavours started to bring them home.

The next trivial step is to add the feature of borrowings to the plot, to see chronologically which terms were borrowed, and which are native inventions.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus.

⁹Literally meaning 'ignorance', this term refers to the pre-Islamic period of Arabia.

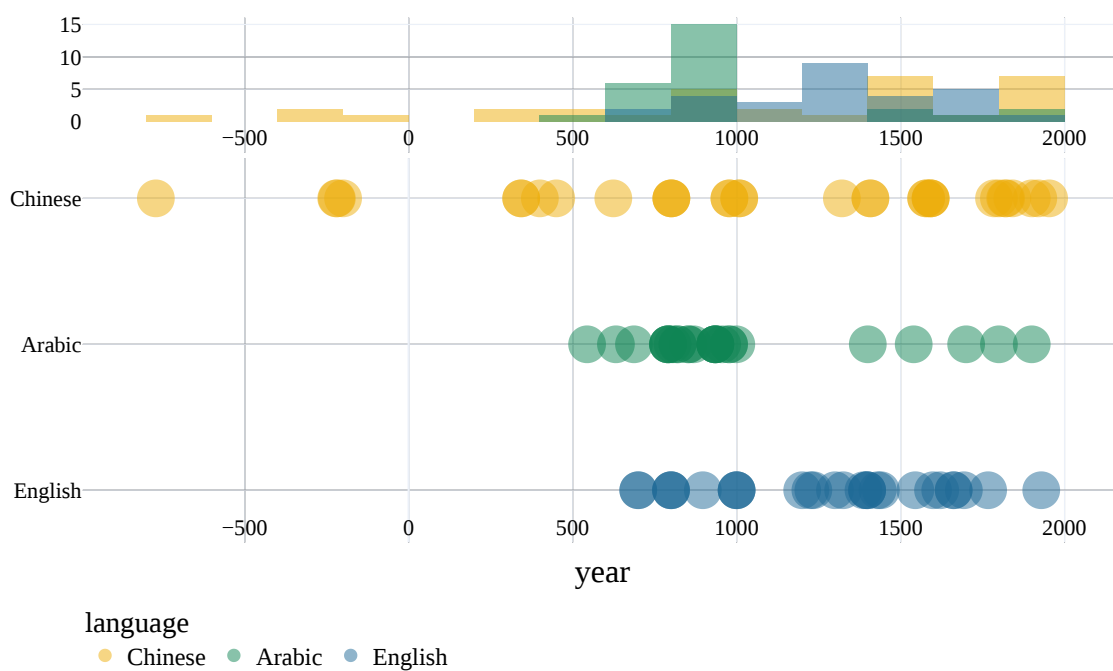


Figure 4.12

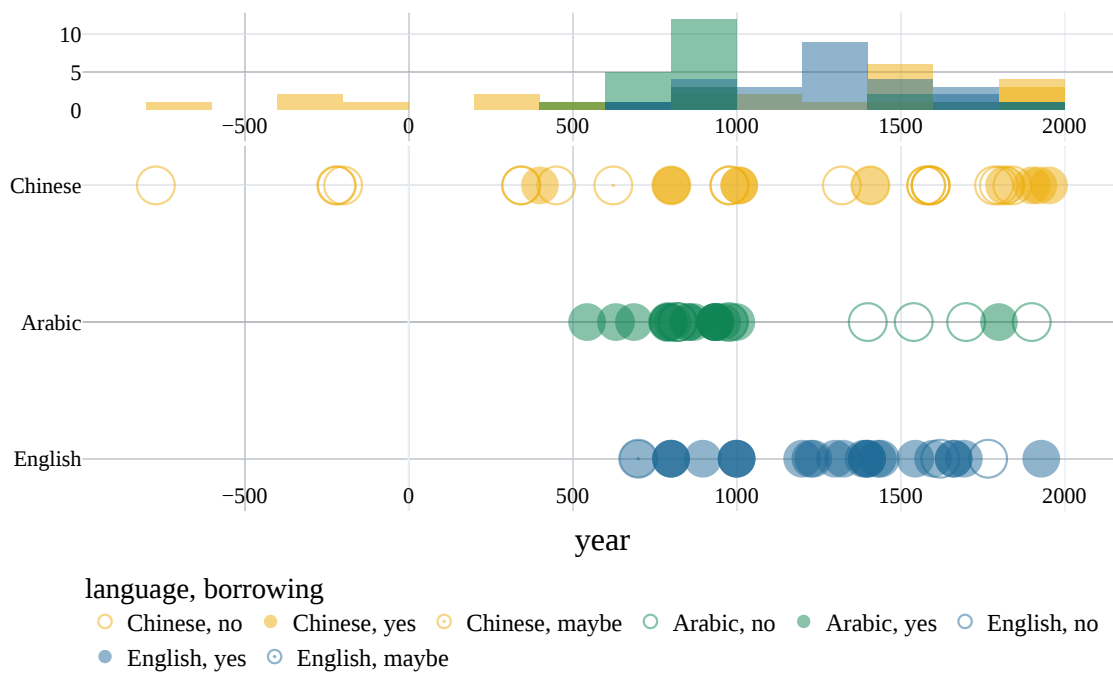


Figure 4.13

Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

4.4 The Donor Languages

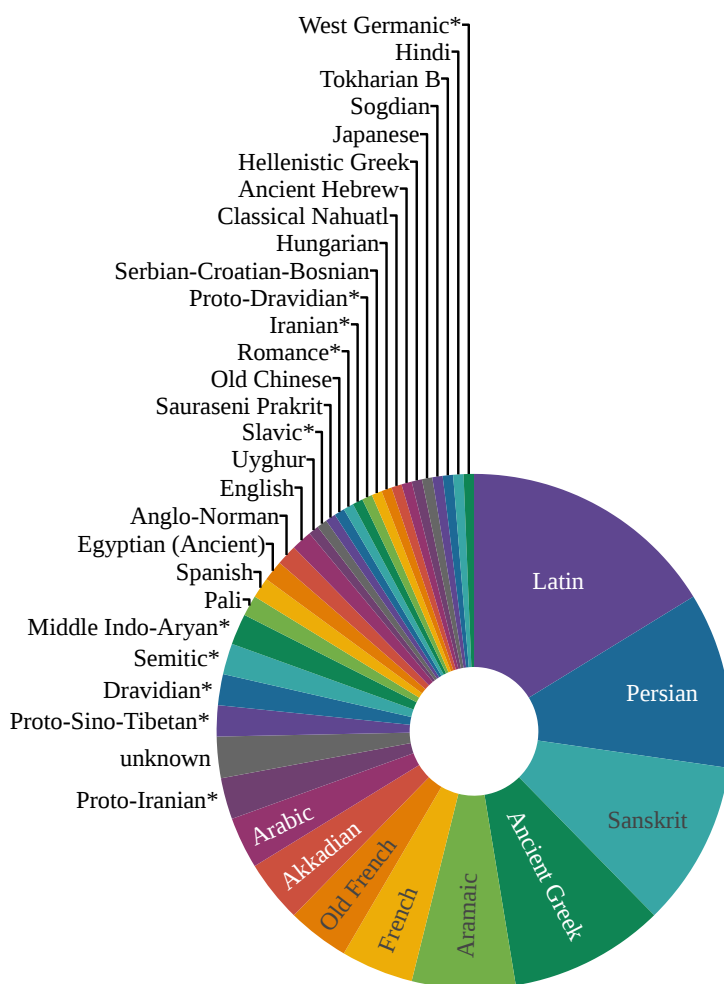


Figure 4.14 All identified donor languages of loanwords in the spice domain.

an asterisk, figure 4.14 is an illustration of these languages.

To give this batch of information some meaning, I have broken down this data according to our three reference languages, English, Arabic, and Chinese. You can consult this in figure 4.15. This bar chart shows the top 5 languages that have played a role in *carrying* loanwords of the spice domain, at any given stage, whether being the source, or a transmitting language. Speaking of source, figure 4.16 shows the top 5 source languages of the loanwords of the spice domain.

So who loaned these words? Which languages and civilizations are responsible for transmitting, transmutating, and disseminating the terms of the spice domain? From the etymological dataset, I have extracted the *participating* languages. In order of their frequency, they are: Latin, Sanskrit, Persian, Ancient Greek, Aramaic, French, Akkadian, Old French, Arabic, Proto-Iranian*, Unknown, Middle Indo-Aryan*, Semitic*, Dravidian*, Iranian*, Anglo-Norman, Hungarian, Spanish, English, Pali, Egyptian (Ancient), Proto-Dravidian*, Uyghur, Turkic*, West Germanic*, Romance*, Proto-Sino-Tibetan*, Old Chinese, Old Tamil, Sauraseni Prakrit, Late Latin, Old English, Middle Chinese, Hindi, Tokharian B, Sogdian, Slavic*, Serbian-Croatian-Bosnian, Japanese, Classical Nahuatl, Hellenistic Greek, Ancient Hebrew, and Mandarin Chinese. Language families/branches, and proto languages are marked by

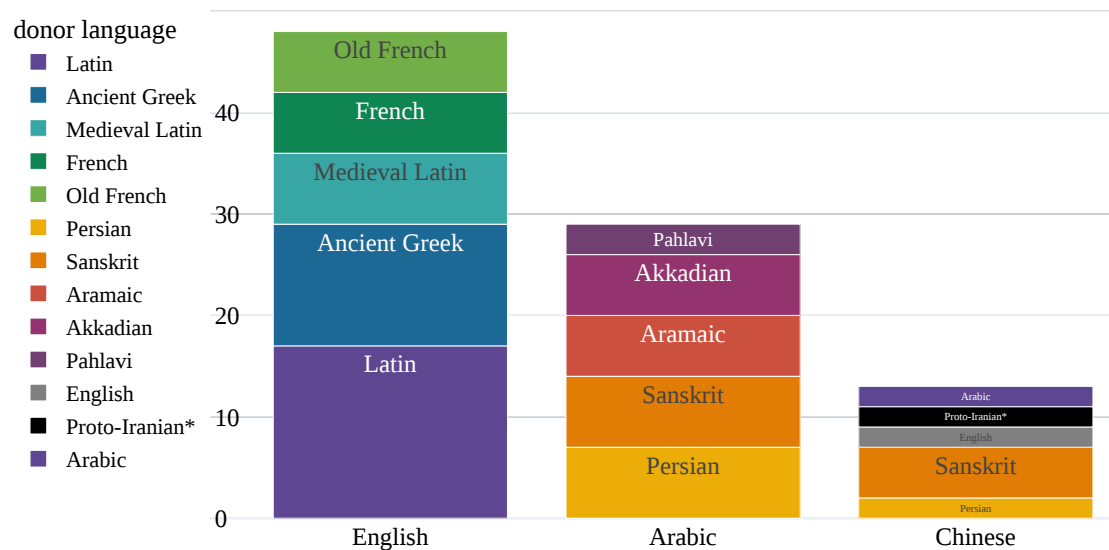


Figure 4.15 The top donor languages of English, Arabic, and Chinese loanwords in the spice domain.

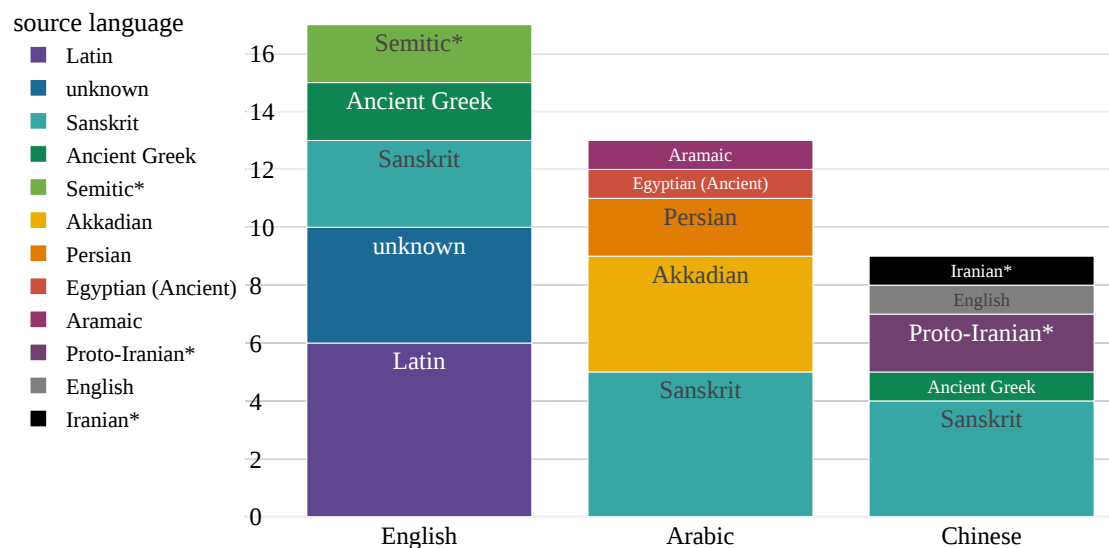


Figure 4.16 The top donor languages of English, Arabic, and Chinese loanwords in the spice domain.

The Names of Spices

Now that the detailed explanation of the diffusion of spices is complete, let us examine spice names. Throughout this chapter, i will look at the terminology comparatively, using three sets of names representing spice nomenclature in English, Arabic, and Chinese. This chapter constitutes the results and findings of the analysis on the terms of the spice domain, from linguistic-cognitive perspectives.

