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# ALMONDS ALONG THE SILK ROAD: THE EXCHANGE AND ADAPTATION OF IDEAS FROM WEST TO EAST

Ken Albala

This is a story of almonds and the passage of ideas eastward along the various routes that have come to be known as the Silk Road. While we normally think of exotic goods travelling westward, there was also a significant trade in the other direction, to China and south to India. Both the almond and ideas about how to use them made this journey. For example, a Chinese pharmacist will explain that among various properties of almonds, they suppress coughs and are useful for treating lung ailments. This is the same advice offered by Greek physician Galen of Pergamum nearly two millennia ago. A practitioner of Ayurvedic medicine in India would suggest that almonds are fattening and serve as an aphrodisiac, but can be difficult to digest, again echoing ancient Greek medical ideas. These similarities are no coincidence. Despite the very different structure of these three medical systems, almonds were employed in similar ways in each. How this confluence of ideas might have taken place and the passage of almond uses eastward along the Silk Road is the topic of this article.

Almonds are native to south-west Asia, in a region historically described as the Fertile Crescent which stretches across Israel, Palestine and Lebanon up through Syria and eastern Turkey and across to Iraq. Almonds were collected here in the wild 10,000 years ago, and they were among the first plants to be domesticated anywhere on earth, around the third millennium BC. The earliest archaeological evidence suggests that this occurred in Jordan. Almonds are mentioned in the earliest Sumerian culinary texts in a list of banquet menu items<sup>1</sup> and they are also among the plants

mentioned frequently in the Bible. Almonds are consistently found in archaeological sites, even the famous tomb of Tutankhamun in Egypt.

Almonds thrive in hot weather but cannot tolerate frost or high humidity, so it is not surprising that almond cultivation spread in a narrow horizontal band westward to the Mediterranean and eastward toward India. Although they can be propagated by seed, the plants tend to degenerate, thus encouraging grafting or planting of shoots. This was one factor which stimulated the exportation of nuts for consumption as opposed to planting groves in eastern Asia. There is in fact no solid evidence that they were grown in China, nor are they today, although there is a 'Chinese almond' – actually the seed of an apricot, which is blanched to remove the hydrocyanic acid. These were often confused with almonds by visitors, but it is also clear that real almonds were imported, especially in the Tang Dynasty (618–907), a period of rich cultural exchange between East and West. The eastern limit of extensive almond cultivation was Afghanistan. Thus, as in northern Europe, the Chinese only knew almonds as an exotic import. They did eventually spread to India, but only in mountainous areas such as Kashmir in the far north and Uttar Pradesh, where the plants experience the chilling requirement necessary for fruiting. This is why almonds remained an expensive luxury item, and as such were ideally suited to take a place in the pharmacopoeias of eastern Asia. Furthermore, it was perfectly logical that Asians would adopt Western medical uses for almonds, even though they explained their properties using their own native systems.

How these ideas were transmitted and adapted does not appear in the historical record, but the fact that almonds are classified in similar ways, are used to treat the same ailments, and appear in similar culinary preparations strongly suggests that ideas about how to use almonds were imported with the nut itself. First we must examine the source of these ideas. The oldest and most extensive medical system which records the use of almonds derives from ancient Greece. Significantly, it was this system that was adopted

by Muslim physicians in the Middle Ages, and subsequently transported to northern India, central Asia and ultimately China. A detailed examination of Greek ideas will show exactly what ideas were transmitted and how they were adapted in the East.

Hippocrates, the father of Western medicine, or more precisely one of the many authors in the Hippocratic corpus, was the first to discuss almonds. He records that 'Almonds are burning but nutritious; burning because they are oily, and nutritious because they are fleshy.'<sup>2</sup> In the Greek system of humoral physiology, this means that almonds would have been categorized as a hot and dry food, one that stimulates cholera in the body. Logically, as a medicine in this allopathic system, in which ailments are cured by administering substances of opposite qualities, almonds would be ideal for treating colds and other phlegmatic disorders.

A follower of Hippocrates, Diocles of Carystus, offers further details: 'almonds are nourishing and good for the bowels, and are moreover, calorific because they contain some of the properties of millet. The green are less unwholesome than the dry, the soaked than the unsoaked, the roasted than the raw.'<sup>3</sup> Apart from concurring that almonds are nutritious, Diocles mentions various forms in which almonds could be consumed. Green almonds were just that, unripe and peeled from the interior of the fleshy green coating, or fruit. They are still consumed this way in the Middle East. Soaking almonds was normally done to remove the bitter brown peel. Each of these procedures, according to Diocles, mitigates the heat of the nut, making it more humorally balanced. Roasting would have made them more easily digested and purged of superfluities. Although green almonds would have been unknown outside their sphere of cultivation, soaking or blanching was a common practice in Asian medicine, for precisely the same reason it appears, to reduce their propensity to heat the body. Although humours as they are described in the Greek system are foreign to Chinese and Ayurvedic medicine, this idea of foods qualitatively heating, cooling, drying or moistening the body does have direct parallels in the East, as will be shown below.