I will start with an overview of the data and the results in numbers, and then I will thematically introduce certain aspects of the terminology, guiding the reader from a general questions of analyzability and structure, towards more nuanced probes that will shed light on the composition, rationale, and motivations behind spice names. The aim of this section is to have an understanding of how spice names are formed, what are the components of typical spice names, and why languages use these elements. At the end of this chapter, a close look into the names of one specific spice will show how can we apply the findings.

5.1 Overview: Spice Names in Numbers

As a result of the data collection set forth in ??, the spice name dataset now contains 365 spice names. Of these, 157 are in English, 86 are in Arabic, and 122 are in Chinese; figure 5.1 shows this distribution. The total number is the result of the lengthy process of carefully compiling the nomenclature for the set of spices as defined at the beginning of the thesis, which consists of 24 different spices. The data collection methods were detailed in section 3.2. Combing through dictionaries and the literature, it quickly became clear that the accumulation of spice names—and therefore this project is essentially endless—there is no feasible way to compile the infinite aromatic plant products of the world, and certainly not their many names. This can spark both stress and joy; on the one hand I am relieved that I chose only two dozen relatively well known spices and not more, while on the other I am excited to see that there is room to grow: there are more aromatics to include, more names to examine, and more things to learn.

On average, a spice in my dataset has 14 names, where the max is 44 (chile), and the min is 4 (fenugreek and mace). Figure 5.2 shows the top ten and the bottom ten spices that have the most and least number of names, including all three languages. The legitimacy of this figure might raise some eyebrows, but in fact it is a very good indicator of which spices are more complicated in their nomenclature overall, and therefore which are the most *problematic* to untangle. As we can see, spice plants that boast with many names include the chili pepper, Sichuan pepper, cassia and false

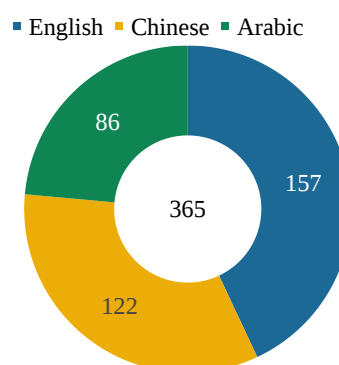


Figure 5.1 The distribution of spice names across the three languages.

cardamoms, which represent spices that are rich in variety. On the other hand there is also allspice, which has no variety at all but a confusing and unclear set of names across the three languages. These are—not incidentally—the very items that I have dedicated substantially more pages to than some of their peer spices, due to issues about their identity or the complexity and richness of their nomenclature. This seems to go hand in hand with matters of biodiversity: chile has countless varieties that have spread to faraway corners of the earth, and now it is a hobby in its own right to cultivate, breed, and crossbreed hot chile cultivars. As we saw, Sichuan pepper species are used across vast regions in East Asia (mainly in China), and it can cause headache to pin them down exactly, their “boundaries” and varieties are not that well defined—especially to those outside East Asia—and it does need some explanation to untangle and isolate the various sources of cassia types as well.

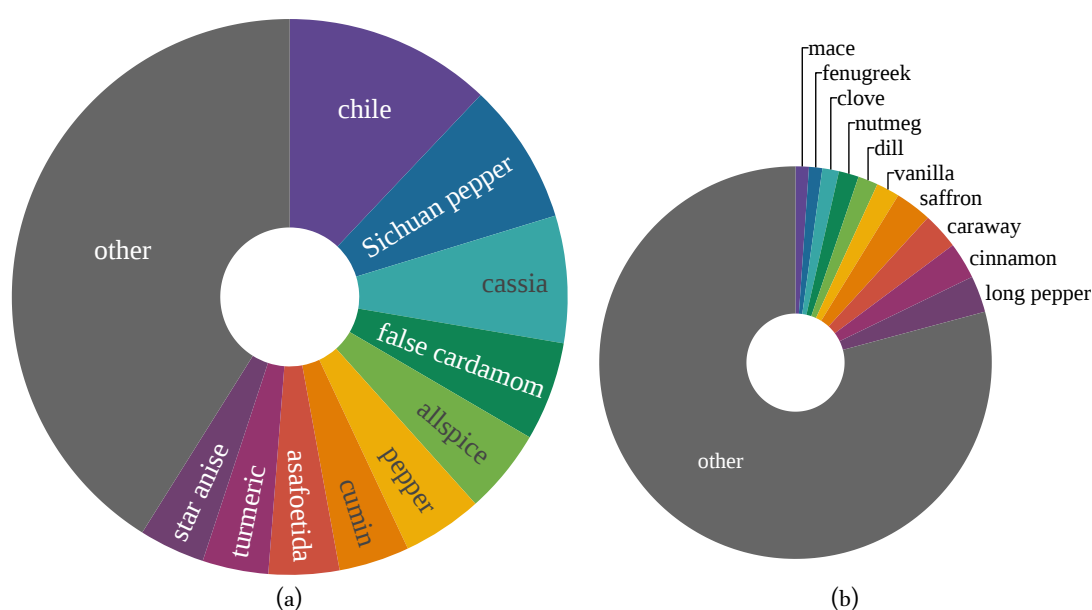


Figure 5.2 Top 10 spices with the most number of names (a), and bottom 10 spices with the least number of names (b).

On the other hand, spices with the lowest number of names are presumably the most straightforward items, take for example cloves, or vanilla. But what makes a spice “straightforward”, or in other words, simple? In my opinion, it is their uniqueness and recognizability. Indeed, if we reflect on our investigation on vanilla in the last section of the data chapter, we have already established that it is a rather special item: there is no other spice that is made from the fruits of an orchid, no other spice that is obtained from crystals of long dark brown beans, and no other spice that is sold in liquid form—it is unique. Or, if we think of cloves, they are unmistakable in their shape and in many language they are known by their shape (see ??). These two items are also very well circumscribed in terms of their geographic origins. Although now cultivated in multiple tropical regions, vanilla is known to be from the jungles of Central America and Brazil, there is no doubt about its origins. The native habitat of cloves is even more narrow, as it is only indigenous only to North Maluku and the “spice islands” of Makian, Ternate, and Tidore. We see nutmeg and mace as well among the bottom five items with the

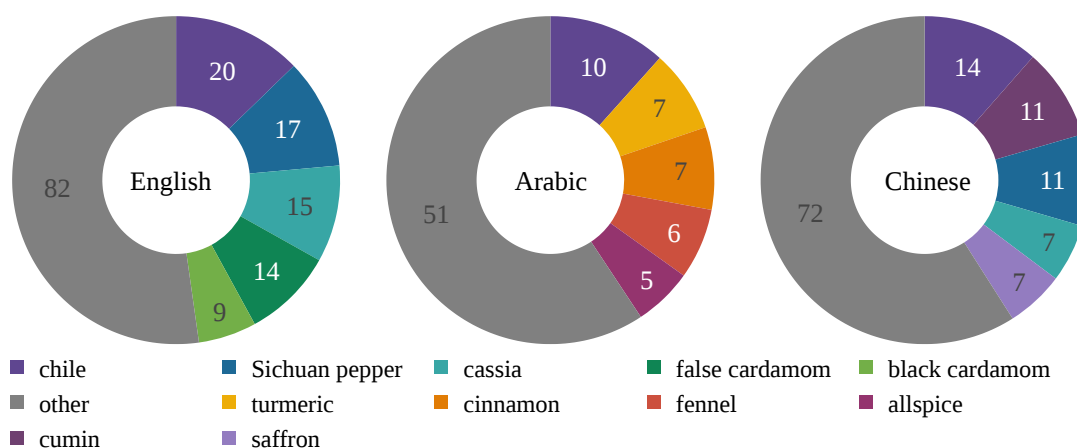


Figure 5.3 Top 5 spices with the most number of names, broken down by language.

least amount of names, and we should notice that nutmeg and its mace are also from this region, they were exclusively found on the Banda islands of Maluku, and nowhere else until the second half of the 18th century. Now, it makes a bit more sense to look at these same charts deconstructed by language, this can be seen on figure 5.3. The most conspicuous feature of these pie charts is that chili has the most names, across every language.

5.2 The Analysis of Spice Nomenclature

This section will now present the analysis on spice names trying to answer the main question: How do people name spices, and specifically, new spices that they came into contact with? Immediately, we can think of two ways: languages either borrow, or conceive a name. We saw the borrowed element in the previous chapter, and now we will dive into how the naming process exactly works. What are the structural requirements and salient features that influence the creation of a name? How languages invent and generate new names for novel materials and substances? In an attempt to give answers to these questions, I took a bottom-up approach and looked at all 365 names of the 24 spices from the data I collected to arrive to some conclusions.

So what kind of spice names there are? How does a typical spice name looks like? Intuitively, we can identify two core types of names instantaneously along the lines of their structure: *basic*, *modified*. *Basic* would be a monomorphemic or a derived word that refers to a prototype spice, without any distinguishing word, e.g., *cardamom*. *Modified* could refer to compounds and noun phrases that use a spice name as a headword, but also have a modifier for purposes of identification and disambiguation, e.g., *green cardamom*, *black cardamom*, *true cardamom*, *false cardamom*, *Nepal cardamom*, *Ethiopian cardamom*, *round cardamom*, *lesser cardamom*, *greater cardamom*, *hill cardamom*, etc. We can also discern the wide range of categories of the modifiers referring to color, shape, size, geographic origin, and even positive and negative evaluations of perceived authenticity. A spice term can also have a modifying word to specify the plant part as well, this can be observed most commonly for spices that are known also as plants, or other parts of the plant are used as well, or the same part is used in other

#	analyzability	English	Arabic	Chinese
0	analyzable	115	51	100
1	unanalyzable	40	32	21
2	semi-analyzable	2	3	1

Table 5.1 Analyzability of words in the spice name dataset.

form (i.e. ground or powdered). In English this is usually attached after the headword, similarly to a regular suffix. Examples include: *cumin seed*, *coriander-seed*, *aniseed*, *ginger root*, etc. After consulting intuition, let us consider a more formal analysis.

5.2.1 Analyzability and Structure

Analyzability of words is originally an idea from the 20th-century philological movement and method *Wörter und Sachen* (words and things in German), which had a big influence on linguistics and ethnography. Outlined by Hugo Schuchardt and based on the titular journal *Wörter und Sachen* started by Indo-Europeanist Rudolf Meringer in 1909, it proposed the close study of the etymology of words together with the artifacts/concepts (Ortutay, 1977–1982). Meringer wrote in 1906: “Ohne Sachwissenschaft keine Sprachwissenschaft mehr!” (There is no more linguistics without the study of material culture!). Practically speaking, analyzability meant that the more opaque a name is in terms of morphological analysis, the longer it is assumed to be present in the language. A basic example would be *York* (monomorphemic) vs. *New York* (analyzable), which provides a potential chronology for the concepts the words signify. This approach was incorporated into historical linguistic research and philology, often studied in parallel with findings in archeology (Ortutay, 1977–1982).

Haspelmath and Tadmor (2009a, p. 12) also used the term “analyzability” in the creation of their loanword database (*The World Loanword Database* (WOLD)) as a first step to assess a word’s loanword status, although in a purely linguistic way. I have applied a simplified version of this annotation, and indicated if a word was (1) unanalyzable, (2) semi-analyzable, (3) or analyzable. Items are semi-analyzable if the situation is morphosyntactically complex. For example in case of “cranberry words” such as *fenugreek*, where an English speaker could decipher the element *Greek*, but would be left in the dark with *fenu-*, or the Arabicized loanwords from Persian, *dāršīnī* ‘cinnamon’ or *dārfilfil* ‘long pepper’, where both *šīnī* ‘Chinese’ and *filfil* ‘pepper’ would be understood, but Arabic speakers would not know what to do with *dār* (which coincidentally means ‘house’ in Arabic, but it is from Persian ‘wood’). A Chinese example could be *huluba* ‘fenugreek’, where *hu* ‘barbarian’ is the same character that is found in *hujiao* ‘black pepper’, pointing to its foreign origins, but the whole word itself would be difficult to decode since it is in part a phono-semantic matching or Arabic *ḥulba* ‘fenugreek’.

Analyzability of words greatly interlinks with their structure, which can be simple or monomorphemic (e.g. *hing*), compound (e.g., *stinking gum*), or phrasal (e.g., *devil’s dung*). *Asafoetida* would be considered a compound to those only who are familiar with either Latin, or the history and meaning of this word. Even if we are, *asa* is a cranberry morpheme, and *foetida* ‘fetida’ might not be immediately obvious, so it is a semi-analyzable compound.

Importantly, compounds that are coined within a language are not considered loanwords, even if they contain borrowed elements. Thus, while *chili* is considered a loanword, *chili pepper* is not. Of course, there are always ambiguous cases: is *black pepper* a loanword? It depends on if it is a learned loan/semantic translation from Latin *piper nigrum*, or a genuine English invention; and for this we have to dig deep into the history of words. To sum up, we could say that if a word is morphosyntactically complex, “it was almost certain that it was created by speakers of the language rather than borrowed from some other language” (Haspelmath & Tadmor, 2009a, p. 12).

Words that are analyzable are most often compound in their structure, but there are a few derived names as well. As English is an isolating language, it is less common to find derived words. Derived terms do occur in Arabic, where a handful of spice names come from verbal roots originally referring to the method of acquisition, such as *qirfa* ‘cinnamon’ from *qarafa* ‘to peel, derind’, or *salikha* ‘cassia’ from *salakha* ‘to pull off, strip off; skin, flay’. Other methods of word formation for generating spice names in Arabic include the diminutive pattern, cf. the form *fulayfila* from *fulful* ‘pepper’, equivalent to ‘capsicum’. Or, the pattern to form an active participle in the feminine as it has been proposed in case of *fāghira* ‘Sichuan pepper’ from *faghara* ‘to open’, alluding to the half open, mouth-like pericarps of *Zanthoxylum* species. There are a few examples of phrasal names as well, such as the abovementioned *devil’s dung*, but most often these tend to be titles of praise rather than actual names, for example *king of spices* ‘black pepper’, *queen of spices* ‘cardamom’, *red gold* ‘saffron’, etc. Table 5.1 and figure 5.4 show the trilingual distribution on the analyzability of words. Closely related to analyzability, is the question if a term is borrowed or not, which I have already covered in the previous chapter on the diffusion of spice words.

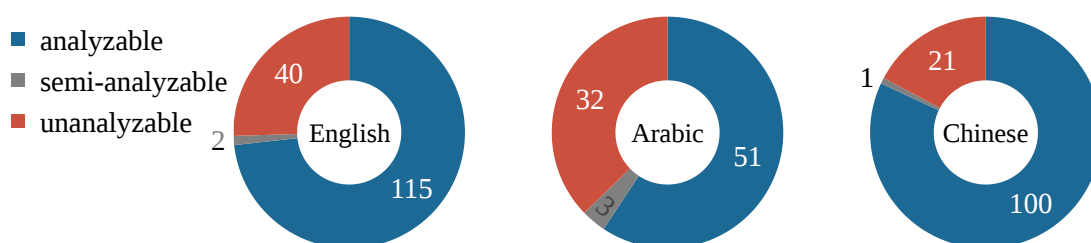


Figure 5.4 The ratios of the analyzability of words in the spice name dataset.

5.2.2 Spice Term Anatomy: Prototypes and Distinguishing Words

I already mentioned that the vast majority of analyzable spice terms are compounds, and so let us look at the anatomy of these compounds. By far, most compounds are made up of two elements, sometimes three, but even more is possible. Based on the principle of analyzability explained above we could rightfully assume that the more elements a compound name has, the more culturally *distant* it is, the more unfamiliar its referent is to the speakers of the language. We saw in chapter 4 that the earliest attested words are indeed *short* and monomorphemic in their form, such as *dill*, *fulful* ‘pepper’ and *gui* ‘cassia’. And in support of this theory we also saw that recently attested words are likely to be polymorphemic compounds, such as *Sichuan pepper*, *fulful ifranji* ‘allspice’, and *xilanrougui*

‘cinnamon’. In short, there is an obvious tendency from simple towards the complex.

Every compound element has a headword, and one (or more) modifier(s). Take for instance *sweet cumin* referring to ‘anise’, where the headword is *cumin*, and the modifier is *sweet*. The use of *cumin* can be explained by the prototype theory; to the person(s) who coined this term, cumin was an already known, ideal prototype for anise, on account of their similarity in their appearance (indeed, the two kinds of seeds look very similar, and they are related plants from roughly similar geographical origins to an English speaker). And so here, we can determine that the rationale for use of the headword is ‘prototype similarity’ with the basis of physical appearance. In most cases, the motivation behind the creation of spice names is simply identification and disambiguation.¹ Thus, a distinguishing word is needed to differentiate from the *original* cumin, and this word here is *sweet*. The distinguishing words or modifiers often arise from the most salient quality of the materials when compared to the prototype item: in this case, the sweetness of anise.

The final thing to point out in this example is that *sweet cumin* is not merely an alternative name of anise, it is an *alias*. Under “alias”, I am referring to the misleading quality of this name, and I would like to emphasize that the prototype words could be used in two ways: matching or not matching. For example: in the compound *white pepper*, the headword *pepper* is used a matching prototype because the referent of the prototype matches the referant of the whole compound (i.e. white pepper is really pepper). Hence, white pepper is an alternative name which has the role of narrowing, specifying the subtype of pepper in certain situations. Contrastingly, *Jamaica pepper* is an alias, because in the real world the referent of the prototype and the referant of the compound do not match. In these cases, the prototype is used as a headword on account of its similarity—whether physical, chemical, or other.

This difference in how prototypes fill the role of the headword (matching or not) can have serious real world implications, and it is the one single feature of spice names that can cause the biggest confusion. If I may share a personal anecdote. One of my very close friends is working in the family business of importing and exporting various nuts and oil seeds. When a customer ordered a large shipment of black cumin, her boss—her sister—mistakenly ordered cumin. Now, if my friends sister would have glanced on the report my friend made, she would have noticed immediately that black cumin (also known as nigella, *Nigella sativa*) and cumin (*Cuminum cyminum*) are two different spices, from different families. The mistake cost a lot to the company, and a lesson was learned, but we can safely assume that this kind of mixup happens regularly. To be clear, I do not want to “fix” the usage of common names in this thesis, I am simply trying to explore and explain why there is confusion between certain materials, so that I can organize and present it in a way that it one day might be useful as a trustworthy checklist or master list of spice names. Right now, I still believe that botanical names are the safest way avoid accidents like this.

By the way, to make things much worse, there are more than one spices that can be called *black cumin* besides nigella, *Bunium bulbocastanum* (a.k.a. great pignut), and especially *Etwendia persica* (black seed, black cumin, black caraway) is often confused with the black seeds of nigella. It is not uncommon for a name to be used for the products of several different aromatic plants, and this is a

¹Another interesting type of motivation is promotion/advertisement, as in the case of *grains of paradise*, where the creation of the name was intended to make the spice more desirable for European buyers. Cf. *xiangcao* ‘fragrant-grass/herb’

source of confusion.

Headwords and Prototypes

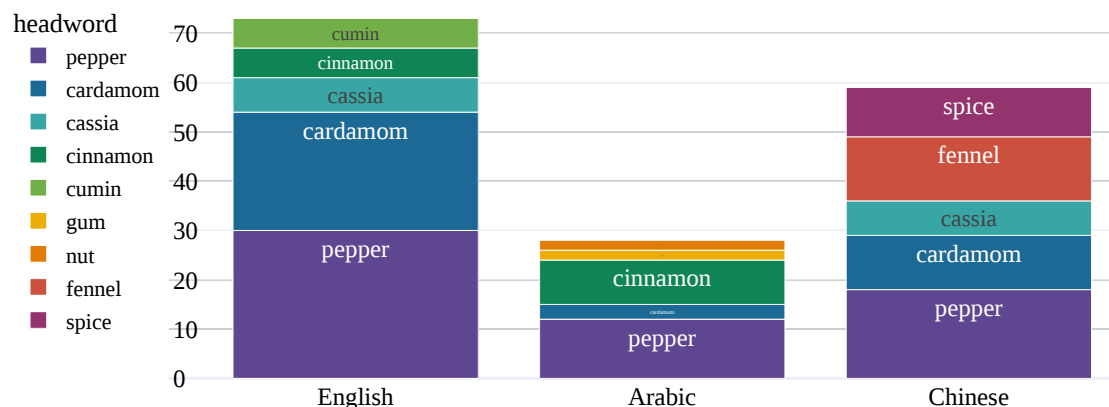


Figure 5.5 Top 5 headwords appearing in spice names, by language.

When it comes to frequent headwords, we will most often find spice name prototypes—both matching and not matching the referent of the whole compound—for example, the prototype words for pepper, cardamom, cinnamon, and fennel occur in high numbers. The top most frequent headwords can be seen on figure 5.5. There are also headwords that do not refer to spices, but rather signify other plant parts and products, such as Arabic *jawz* ‘nut’ (with the primary sense of ‘walnut’ but by extension any nut) as in *jawz al-tīb* [nut-of.fragrance] ‘nutmeg’. Arguably the most salient feature of the nutmeg is its nut-like appearance, and English also testifies to this. Another example could be the words for gum, referring to the useful part of the ferula plant, asafoetida. Headwords that allude to the function, role, and usage of the substances are also present, consider the *spice* in *allspice*, *bahār* ‘spice’ in *bahār ḥulw* [sweet-spice] ‘allspice’, or *huixiang* [Muslim-spice] ‘fennel’ or *dingxiang* [nail-spice] ‘clove’.

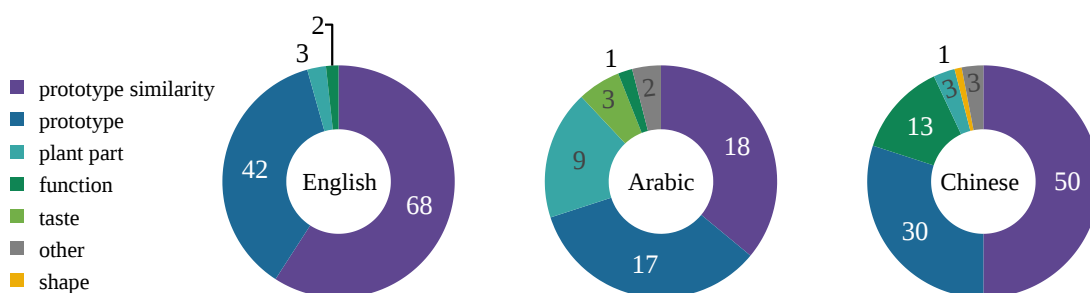


Figure 5.6

To have an outlook on the full extent of how headwords operate, I have tried to categorize them. According to the usage, most headwords are prototype words used because they are similar to the item that bears the name, followed by cases when the prototype is used matchingly. The rest are a few cases that utilize words of plant parts, function, taste, shape, and color in their headwords as most salient elements.

Modifiers and Distinguishing Words



Figure 5.7 Top 5 modifiers appearing in spice names, by language.

When it comes to modifiers, we can see that the most prominent distinguishing words are adjectives of color, taste, size, shape, but unmistakably, modifiers pointing to geographical origins. Names of countries, regions, cities, perceived or real sources of spices are the most prevalent category here. Figure 5.7 show the top five modifiers across the three languages.

Among the top modifiers in English, we can see *Indian* and *Chinese*,

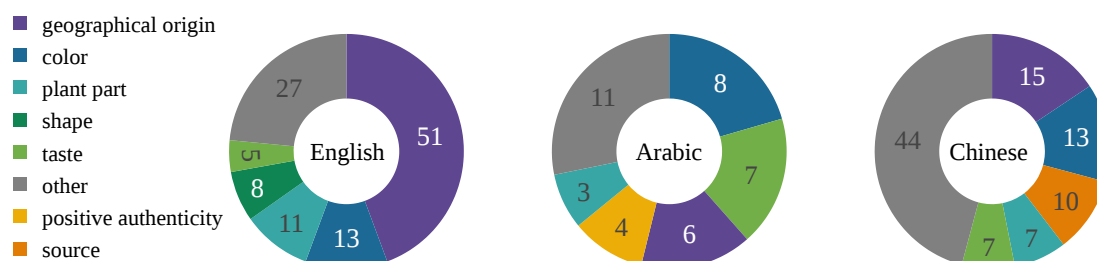


Figure 5.8

Besides adjectival modifiers, there is another usual way to compound spice names, with the use of plant parts.

Summary

The final question offers itself: What is the most common blueprint for a spice name? According to the statistics of the dataset, the most common combination is *prototype similarity* + *geographical origin*. Therefore, names such as *Indian cardamom*, *Ceylon cinnamon*, and *Chinese anise* are the most typical examples for naming a spices, where the headwords point to a different item of significant similarity. Therefore, *Jamaica pepper*, the first example we mentioned many pages ago in the introduction, is a fairly regular spice name.

5.3 The Case of Star Anise

Let us consider the nomenclature of star anise in the three languages (see ??). In English, there is the default *star anise*, which is a native invention, obviously after the fruit's unmistakable appearance. On a rare occasion, we have information on the exact time of star anise's arrival to England, which is dated to 1588, as it was introduced in ??. The same idea for a name is found in most European languages, either influenced by 16-17th-century spice dealer terminology, or devised on their own conviction, looking at its recognizable shape. I used the word “native”, even though the phrase is obviously mixed from an etymological point of view: *anise* is a loanword ultimately from Greek. However, when faced with this type of phrases, I consider that at the time of the contact situation, *anise* was already part of the English lexicon — as well as *star* — therefore, this phrase was coined within English, and deemed as a native creation. This practice is consistent with the approach took by the team of Haspelmath and Tadmor (2009b) at WOLD. English also has the term *Chinese anise*, which is a phrase consisting of *anise*, again, and *Chinese*, referring to star anise's geographical location and the origin of its procurement for the English. Both phrases utilize the term *anise*, which refers to the small anise seeds of the Mediterranean, used as a spice, and flavouring for liqueurs and confectionary (see ??). Why is there a connection to anise? The two plants could not be more different, they are geographically distant, they are botanically unrelated. The only thing that connects them is their highly similar flavor profile, dominated by the volatile oil anethole, the same nauseating and sweet chemical compound that is found in fennel and licorice. And so, for the Europeans who were familiar with anise and its taste, the novel product reminded them of anise's aroma. Hence, the names are in part inspired by taste/plant chemistry, defining anise as a prototype spice and prototype term. To avoid confusion, (the existence of which will be clear to anyone who tries to do a brief search about anise or star anise), distinguishing words are used for the new material. These modifiers are attached to the head word, and in one case inspired by the spice's shape, on the other hand referring to its geographical origin. The existence of a Chinese star anise could be explained by the fact that there is a Japanese star anise as well, a similar looking but poisonous fruit and tree, *Illicium anisatum*. In short, the two phrases have different ways to identify this spice. English also has a now archaic form referring to star anise: *badian* from French, which arrived via a land route through Persian, perhaps a phonetic loan from Chinese, but there is no documentary evidence for this (see Etymology ??).

Arabic *yansūn najmī* [star anise] was devised along similar lines, using a native Arabic word for ‘star’, the prototype word is anise, and the more interesting instances are to be found in neighboring Persian. *Bādyān khatā’ī* or *khatāyī* [star anise] is star anise, while *bādyān rūmī* [Roman anise] is anise.² *Bādyān* alone could also refer to fennel.³ This shows, that in Persian, the prototype word was *bādyān*.

As for Chinese, we do not find any loanword among the terms used to refer to star anise, all names are local “inventions”. The modern “proper name” for star anise is *bājiǎohuǒxiāng* [eight-horn-hui-spice], where [eight-horn] means ‘octagonal’, and [hui-spice] is fennel, therefore it can be translated

²Hayyim, 1934–1936, vol. 1, p. 197.

³Steingass, 1892, p. 140.

as ‘octagonal fennel’, or ‘eight-horned fennel’. An other name, *dàhuíxiāng* ‘big-fennel’ strengthens the assumption that in Chinese, *huíxiāng* ‘fennel’ is the prototype. Again, the flavor profiles of fennel and anise are basically identical, hence the connection (and confusio). The formal Chinese names of star anise are not attested in historical corpora as we discussed in ??, and I assume that the vernacular name of *bājiǎo* [eight-horn] was first applied to star anise, and the formal name was modelled later driven by the plant sciences. In modern dialects star anise is also referred to as *huíxiāng* ‘hui-spice’ (historically ‘fennel’) and *dàxiāng* ‘big-spice’. In modern TCM, fennel is referred to as *xiǎohuíxiāng* ‘little-hui-spice’, contrasting the two spices that are confounded due to their taste, using size. In fact, the Chinese 大/小 *dà/xiǎo* ‘greater/lesser’ contrast is not necessarily a marker of size, but a semantic tool to convey unmarked/marked, or proper/imitator.

To summarize the points I intended to make above: First, I determined if the words and phrases are analyzable (morphologically, syntactically, semantically), then I examined those names further, while also stating why a specific item is unanalyzable. E.g., *badian* as a loanword does not carry any useful information for an English speaker that is not familiar with the word, it cannot be dissected or interpreted alone. Next, I looked at the borrowed status of the names to determine if the word or phrase is borrowed, or devised locally. E.g., the Chinese names are native “lexical creations”, while English and Arabic use a non-native headword (*anise/yansūn*) and a native distinguishing word (*star/najmī*). Finally, I have looked at the inspirations behind these lexical inventions, and identified the rationale and motivation behind them. For phrases and compound words, we can separate a prototype word (headword), and a distinguishing word (modifier). In each case, we can discern the reasons why that prototype word was used, what feature of the prototype item (referent) is the most salient. The same is true for the distinguishing word(s). For example, *star anise* is named so after (1) similarity in taste + (2) shape; and *Chinese star anise* is named so after (1) similarity in taste + (2) shape + (3) geographic origin. In table 5.2, you can see a concise overview of the analysis of star anise terminology.

Term	Gloss	Analyzability	Borrowed	Prototype	Modifier
star anise		analyzable	native	similarity in taste	shape
badian		unanalyzable	borrowed		
Chinese anise		analyzable	native	similarity in taste	origin
Chinese star anise		analyzable	native	similarity in taste	shape + origin
<i>yansūn najmī</i>	star anise	analyzable	native	similarity in taste	shape
<i>bājiǎo</i>	octagonal	analyzable	native	shape	
<i>bājiǎohuíxiāng</i>	octagonal-fennel	analyzable	native	similarity in taste	shape
<i>bóhuíxiāng</i>	ship-fennel	analyzable	native	similarity in taste	shape
<i>dàhuíxiāng</i>	big-fennel	analyzable	native	similarity in taste	size*
<i>dàliào</i>	big-ingredient	analyzable	native	function	size*

Table 5.2 Cap

In this sense, the space names are layered. Intuitively, the more layers a spice name has, the more

distant the item was culturally, and on the converse, the less components there is to a term, more familiarity with the substance is presumed (e.g., anise vs. star anise in English). Therefore, spice names' modifiers can be categorized according to what salient feature contributed to the naming the most, and in this specific case, it is star anise's distinct shape. As we will later see, shape is just one of many properties that can distinguish/identify a spice, for others, different properties are salient, including color, taste, smell, and the geographical origin we mentioned. Furthermore, these names reflect on the materials' physical qualities, and the perception and importance of a spice for various sensory modalities in the human experience: vision, gustation, olfaction, etc.

The Language of Spices

6.1 The Case of Pepper

One of the most globally and cross-linguistically recognizable words of the spice domain is *pepper*. In the **WOLD**, it is ranked no. 7th when sorted by borrowability, following behind the olive, the sugar, the wine, the kettle, the beer, and the cheese, in the semantic field of food and drink (Haspelmath & Tadmor, 2009b). Pepper has a score of 0.66, making it the top spice meaning in this dataset of 81 entries (and the only spice besides the chili pepper). This metric, “borrowed score”, is an average of the scores of all the words that correspond to the meaning ‘pepper’, where individual meanings are scored according to their borrowed status.¹ “Thus, the higher the average borrowed score of a meaning, the greater its borrowability.” – it is explained on the database’s website. This suggests that if we were to collect the words for pepper in different languages and project them onto a world map, we should be able to see clusters that indicate the donor languages, and that gather around key areas of the globe that were important in the diffusion of this spice and **Wanderwort**. This in turn, would highlight the cultures and locations that were responsible for its transfer.

6.1.1 The Distribution of Pepper

Similarly to the analysis we conducted in chapter 4 with cinnamon and the distribution of its names seen in ??, we can also plot the names of pepper onto a world map, and look at how they are dispersed at present. First, I made the choice to collect words that correspond to ‘pepper’, and not compounds that gloss the more specific ‘black pepper’ (or not ‘chili pepper’ for that matter). Then, I have collected the names by scraping the relevant Wiktionary translations² for the word *pepper* in the sense ‘spice’, (and not in the sense of ‘fruit of the capsicum’). I then cleaned and manually checked the data for errors, and corrected the list to the best of my ability. Next, I augmented the dataset using other sources, such as dictionary entries, Katzer (2012a), and the “the pepper” meaning page from **WOLD** by Haspelmath and Tadmor (2009b), which contains 36 entries. Lastly, I have analyzed the words based on their etymologies, and grouped them into categories according to their etymons. After concatenating the collected data with language information and coordinates obtained from the *The World Atlas of Language Structures* (WALS) and *Glottolog* datasets, the plot could be generated, and it can be found under figure 6.1

Looking at figure 6.1 it becomes immediately evident, that there are a few large, clearly distinguishable groups forming among the scattered data points, each representing a word and a language. The following categories were identified: pippali, pigment, marica, and hujiao. Pippali contains all words

¹The values assigned are determined as the following: clearly borrowed: 1.00, probably borrowed: 0.75, perhaps borrowed: 0.50, very little evidence for borrowing: 0.25, and no evidence for borrowing: 0.00. See more at <https://wold.clld.org/terms>

²“Pepper,” 2022.

Words for pepper

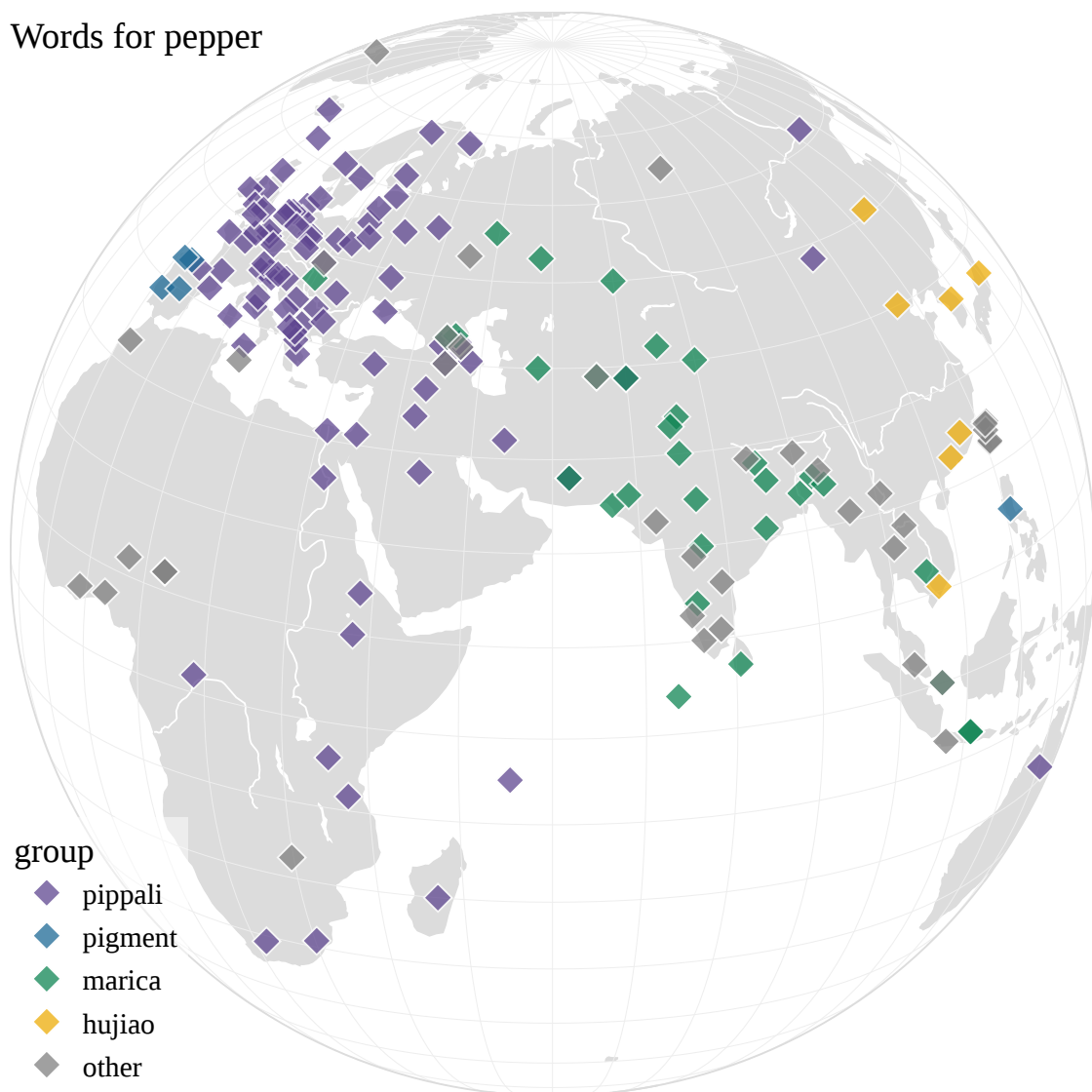


Figure 6.1 The distribution of names for pepper (*Piper nigrum*) in a few languages around the globe. For a full, interactive and explorable version of the plot, please visit the following link: http://htmlpreview.github.io/?https://github.com/partigabor/phd-test/blob/main/distribution_pepper.html.

that ultimately derive from Sanskrit *pippali* and this means most languages in Europe, including those that were influenced by Latin *piper*, and those that loaned this word through Persian *pilpil* and Arabic *fulful*. The pigment group covers West Iberian Romance languages, where the Latin word for pigment went through a series of changes by way of metonymy and specialization of meaning, explained under ???. The marica groups captures instances that originate in the “true sense” for black pepper, Sanskrit *marica*, which is distributed across South, Central, and to a lesser extent Southeast Asia. Lastly, words that belong to the hujiao group are those languages that borrowed their word for black pepper from Chinese, found across the Sinosphere. Instances that do not belong to any group or their origins I could not determine were assorted to “other”. Besides the apparent category of words derived from Sanskrit *pippali* (and spread generously though Persian and Latin), there are other major and minor

groups that can be discerned, especially the category of words that derive from Sanskrit *marica*. The piquancy of this ambivalence in the distribution of these two Sanskrit words is elevated by the fact that while *pippali* refers to long pepper (*Piper longum*), *marica* is the term that originally referred to black pepper (*Piper nigrum*) — forming a duo of closely related aromatic plants and spice terms.

Words that derive from *marica* are dispersed throughout South and Central Asia, and Hungarian *bors* is probably the furthest instance geographically from the once Sanskrit heartland and the home of pepper. Hungarian tribes most likely loaned this word from Turkic speaking peoples (with many other words from the domain of commerce and agriculture) on their way to the Carpathian basin sometime before the 9th century.³

We know for a fact that even in the early times of the Roman republic (510–31 BC), Indian long pepper was imported and used in Europe, but have evidently lost its prominence later on. From the history of this word, we can ascertain that at the time the Greeks borrowed the word for pepper from Aryan merchants, long pepper was definitely traded alongside black pepper. Unfortunately, we are not sure in what ratio they were imported, but they were both known to ancient writers of Europe. Hippocrates have discussed pepper and its medicinal benefits in the 5th century BC, Theophrastus have distinguished them in his *Historia Plantarum* in the 4th century BC, and explained the difference between the two; stating that long pepper has a stronger flavor. According to Toussaint-Samat (2009), the pepper that the Romans preferred was in fact long pepper, and the round black peppers we now use “became popular in the 12th century and had replaced long pepper by the 14th”. It is often difficult to know which pepper ancient writers are talking about, because in Latin, both could be referred to simply as *piper* (Toussaint-Samat, 2009, pp. 442–443). The modern scientific names go back to these early times, *longum* means ‘long’ and *nigrum* means ‘black’.

If we rely on historians, it becomes rather trivial that the name *piper* and its other derivatives is a [Wanderwort](#) that have first traveled with the product (the long pepper called *pippali*), and went through a semantic shift later, when black pepper replaced long pepper. The word stayed, but its referent changed. And this change happened alike in many languages in this part of the world, even if the two kinds of peppers looked different, their flavor profile and functions were the same. This semantic change happened once more in history: when people became acquainted with chilies, the same shift happened, and people started to use their (local) words for the pepper they had, to refer to the red hot chili peppers that conquered the world.

6.1.2 The Diffusion of Pepper

The names of pepper on the above map demonstrate indirect evidence for the trails the material have left, and show the extent of trade networks at certain times. They reveal the cultures and civilizations located at the heartland of the product and the crossroads of its exchange. The distribution of clusters of words belonging to the same categories in this plot also indicate the possible ways of diffusion. This can be then studied from a historical linguistic point of view through investigating language

³Hungarian *bors* was attested in 1075 as a proper noun, 1395 as a common noun. Cf. Ottoman Turkish dialectal *burç*, Chuvash *pəṛəs* ‘id.’, the Turkic words are from an Iranian language; cf. Sogdian *marč*, Pamirian *märč* ‘id.’ (Zaicz, 2006, p. 90)

contact and loanwords, reinforced with historical awareness, and supported by botanical information. Domain knowledge of spices is also crucial, if we want to answer specific questions about the spread of spices and spice terminology. For example, one of the reasons pepper (and its name) was so successful on reaching faraway places so early on is due to the fact that pepper does not spoil. Or at least, not fast compared to other agricultural products; it keeps its aroma and pungency longer than many other spices. Krontl (2007, p. 59) writes that “pepper, in particular, is remarkably stable and can be stored up to a decade as long as it’s kept reasonably dry.” This is one of the key features of spices, that allowed them to be shipped and carried thousands of miles away, during the course of several months if not years. Moreover, as dried plant matter, spices are also light, resulting in an extremely high price-to-weight ratio compared to, say, wheat, which made trading in pepper so lucrative in the past, and defined the fate (and face) of cities, such as Venice.

Turning our attention back to vocabulary, the most fascinating part of this phenomenon is that the word *pepper* originates so distant from English; both in time and space. Thanks to the hard work of historical linguists and philologists, we have a decent reconstruction of *pepper*’s journey, and we know that Germanic tribes must have loaned the term on mainland Europe, some time before their migration to England around the 5th century. Early Old English *pipor* comes from Latin, which originates in the Sanskrit word *pippali* by way of an Indo-Aryan transmission (see ??). The spatial and temporal trajectories of this word are remarkable, and follow the path of the material. Indian pepper (black and long) was known and coveted in Arabia and Rome long before the Anglo-Saxons got to taste it. Still, much of the story of pepper and its worldwide diffusion goes back to prehistoric times. Tracing its itinerary on Eurasian pathways is difficult at this time depth, yet we have breadcrumbs: its names. *Pippali* and its derivatives mark the way the spice has spread, even where written documentation and archaeological finds are missing.

Now, homing in on our scope of English, Arabic, and Chinese, we can look at the etymological stages of the words for pepper in these languages. In figure 6.2, I tried to illustrate the origins of the words for pepper in the languages under inspection. We see that the branch that leads to English is on the same trajectory as Arabic, both going back to the Sanskrit etymon. They also formed their words for long pepper with the prototype words *pepper* & *filfil*: English modeled it after Latin, while Arabic loaned a Persian term that compounded ‘wood’ and ‘pepper’ (*dar pilpil*), the reasons behind which we can only speculate. Either it reminded the Persians of a piece of stick, or there was maybe some type of analogy with the name of cinnamon: *dar chini*. Unmistakably, the Chinese did not loan a word for black pepper; they formed their own name by compounding their prototype word, *jiao*, appending it with *hu*, referring to foreigners, Western barbarians. Notwithstanding, Sanskrit *pippali* also survives in Chinese, in the form of *biba*, strictly referring to long pepper, known since ?? and still used in TCM. The questions beg to be asked: Why was one pepper adopted with a native word and designation, and why was the other loaned? I can think of two reasons. First, black peppercorns are very similar to the indigenous Sichuan peppers — in their shape, size, taste, and function — therefore it seems obvious to apply the term that already existed and conceptually very close to the new material. By way of their similarity, a metaphoric way of expression extended the set of referents for this word, *jiao*. Second, long pepper was a new item not incredibly similar to already existing Chinese products,

Etymological stages of names for pepper

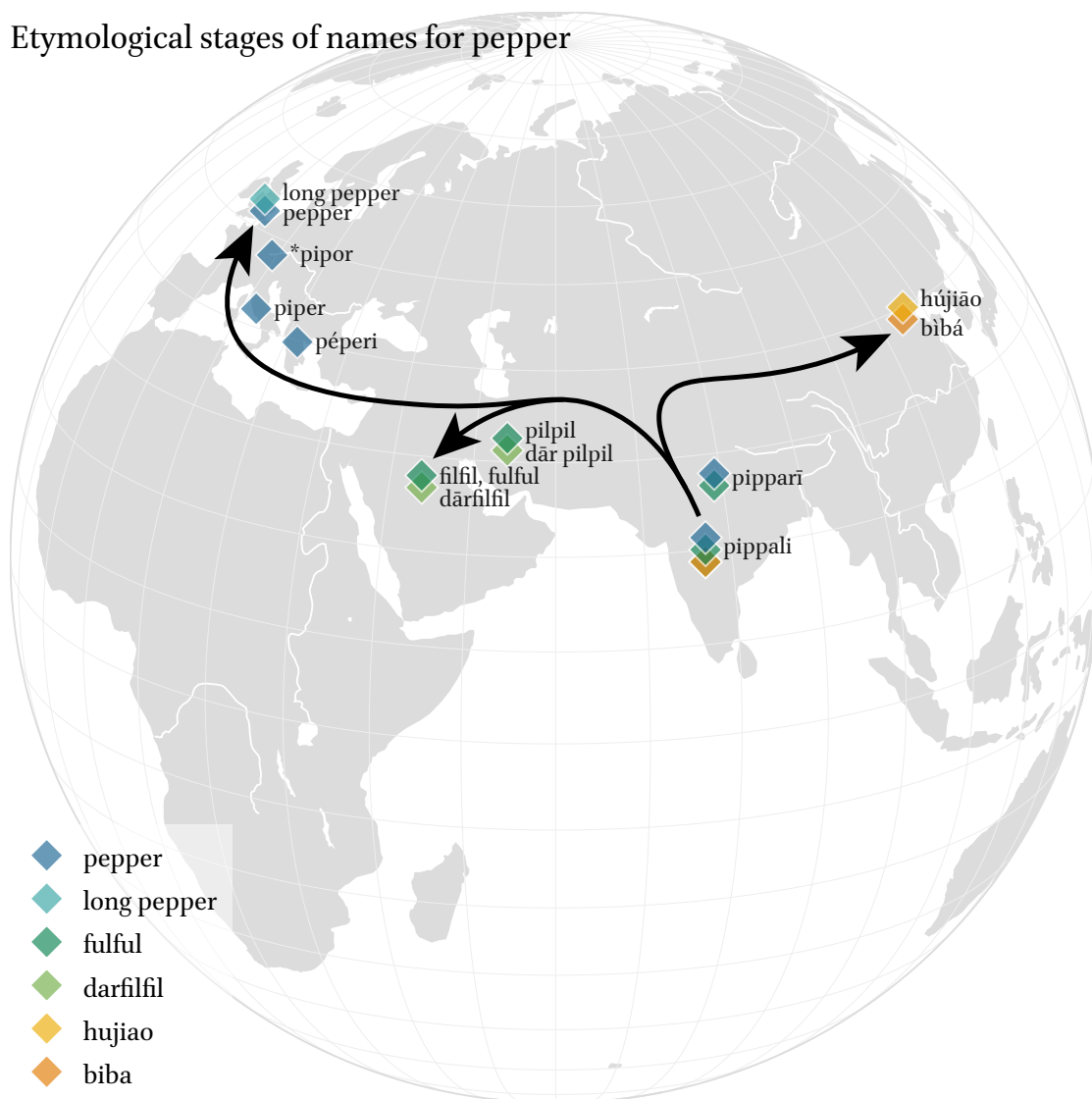


Figure 6.2 The diffusion of names for pepper (*Piper nigrum*; *P. longum*) in English, Arabic, and Chinese. For a full, interactive and explorable version of the plot, please visit the following link: http://htmlpreview.github.io/?https://github.com/partigabor/phd-test/blob/main/diffusion_pepper.html.

it would place itself further away from Sichuan pepper in the semantic space. They do not match in color, shape, size, and even in its use long pepper was (and still is) rather a medicine than culinary spice. It was alien enough to be adorned with a loanword.

The etymologies were introduced in detail under etymologies ??, ??, and ??.

6.1.3 The Role of Pepper in English: A Brief Contemplation About Spiciness

Now that we have discovered that pepper as a product, and thus SPICE as a concept was at one point a novelty for the ancestors of English speakers, let us briefly consider life before pepper. We can safely presuppose a time, where pepper — and therefore experiences of spiciness — simply did not exist for certain communities. Or did it? Was there some wild garlic growing in Europe whose sharpness in

taste could be compared to pepper? Some mustard, or horseradish? How did these people describe spiciness before spice? Or peppery before pepper?

Sensory experiences of taste, such as sweet, salty, sour, and bitter, are encoded in the mappings of our evolutionary biology, and the same is true for pain. In fact, spiciness is a tactile sensory experience, roughly working along the same mechanisms as our perception of heat and pain. The technical term is chemesthesis, and it is defined as the sensitivity of our mucosal surfaces of the skin (e.g. the moist inner linings of the mouth) to outside chemicals. This system activates thermal, nociceptive (i.e. pain), and tactile sensations (Simons & Carstens, 2008). Substances such as piperine (in black pepper) and capsaicin (in chile pepper) cause a reaction that activates this system causing a burning, stinging sensation which — in moderate amounts — can be a pleasant. These stimuli also contribute to the overall flavor perception of food (Tewksbury et al., 2008). The first sense of the word *pungent* (now rare) shows well how strong the connection to pain was: “of pain: as if caused by a sharp point; piercing, stabbing; pricking.” The definition for the sense that is now generally understood is “affecting the sense organs, esp. those of smell or taste, with a sharp, penetrating sensation; acrid, irritant; intensely flavored, piquant.” Words, such as *pungent*, *sharp*, *biting* (also a cognate of *bitter*), and *hot* show that we do not necessarily need the word *spicy* (a loanword), to describe SPICINESS (i.e. pungency). However, the foreign concept of SPICE was influential enough to make way for new words and meanings attested in 13th century English.

Today, spices and their access ability is taken for granted, and the idea of not knowing how “spicy” tastes like, is — for most of us — unimaginable. The existence and abundance of spices around us, even if one does not prefer the heat on a daily basis, is now part of the human experience. This omnipresence is reflected in our words; spices have become the part of our vocabulary, the way we speak, and not just when we talk about the spices themselves. The following section will show how spices infiltrated our language, and how their characteristic features gave rise to new words and new meanings, metaphors, and idioms. I will examine the profound effect spices made on the lexis, through looking at the case of pepper in English.

6.2 *Pepper as a Lexical Item*

Pepper, and I mean black pepper, is undoubtedly a prototypical spice. In a significant portion of the world’s regions — or at least in the temperate areas — black pepper was the first pungent spice people have ever tasted. Although black pepper became indeed the first global spice, it is not the only one. Many other regions have their own prototypical pungent spices and relishes; some already famous worldwide, some still relatively unknown. As examples, we must mention the chile of the Americas, the prickly ash of China, the *cabai* of Southeast Asia, and the grains of paradise of West Africa. Now, if I would to list them again in the same order, but this time through a finer/different sieve of English, I could have written: chili pepper, Sichuan pepper, long pepper, and melegueta pepper. Mind you, these are all botanically different aromatic plants, distributed all over the globe, all culturally rooted in their respective regions. Yet in English, all of them can be referred to as some kind of pepper.

What we have here, is evidence that English speakers, going beyond the primary sense of the

term *pepper* (used for the little round fruits of *Piper nigrum*) have developed the use of this word for “any of certain other pungent spices derived from plants of other families, esp. ones used as seasonings”⁴. The meaning of *pepper* was extended by ways of its physical attributes (small, black, seed-like fruits), chemical characteristics (pungency), and role (spice, seasoning, condiment). Hence, other substances that matched or approximated one or more of the above-mentioned features, could be referred to as *pepper*. Often with a distinguishing word, today many plant products are known as peppers: *red, pink, bell, sweet, Jamaica, alligator*, etc. The list is long and functionally diverse, as distinguishing words and modifiers can have various different roles. They can identify, distinguish, or indicate some aspect of the produce, for example, its place of origin, flavor, or shape. *Pepper*, with the primary meaning referring to the fruits of *Piper nigrum*, was attested in early Old English, and the extended sense developed shortly after the European “Age of Exploration”, when the world opened up to the English sailors and merchants, and exotic, new products were brought back from Africa, Asia, and America. A 16th-century quote from a herbal shows this new use of the word *pepper*, and also the attitude towards a novel spice — Guinea pepper⁵ — and simultaneously hints on the status of black pepper:

“Ginnie pepper hath the taste of pepper, but not the power or vertue.”

(Gerard, J. (1597) *Herball* (Vol. 2, p. 293).in OUP, [n.d.](#), pepper)

And so, a *pepper-genesis* started, a rather clumsy term I made up for this phenomenon when Europeans familiarized themselves with new additions from the fruits of the plant kingdom; both to the cargo hold of their ocean-going ships, their apothecaries and grocers, and their vocabularies. Pepper worked as a prototype, and lent its name to other fragrant plant materials that needed to be named,

Beyond this the ability to generate names of all kinds of peppers — true and false — there is an even more interesting aspect of the word *pepper* that I would like to discuss: the derivation of new words over various word classes.

We also assume that the more a language is familiar with a substance, more senses could exist in a language, and with this above assumption (4) we look for derivationally related linguistic categories of terms from the spice domain. Under these categories we will include:

the names (nouns) · names of the sensation induced by the spice (nouns, adjectives) · synaesthetic properties associated with the spice (adjectives, verbs) · cognate verbs of seasoning, cooking (verbs) · denominal metaphors, idiomatic expressions (nouns, verbs, phrases)

The English compound ‘*pep talk*’ appeared in colloquial American English in the 20th century, and contains ‘*pep*’, which is a shortening for pepper, meaning “energy and high spirits; liveliness, vigour, power” (OED). We can see the WordNet mappings showing ‘*ginger*’ as one of the synonyms for

⁴OUP, [n.d.](#), pepper, n.

⁵An ambiguous name for an African source of “pepper”, it can refer to one of three different spice yielding plants: *Aframomum melegueta* (grains of paradise, melegueta pepper, etc.); *Piper guineense* (West African pepper, Ashanti pepper, etc.); *Xylopiia aethiophica* (Grains of Selim, Senegal pepper, etc.)

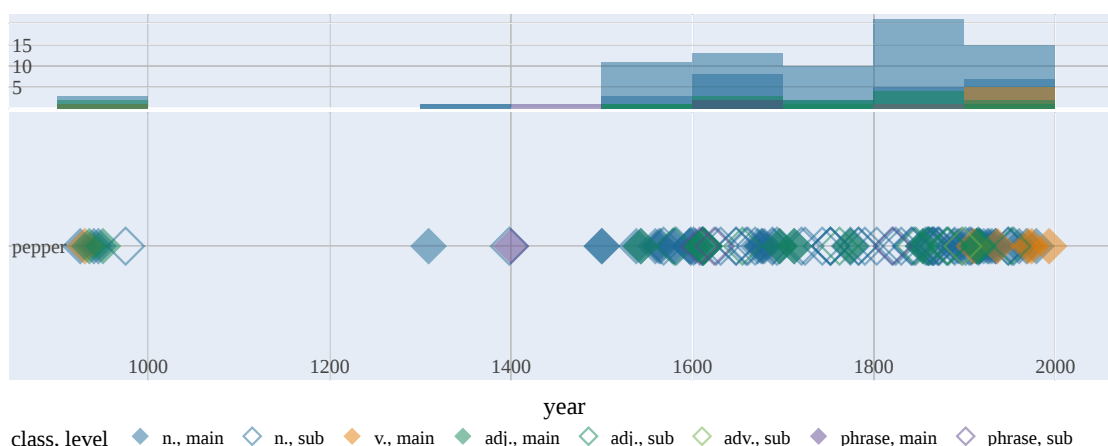


Figure 6.3 A timeline of words and phrases derived from *pepper*, based on main- and sub-level entries in the OED, and plotted by the dates of their attestations. A histogram on the top margin shows the number of attestations in 50 year increments. To explore the data points in an interactive plot, please visit the following link http://htmlpreview.github.io/?https://github.com/partigabor/phd-test/blob/main/oed_pepper.html.

‘pep’, and consulting a dictionary confirms the evidence of a second spice representing ‘liveliness’: “Spirit, pep, energy; temper. Frequently in to put ginger (into), to show ginger.” (OED), in American slang.

We suspect that word frequencies in corpora would show their relative importance in a language, hence for example ‘Sichuan pepper’ and its variations³⁴ in an English corpus should have a smaller relative frequency (0.03 per million words), than ‘花椒’ huājiāo (“Sichuan pepper”) in a Chinese corpus (4.6 per million), or ‘हaldi’ haldi (“turmeric”) in a Hindi corpus should have a very high frequency score (27.29 per million words), which arguably shows the importance of this spice in Indian culture. These are merely examples from the preparatory stage, but similar observations shall be refined and collected in a tasteful and readable manner in the dissertation.

Conclusion

Conclusions and Suggestions for Future Research (the latter being optional)

6.3 Future Studies

Primary Sources

al-Qānūn fi l-Tibb القانون في الطب [The Canon of Medicine] by Ibn Sīnā — 1025. [12](#)

Bencao Gangmu 本草綱目 [Compendium of Materia Medica] by Li Shizhen — 1578. [12](#)

Hou Hanshu 後漢書 [Book of the Later Han] 5th c. [10](#)

Lisān al-‘Arab لسان العرب [Tongue of the Arabs] — 1290 [25](#)

Periplus Maris Erythraei [Periplus of the Erythraean Sea] — 1st c. AD [25](#)

Shennong Bencaojing 神農本草經 [Shennong’s Classic Herbal] — ca. 200 [12](#)

Shuowen Jiezi 說文解字 [Discussing Writing and Explaining Characters] — 100 AD [25](#)

Youyang Zazu 酉陽雜俎 [Miscellaneous Morsels from Youyang] by Duan Chengsi — 9th c. [25](#)

Bibliography

- Academia Sinica. (1993–2008). *Scripta Sinica*. <https://hanchi.ihp.sinica.edu.tw/ihp/hanji.htm> (Cited on p. 27).
- Adelaar, K. A. (1994). Malay and Javanese Loanwords in Malagasy, Tagalog and Siraya (Formosa). *Bijdragen Tot de Taal-, Land- En Volkenkunde* [Contributions to Linguistics, Geography and Ethnology], 150(1), 50–65 (Cited on p. 31).
- Allan, P. K. (2021). Finding the Cure for Scurvy. *Naval History Magazine*, 35(1). Retrieved August 11, 2022, from <https://www.usni.org/magazines/naval-history-magazine/2021/february/finding-cure-scurvy> (Cited on p. 31).
- Allen, L. H., Prentice, A., & Caballero, B. (Eds.). (2013). *Encyclopedia of Human Nutrition*. Elsevier Science. (Cited on p. 1).
- Alrabiah, M., Al-Salman, A., & Atwell, E. S. (2013). The Design and Construction of the 50 Million Words KSUCCA. *Proceedings of WACL'2 Second Workshop on Arabic Corpus Linguistics*, 5–8. <https://doi.org/http://eprints.whiterose.ac.uk/81860/> (Cited on p. 27).
- Alrabiah, M., Alhelewh, N., Al-Salman, A., & Atwell, E. S. (2014). An Empirical Study on the Holy Quran Based on a Large Classical Arabic Corpus. *International Journal of Computational Linguistics (IJCL)*, 5(1), 1–13. <http://eprints.whiterose.ac.uk/81839/> (Cited on p. 27).
- Amar, Z., & Lev, E. (2017). *Arabian Drugs in Early Medieval Mediterranean Medicine*. Edinburgh University Press. (Cited on p. 10).
- Apicius, M. G. (1977). *Apicius, Cookery and Dining in Imperial Rome: A Bibliography, Critical Review and Translation of the Ancient Book Known as 'Apicius de Re Coquinaria'* (J. D. Vehling, Ed.). Dover Publications. (Cited on p. 25).
- Ash, A. (2020, November 10). *Why Frankincense and Myrrh Are so Expensive*. Business Insider. Retrieved August 5, 2022, from <https://www.businessinsider.com/why-frankincense-and-myrrh-are-so-expensive-2020-10> (Cited on p. 13).
- Austin, D. F., & Felger, R. S. (2008). Sichuan Peppers and the Etymology of Fagara (Rutaceae). *Economic Botany*, 62(4), 567–573 (Cited on pp. 9, 15).
- Bagli, M. (2021). *Tastes We Live by: The Linguistic Conceptualisation of Taste in English*. De Gruyter Mouton. (Cited on p. 14).
- Bearman, P. J., Bianquis, T., Bosworth, C. E., van Donzel, E., & Heinrichs, W. P. (Eds.). (1960–2005). *The Encyclopaedia of Islam* (2nd ed.). E. J. Brill. <https://referenceworks.brillonline.com/browse/encyclopaedia-of-islam-2> (Cited on p. 26).
- Beekes, R. S. P., & van Beek, L. (2010). *Etymological Dictionary of Greek*. Brill. (Cited on p. 26).
- Beers, S.-J. (2012). *Jamu: The Ancient Indonesian Art of Herbal Healing*. Tuttle. <http://site.ebrary.com/id/10595159> (Cited on p. 13).

- Bellwood, P. S., Fox, J. J., & Tryon, D. T. (Eds.). (2006). *The Austronesians: Historical and Comparative Perspectives*. Dept. of Anthropology as part of the Comparative Austronesian Project, Research School of Pacific and Asian Studies, Australian National University. (Cited on p. 31).
- Billing, J., & Sherman, P. W. (1998). Antimicrobial Functions of Spices: Why Some Like It Hot. *The Quarterly Review of Biology*, 73(1), 3–49. <https://doi.org/10.1086/420058> (Cited on p. 12).
- Blažek, V. (2006). Etymology. In K. Versteegh (Ed.), *Encyclopedia of Arabic Language and Linguistics* (pp. 65–69, Vol. 2). Brill. (Cited on p. 26).
- Burkill, I. H. (1935). *A Dictionary of the Economic Products of the Malay Peninsula*. Published on behalf of the Governments of the Straits Settlements and Federated Malay States by the Crown Agents for the Colonies. (Cited on p. 10).
- Burnet, I. (2011). *Spice Islands*. Rosenberg Pub. (Cited on p. 10).
- Carstens, E., Carstens, M. I., Dessirier, J.-M., O'Mahony, M., Simons, C. T., Sudo, M., & Sudo, S. (2002). It Hurts so Good: Oral Irritation by Spices and Carbonated Drinks and the Underlying Neural Mechanisms. *Food Quality and Preference*, 13(7-8), 431–443 (Cited on p. 11).
- Casson, L. (1989). *The Periplus Maris Erythraei: Text With Introduction, Translation, and Commentary*. Princeton University Press. (Cited on p. 25).
- Chang, K.-C. (1977). *Food in Chinese Culture: Anthropological and Historical Perspectives*. Yale University Press. (Cited on p. 9).
- Ch'en, K. K. S. (1964). *Buddhism in China: A Historical Survey*. Princeton University Press. (Cited on p. 27).
- Cobb, M. A. (2019). *The Indian Ocean Trade in Antiquity: Political, Cultural and Economic Impacts*. Routledge. (Cited on p. 10).
- Corn, C. (1998). *The Scents of Eden: A Narrative of the Spice Trade*. Kodansha International. (Cited on p. 10).
- Crane, G. R. (Ed.). (n.d.). *Perseus Digital Library*. Tufts University. <http://www.perseus.tufts.edu/hopper/> (Cited on p. 25).
note: Web portal.
- Craze, R. (1997). *The Spice Companion: The Culinary, Cosmetic, and Medicinal Uses of Spices*. People's Medical Society. (Cited on p. 7).
- Czarra, F. (2009). *Spices: A Global History*. Reaktion Books. <https://press.uchicago.edu/ucp/books/book/distributed/S/bo6899739.html> (Cited on pp. 4, 8).
- Dalby, A. (1996). *Siren Feasts: A History of Food and Gastronomy in Greece*. Routledge. (Cited on p. 9).
- Dalby, A. (2000). *Dangerous Tastes: The Story of Spices*. University of California Press. <https://www.worldhistory.org/books/0520236742/> (Cited on pp. 8, 31).
- Dalby, A. (2001). Christopher Columbus, Gonzalo Pizarro, and the Search for Cinnamon. *Gastronomica*, 1(2), 40–49. <https://doi.org/10.1525/gfc.2001.1.2.40> (Cited on p. 8).
- Dalby, A. (2003). *Food in the Ancient World, from A to Z*. Routledge. (Cited on p. 9).
- Dalby, A. (2010). *Tastes of Byzantium: The Cuisine of a Legendary Empire*. Tauris. (Cited on p. 9).
- Dalby, A., & Grainger, S. (1996). *The Classical Cookbook*. J. Paul Getty Museum. (Cited on p. 9).

- Davidson, A. (2014). *The Oxford Companion to Food* (3rd ed.). Oxford University Press. <https://doi.org/10.1093/acref/9780199677337.001.0001> (Cited on p. 9).
- de Goeje, M. J. (Ed.). (1870). *Bibliotheca Geographorum Arabicorum*. E. J. Brill. <https://brill.com/view/serial/BGA> (Cited on p. 25).
- Depner, S. C.-y. (2019). Chinese Language and Fruits. In C.-R. Huang, Z. Jing-Schmidt, & B. Meisterernst (Eds.), *The Routledge Handbook of Chinese Applied Linguistics* (pp. 92–104). Routledge. (Cited on p. 13).
- Detienne, M. (1994). *The Gardens of Adonis: Spices in Greek Mythology* (J. Lloyd, Trans.). Princeton University Press. (Cited on p. 8).
- Dietrich, A. (2004). Afāwih. In P. J. Bearman, T. Bianquis, C. E. Bosworth, E. van Donzel, & W. P. Heinrichs (Eds.), *The Encyclopaedia of Islam* (2nd ed., Vol. 12, pp. 42–43, Vols. 13, Vol. 12). E. J. Brill. <https://referenceworks.brillonline.com/browse/encyclopaedia-of-islam-2> (Cited on p. 9).
- Dioscorides, P. (2005). *De Materia Medica* (L. Y. Beck, Trans.). Olms-Weidmann. (Original work published ca. 50–70). (Cited on p. 25)
- Donkin, R. A. (2003). *Between East and West: The Moluccas and the Traffic in Spices Up to the Arrival of Europeans*. American Philosophical Society. (Cited on p. 10).
- Dott, B. R. (2020). *The Chile Pepper in China: A Cultural Biography*. Columbia University Press. (Cited on pp. 8, 32).
- Duan, C. [ca. 860]. *Youyang Zazu* [Miscellaneous Morsels from Youyang]. (Cited on p. 25).
- Duke, J. A. (2002). *CRC Handbook of Medicinal Spices*. CRC press. (Cited on p. 12).
- Duke, J. A., Duke, P.-A. K., & DuCellier, J. L. (2008). *Duke's Handbook of Medicinal Plants of the Bible*. CRC Press. (Cited on p. 10).
- Durkin, P. (2014). *Borrowed Words: A History of Loanwords in English*. Oxford University Press. (Cited on p. 36).
- Engelhardt, U. (2001). Dietetics in Tang China and the First Extant Works of Materia Dietetica. In E. Hsu (Ed.), *Innovation in Chinese Medicine* (pp. 173–191). Cambridge University Press. (Cited on p. 13).
- Farrell, K. T. (1985). *Spices, Condiments, and Seasonings* (2nd ed.). AVI Pub. Co. (Cited on p. 7).
- Farrimond, S. (2018). *The Science of Spice: Understand Flavour Connections and Revolutionize Your Cooking*. Penguin Random House. <https://www.overdrive.com/search?q=1A704FA2-E323-4FD5-95F9-12EDE5F93DDB> (Cited on p. 11).
- Ford, P. W., Harmon, A. D., Tucker, A. O., Sasser, M., Jackoway, G., Albornoz, G., Grypa, R. D., Pratt, J. L., & Cardellina, J. H. (2019). Cinnamon – Differentiation of Four Species by Linking Classical Botany to an Automated Chromatographic Authentication System. *Journal of AOAC INTERNATIONAL*, 102(2), 363–368. <https://doi.org/10.5740/jaoacint.18-0343> (Cited on p. 18).
- Foundation, E. I., & Yarshater, E. (Eds.). (1996–present). *Encyclopædia Iranica* (Online). Retrieved August 7, 2022, from <https://iranicaonline.org> (Cited on p. 26).
- Freedman, P. (2008). *Out of the East: Spices and the Medieval Imagination*. Yale University Press. (Cited on p. 8).

- Freedman, P. (2015). Health, Wellness and the Allure of Spices in the Middle Ages. *Journal of Ethnopharmacology*, 167, 47–53. <https://doi.org/10.1016/j.jep.2014.10.065> (Cited on p. 13).
- González, J., Barros-Loscertales, A., Pulvermüller, F., Meseguer, V., Sanjuán, A., Belloch, V., & Ávila, C. (2006). Reading Cinnamon Activates Olfactory Brain Regions. *NeuroImage*, 32(2), 906–912. <https://doi.org/10.1016/j.neuroimage.2006.03.037> (Cited on p. 14).
- Gutas, D. (1998). *Greek Thought, Arabic Culture: The Graeco-Arabic Translation Movement in Baghdad and Early 'Abbāsid Society (2nd-4th/8th-10th Centuries)*. Routledge. (Cited on p. 43).
- Guthrie, W. B. (2009). The Trade-Language Origin of "Turmeric". *Word*, 60(1), 79–90. <https://doi.org/10.1080/00437956.2009.11432594> (Cited on pp. 9, 19).
- Halikowski Smith, S. (2001). *Portugal and the European Spice Trade, 1480-1580* [Doctoral dissertation, European University Institute]. Fiesole. <https://doi.org/10.2870/92585> (Cited on p. 5).
- Hall, K. R. (2010). *A History of Early Southeast Asia: Maritime Trade and Societal Development, 100–1500*. Rowman & Littlefield Publishers. (Cited on p. 10).
- Haspelmath, M., & Tadmor, U. (Eds.). (2009a). *Loanwords in the World's Languages: A Comparative Handbook*. De Gruyter Mouton. <https://doi.org/doi:10.1515/9783110218442> (Cited on pp. 52, 53).
- Haspelmath, M., & Tadmor, U. (Eds.). (2009b). *The World Loanword Database (WOLD)*. Max Planck Institute for Evolutionary Anthropology. <https://wold.clld.org/> (Cited on pp. 57, 61).
- Haw, S. G. (2017). Cinnamon, Cassia and Ancient Trade. *Journal of Ancient History and Archaeology*, 4(1), 5–18. <https://doi.org/10.14795/j.v4i1.211> (Cited on pp. 9, 15).
- Hayyim, S. (1934–1936). *New Persian-English Dictionary, Complete and Modern, Designed to Give the English Meanings of over 50,000 Words, Terms, Idioms, and Proverbs in the Persian Language, as Well as the Transliteration of the Words in English Characters. Together with a Sufficient Treatment of All the Grammatical Features of the Persian Language*. Librairie-imprimerie Bérroukhim. <https://dsal.uchicago.edu/dictionaries/hayyim/> (Cited on p. 57).
- Herman, L. (2015). *Herb & Spice Companion: The Complete Guide to Over 100 Herbs & Spices*. Wellfleet Press. (Cited on p. 7).
- Hoogervorst, T. (2012). *Southeast Asia in the Ancient Indian Ocean World: Combining Historical Linguistic and Archaeological Approaches* [Doctoral dissertation, University of Oxford]. Oxford. (Cited on p. 10).
- Hooper, D. (1929). On Chinese Medicine: Drugs of Chinese Pharmacies in Malaya. *The Gardens' Bulletin Straits Settlements*, 6(1-5), 1–163 (Cited on p. 35).
- Hosseinzadeh, H., & Nassiri-Asl, M. (2013). Avicenna's (Ibn Sina) the Canon of Medicine and Saffron (*Crocus Sativus*): A Review. *Phytotherapy Research*, 27(4), 475–483 (Cited on p. 12).
- Hourani, G. F. (1975). *Arab Seafaring in the Indian Ocean in Ancient and Early Medieval Times*. Octagon Books. (Cited on p. 10).
- Hu, S.-Y. (2005). *Food Plants of China*. The Chinese University Press. (Cited on pp. 8, 9, 21).
- Huang, C.-R., & Xiong, J. (2019). Linguistic Synaesthesia in Chinese. In C.-R. Huang, Z. Jing-Schmidt, & B. Meisterernst (Eds.), *The Routledge Handbook of Chinese Applied Linguistics* (pp. 294–312). Routledge. <https://doi.org/10.4324/9781315625157-4> (Cited on p. 13).

- Ibn Sayyār al-Warrāq. (2007). *Annals of the Caliphs' Kitchens: Ibn Sayyār al-Warrāq's Tenth-Century Baghdadi Cookbook* (N. Nasrallah, Trans.; Vol. 70). Brill. (Cited on p. 9).
- Ibn Sīnā. (1329). *Al-Qānūn Fī al-Ṭibb* [The Canon of Medicine]. <https://hdl.loc.gov/loc.wdl/wdl.15440> (Original work published 1025). (Cited on p. 25)
- Jurafsky, D. (2014). *The Language of Food: A Linguist Reads the Menu*. W.W. Norton & Company. (Cited on pp. 1, 13).
- Katz, S. H. (Ed.). (2003). *Encyclopedia of Food and Culture*. C. Scribner's Sons Thomson Gale. (Cited on p. 9).
- Katzer, G. (2012a). *Spice Pages: Pepper (Piper Nigrum, Black Peppercorns)*. Gernot Katzer's Spice Pages. Retrieved July 20, 2022, from http://gernot-katzers-spice-pages.com/engl/Pipe_nig.html (Cited on p. 61).
- Katzer, G. (2012b). *Welcome to Gernot Katzer's Spice Pages*. Gernot Katzer's Spice Pages. Retrieved July 20, 2022, from <http://gernot-katzers-spice-pages.com/engl/> (Cited on p. 14).
- Keay, J. (2006). *The Spice Route: A History*. University of California Press. (Cited on p. 7).
- Kilgariff, A., Baisa, V., Bušta, J., Jakubíček, M., Kovář, V., Michelfeit, J., Rychlý, P., & Suchomel, V. (2014). The Sketch Engine: Ten Years On. *Lexicography*, 1(1), 7–36. <https://doi.org/10.1007/s40607-014-0009-9/> (Cited on p. 27).
- Kilgariff, A., Rychlý, P., Smrž, P., & Tugwell, D. (2004). The Sketch Engine. *Information Technology*, 105(116). <https://is.muni.cz/publication/560635/en?lang=en> (Cited on p. 27).
- King, A. H. (2007). *The Musk Trade and the Near East in the Early Medieval Period* [Doctoral dissertation, Indiana University]. (Cited on p. 8).
- Klein, E. (1987). *A Comprehensive Etymological Dictionary of the Hebrew Language for Readers of English*. Carta. (Cited on p. 26).
- Kronld, M. (2007). *The Taste of Conquest: The Rise and Fall of the Three Great Cities of Spice*. Ballantine Books. (Cited on pp. 8, 64).
- Kurlansky, M. (2002). *Salt: A World History*. Walker and Co. (Cited on p. 8).
- Lakshmi, P. (2016). *The Encyclopedia of Spices and Herbs: An Essential Guide to the Flavors of the World*. ECCO. (Cited on p. 7).
- Laufer, B. (1919). *Sino-Iranica: Chinese Contributions to the History of Civilization in Ancient Iran, With Special Reference to the History of Cultivated Plants and Products* (Vol. 3). Field Museum of Natural History. (Cited on pp. 10, 19, 37).
- Lawrence, B. M. (1984). Major Tropical Spices-Ginger (*Zingiber Officinale* Rosc.) *Perfumer & Flavorist*, 9(5), 1–40 (Cited on p. 31).
- Leung, A. K. C., & Chen, M. (2019). The Itinerary of Hing/Awei/Asafetida across Eurasia, 400–1800. In P. H. Smith (Ed.), *Entangled Itineraries: Materials, Practices, and Knowledges across Eurasia* (pp. 141–164). University of Pittsburgh Press. <https://doi.org/10.2307/j.ctvhgvzci.10> (Cited on p. 9).
- Lev, E., & Amar, Z. (2008). *Practical Materia Medica of the Medieval Eastern Mediterranean According to the Cairo Genizah*. Brill. (Cited on p. 10).

- Lewicka, P. B. (2011). *Food and Foodways of Medieval Cairenes: Aspects of Life in an Islamic Metropolis of the Eastern Mediterranean*. Brill. (Cited on p. 9).
- Liu, Z., Gao, M., Mai, Y., & Youwei, S. (1985). 漢語外來詞詞典 *Hanyu Wailaici Cidian* [A dictionary of loan words and hybrid words in Chinese]. 商務印書館香港分館 [The Commercial Press Hong Kong Branch]. (Cited on p. 26).
- Mair, V. H., & Hoh, E. (2009). *The True History of Tea*. Thames & Hudson. (Cited on p. 8).
- Matisoff, J. A. (2003). *Handbook of Proto-Tibeto-Burman: System and Philosophy of Sino-Tibetan Reconstruction*. University of California Press. (Cited on p. 39).
OCLC: ocm53232585.
- Merriam-Webster. (n.d.). *Merriam Webster's Unabridged Dictionary*. Retrieved November 12, 2021, from <https://unabridged.merriam-webster.com/> (Cited on p. iii).
- Milton, G. (1999). *Nathaniel's Nutmeg: Or, the True and Incredible Adventures of the Spice Trader Who Changed the Course of History*. Hodder & Stoughton Farrar, Straus and Giroux. (Cited on p. 7).
- Mirabal, S., Cadenas, A. M., Garcia-Bertrand, R., & Herrera, R. J. (2013). Ascertaining the Role of Taiwan as a Source for the Austronesian Expansion: Taiwan as Source for Austronesian Expansion. *American Journal of Physical Anthropology*, 150(4), 551–564. <https://doi.org/10.1002/ajpa.22226> (Cited on p. 31).
- Morton, T. (2006). *The Poetics of Spice: Romantic Consumerism and the Exotic*. Cambridge University Press. (Cited on p. 8).
- Musallam, B. (1987–2011). AVICENNA x. Medicine and Biology. In *Encyclopædia Iranica* (online, pp. 94–99, Vol. III/1). <http://www.iranicaonline.org/articles/avicenna-x> (Cited on p. 12).
- Nabhan, G. P. (2014). *Cumin, Camels, and Caravans: A Spice Odyssey*. University of California Press. (Cited on p. 8).
- Nilius, B., & Appendino, G. (2013). Spices: The Savory and Beneficial Science of Pungency. *Reviews of Physiology, Biochemistry and Pharmacology*, 164, 1–76 (Cited on p. 12).
- Norman, J. (2015). *Herbs & Spices* (2nd ed.). DK Publishing. (Original work published 2002). (Cited on p. 8)
- Nugent-Head, J. (2014). The First Materia Medica: The Shen Nong Ben Cao Jing. *Journal of Chinese Medicine*, 104, 24–28 (Cited on p. 12).
- O'Connell, J. (2016). *The Book of Spice: From Anise to Zedoary*. Pegasus Books. (Cited on p. 8).
- Oketch-Rabah, H. A., Marles, R. J., & Brinckmann, J. A. (2018). Cinnamon and Cassia Nomenclature Confusion: A Challenge to the Applicability of Clinical Data. *Clinical Pharmacology & Therapeutics*, 104(3), 435–445. <https://doi.org/10.1002/cpt.1162> (Cited on p. 18).
- Opara, E. I., & Chohan, M. (2021). *Culinary Herbs and Spices: A Global Guide*. Royal Society of Chemistry. <https://doi.org/10.1039/9781839164446> (Cited on p. 8).
- Ortutay, G. (Ed.). (1977–1982). *Magyar Néprajzi Lexikon* [Hungarian Ethnographic Lexicon]. Akadémiai Kiadó. <http://mek.niif.hu/02100/02115/html/> (Cited on p. 52).
- OUP. (n.d.). *Oxford English Dictionary*. Oxford University Press. Retrieved March 24, 2022, from <https://www.oed.com/> (Cited on pp. 39, 67).

- Parthasarathy, V. A., Chempakam, B., & Zachariah, T. J. (Eds.). (2008). *Chemistry of Spices*. CABI. (Cited on p. 11).
- Pearson, M. N. (Ed.). (1996). *Spices in the Indian Ocean World*. Variorum. (Cited on p. 10).
- Pepper. (2022, June 1). In *Wiktionary*. Retrieved July 21, 2022, from <https://en.wiktionary.org/w/index.php?title=pepper&oldid=67220820> (Cited on p. 61).
Page Version ID: 67220820.
- Peter, K. V. (Ed.). (2006). *Handbook of Herbs and Spices, Volume 3* (1st ed.). Woodhead Publishing Limited. <https://www.sciencedirect.com/book/9781845690175/handbook-of-herbs-and-spices> (Cited on p. 22).
- Peter, K. V. (Ed.). (2012). *Handbook of Herbs and Spices* (2nd ed.). Woodhead Publishing Limited. <http://www.sciencedirect.com/science/book/9780857090409> (Cited on pp. 11, 14, 21, 22).
- Pliny the Elder. (1855). *Naturalis Historia* [The Natural History of Pliny] (J. Bostock & H. T. Riley, Trans.). Henry G. Bohn. <https://www.perseus.tufts.edu/hopper/text?doc=Plin.+Nat.+toc> (Original work published 77). (Cited on p. 25)
- POWO. (2022). *Plants of the World Online* (Botanical Database). Facilitated by the Royal Botanic Gardens, Kew. <http://www.plantsoftheworldonline.org/> (Cited on p. 32).
- Prescott, J., & Stevenson, R. J. (1995). Pungency in Food Perception and Preference. *Food Reviews International*, 11(4), 665–698 (Cited on p. 11).
- Rain, P. (2004). *Vanilla: The Cultural History of the World's Most Popular Flavor and Fragrance*. J.P. Tarcher/Penguin. (Cited on p. 8).
- Ravindran, P. N. (Ed.). (2017). *The Encyclopedia of Herbs & Spices*. CABI. <https://search-credoreference-com.ezproxy.lb.polyu.edu.hk/content/title/cabiherbs?tab=contents> (Cited on pp. 11, 22).
- Ravindran, P. N., & Nirmal Babu, K. (Eds.). (2005). *Ginger: The Genus Zingiber*. CRC Press. (Cited on p. 31).
- Reid, A. (1988). *Southeast Asia in the Age of Commerce, 1450-1680: Volume One, The Lands Below the Winds*. Yale University Press. (Cited on p. 10).
- Ross, A. S. C. (1952). *Ginger, a Loan-Word Study*. Basil Blackwell. (Cited on p. 9).
- Sajadi, M. M., Mansouri, D., & Sajadi, M.-R. M. (2009). Ibn Sina and the Clinical Trial. *Annals of Internal Medicine*, 150(9), 640–643 (Cited on p. 12).
- Schafer, E. H. (1985). *The Golden Peaches of Samarkand: A Study of Tang Exotics*. University of California Press. (Cited on p. 19).
- Schivelbusch, W. (1992). *Tastes of Paradise: A Social History of Spices, Stimulants, and Intoxicants*. Pantheon Books. <https://archive.org/details/tastesofparadiseooschi/mode/2up> (Cited on p. 8).
- Schuessler, A. (2007). *ABC Etymological Dictionary of Old Chinese*. University of Hawai'i Press. (Cited on p. 26).
- Shaffer, M. (2013). *Pepper: A History of the World's Most Influential Spice*. Thomas Dunne Books. (Cited on p. 8).

- Sherman, P. W., & Billing, J. (1999). Darwinian Gastronomy: Why We Use Spices. *BioScience*, 49(6), 453–463. <https://doi.org/10.2307/1313553> (Cited on p. 11).
- Sidebotham, S. E. (2011). *Berenike and the Ancient Maritime Spice Route*. University of California Press. (Cited on p. 10).
- Simons, C., & Carstens, E. (2008). Oral Chemesthesis and Taste. In *The Senses: A Comprehensive Reference* (pp. 345–369). Elsevier. <https://doi.org/10.1016/B978-012370880-9.00090-6> (Cited on p. 66).
- Small, E. (1996). Confusion of Common Names for Toxic and Edible "Star Anise" (*Illicium*) Species. *Economic Botany*, 50(3), 337–339 (Cited on p. 18).
- Smith, R. D. (1980). Avicenna and the Canon of Medicine: A Millennial Tribute. *Western Journal of Medicine*, 133(4), 367–370 (Cited on p. 12).
- Spence, C. (2018). Why Is Piquant/Spicy Food so Popular? *International Journal of Gastronomy and Food Science*, 12, 16–21. <https://doi.org/10.1016/j.ijgfs.2018.04.002> (Cited on p. 11).
- Spengler, R. N. (2019a). *Fruit From the Sands: The Silk Road Origins of the Foods We Eat*. University of California Press. (Cited on p. 7).
- Spengler, R. N. (2019b). Spices, Oils, and Tea. In *Fruit from the Sands* (1st ed., pp. 247–270). University of California Press. (Cited on p. 10).
- Steingass, F. J. (1892). *A Comprehensive Persian-English Dictionary: Including the Arabic Words and Phrases to Be Met With in Persian Literature*. Routledge & K. Paul. <https://dsal.uchicago.edu/dictionaries/steingass/> (Cited on p. 57).
- Sturgeon, D. (2021). Chinese Text Project: A Dynamic Digital Library of Premodern Chinese. *Digital Scholarship in the Humanities*, 36(S1), 101–112. <https://doi.org/10.1093/lc/fqz046> (Cited on p. 27).
- Sturgeon, D. (n.d.). *Chinese Text Project*. Retrieved August 7, 2022, from <https://ctext.org/> (Cited on p. 27).
- Tewksbury, J. J., Reagan, K. M., Machnicki, N. J., Carlo, T. A., Haak, D. C., Penaloza, A. L. C., & Levey, D. J. (2008). Evolutionary Ecology of Pungency in Wild Chilies. *Proceedings of the National Academy of Sciences*, 105(33), 11808–11811. <https://doi.org/10.1073/pnas.0802691105> (Cited on p. 66).
- Toussaint-Samat, M. (2009). *A History of Food* (2nd ed.). Wiley-Blackwell. (Cited on pp. 9, 13, 63).
- Turner, J. (2004). *Spice: The History of a Temptation*. Vintage Books. (Cited on pp. 4, 8, 11).
- Unschuld, P. U. (2022, February 16). *On The First English Translation of the Classic Chinese Encyclopedia, Ben Cao Gang Mu*. UC Press Blog. Retrieved August 5, 2022, from <https://www.ucpress.edu/blog/58295/on-the-first-english-translation-of-the-classic-chinese-encyclopedia-ben-cao-gang-mu/> (Cited on p. 12).
- van der Veen, M. (2018). Archaeobotany: The Archeology of Human-plant Interactions. In W. Scheidel (Ed.), *The Science of Roman History* (pp. 53–94). Princeton University Press. <https://doi.org/10.2307/j.ctvc772w1.9> (Cited on p. 10).

- van der Veen, M., & Morales, J. (2015). The Roman and Islamic Spice Trade: New Archaeological Evidence. *Journal of Ethnopharmacology*, 167, 54–63. <https://doi.org/10.1016/j.jep.2014.09.036> (Cited on p. 10).
- van Wyk, B.-E. (2014). *Culinary Herbs and Spices of the World*. University of Chicago Press, joint publication with the Royal Botanic Gardens, Kew. <https://doi.org/10.7208/chicago/9780226091839.001.0001> (Cited on pp. 4, 8, 21).
- Wang, Q. J., Keller, S., & Spence, C. (2017). Sounds Spicy: Enhancing the Evaluation of Piquancy by Means of a Customised Crossmodally Congruent Soundtrack. *Food Quality and Preference*, 58, 1–9. <https://doi.org/10.1016/j.foodqual.2016.12.014> (Cited on p. 14).
- Wijesekera, R., & Chichester, C. O. (1978). The Chemistry and Technology of Cinnamon. *CRC Critical Reviews in Food Science and Nutrition*, 10(1), 1–30. <https://doi.org/10.1080/10408397809527243> (Cited on p. 18).
- Wright, C. A. (2007). The Medieval Spice Trade and the Diffusion of the Chile. *Gastronomica*, 7(2), 35–43. <https://doi.org/10.1525/gfc.2007.7.2.35> (Cited on p. 9).
- Wu, J.-N. (2005). *An Illustrated Chinese Materia Medica*. Oxford University Press. (Cited on p. 12).
- Yang, S.-z. (1998). *The Divine Farmer's Materia Medica: A Translation of the Shen Nong Ben Cao Jing*. Blue Poppy Press, Inc. (Original work published ca. 206 B.C.E.–220). (Cited on p. 12)
- Yao, Y., & Su, Q. (2019). Chinese, Food and Menus. In C.-R. Huang, Z. Jing-Schmidt, & B. Meisterernst (Eds.), *The Routledge Handbook of Chinese Applied Linguistics* (pp. 81–91). Routledge. (Cited on p. 13).
- Yashin, A., Yashin, Y., Xia, X., & Nemzer, B. (2017). Antioxidant Activity of Spices and Their Impact on Human Health: A Review. *Antioxidants*, 6(70) (Cited on p. 12).
- Zaicz, G. (2006). *Etimológiai Szótár: Magyar Szavak és Toldalékok Eredete [Etymological Dictionary: The Origin of Hungarian Words and Affixes]*. Tinta Könyvkiadó. (Cited on pp. 32, 63).
- Zaouali, L. (2007). *Medieval Cuisine of the Islamic World: A Concise History With 174 Recipes* (M. B. DeBevoise, Trans.). University of California Press. (Cited on p. 9).
- Zhao, Q., Huang, C.-R., & Ahrens, K. (2019). Directionality of Linguistic Synesthesia in Mandarin: A Corpus-based Study. *Lingua*, 232, 102744. <https://doi.org/10.1016/j.lingua.2019.102744> (Cited on p. 13).
- Zhao, Z., Guo, P., & Brand, E. (2018). A Concise Classification of Bencao (Materia Medica). *Chinese Medicine*, 13(18). <https://doi.org/10.1186/s13020-018-0176-y> (Cited on pp. iii, 12).
- Zhong, Y., & Huang, C.-R. (2020). Sweetness or Mouthfeel: A Corpus-based Study of the Conceptualization of Taste. *언어연구*, 37(3), 359–387 (Cited on p. 14).
- Zohary, D., Hopf, M., & Weiss, E. (2012). *Domestication of Plants in the Old World: The Origin and Spread of Cultivated Plants in West Asia, Europe and the Nile Valley* (4th ed.). Oxford University Press. (Original work published 1988). (Cited on p. 10)