Another property, related to heat, but ultimately deriving from bitterness, is the power to cleanse or scour the body's passageways. This is why Diphilus of Siphnos contends that 'Almonds are diuretic, attenuating, cathartic, and of little nutrition.'<sup>4</sup> It is possible that Diphilus refers here only to bitter almonds, a variety that contains poisonous prussic acid, but which can be used medicinally if blanched. But even sweet almonds are often mentioned in this context, as a food which cleans and flushes out the system, making it an ideal medicine for coughs. Diphilus continues, 'Dried almonds, however, are much more windy and apt to lie on the stomach than the green, which to be sure, have a poor flavour and are less nourishing. But if they are blanched when still tender though full grown, they are milky and of better flavour.' Here he is clearly discussing sweet almonds, and in a gastronomic context. He also warns against their potential indigestibility, another idea that will travel eastward.

In the Roman world a number of further therapeutic uses for almonds would be promulgated, and these ideas also gained wide circulation in Asian civilization. First, there is the notion that almonds can prevent drunkenness. The idea is often credited to Aristotle, and Plutarch likewise says that Drusus, brother of Tiberius, who was a prodigious drinker, used almonds this way. The logic here is that the almond on account of its bitterness and diuretic properties, speeds the alcohol through the system before it has a chance to send vapours up to the head, which was believed to cause inebriation. Roman author Pliny the Elder writes, 'It is said that if five bitter almonds are taken by a person before sitting down to drink, he will be proof against inebriation.'

Pliny also gives many more medical uses for bitter almonds: they provoke sleep and sharpen the appetite, act as a diuretic and emmenagogue. They are also useful against head-ache and fever, here presumably their purging qualities drive out the fever, rather than counteract or cool it.<sup>5</sup> Of sweet almonds Pliny only says 'their remedial properties are not so extensive; still however, they

are of a purgative nature, and are diuretic. Eaten fresh they are difficult of digestion.' On a purely gastronomic note, he adds that the almonds of Thasos and Alba are held in the highest esteem, and two kinds grown at Tarentum, one with a thin brittle shell (*Amygdalus communis fragilis*), the other harder 'remarkably large and of an oblong shape.' There is also a variety called 'mollusk' the shell of which breaks by itself.<sup>6</sup>

With fair consistency, the classical Western world held almonds as a heating and purgative food and its uses were deduced from these basic properties. The key figure who summed up these ideas, and whose writings would be those translated and transported to the Asia, was Galen of Pergamum, a Greek physician serving several Roman Emperors in succession at the end of the second century AD. Galen claims that almonds are not very astringent, but they cleanse and attenuate and thus purge, and 'act towards the expectoration of moist matter from the lungs and chest.' The very bitter nuts cut through thick and viscous matter. But they are also oily, so not as useful (as walnuts) for purging the stomach, and bitter almonds, unlike the sweet, 'afford little nourishment for the body.'<sup>7</sup> Thus there was established a clear distinction between bitter almonds which serve exclusively as medicine, and sweet almonds which are both food and medicine.

Since almonds qualify as both, and since it is essentially culinary procedures which would render them into medicine, it might be useful to look briefly at how almonds were used in cookery. Among the Romans, the largest extant cookbook is one attributed to Apicius. In it he has a very comforting dish called *apothermum* which is essentially boiled wheat with pine nuts and almonds that have been soaked, skinned and then washed in silver chalk (*creta argentaria*) so they become white. To this is added some raisins and raisin wine, with pepper over the top and served in a dish.<sup>8</sup> This recipe bears a striking resemblance to a rice dish that will be encountered in Persian cookery, and which in turn finds its way to India and China. Its modern descendant is of course rice pudding.

Interestingly, in China to this day a similar dish is served to combat colds and sore throats, although it is made with Chinese almonds (apricot kernels) powdered and mixed with rice congee.<sup>9</sup> A similar almond soup made with rice and sugar was used for sore throats in the Ch'ing court (1644–1911); the almonds were ground and the product was thickened with agar-agar so that it would become gelatinous.<sup>10</sup> This kind of almond-laced starchy pudding, and especially its medicinal use, is merely one piece of indirect evidence that illustrates the cultural links from Greece to the Far East.

How did almonds and these ideas about their use make their way eastward? The crucial vector in this case is Persian civilization during the Abbasid Caliphate centred in Baghdad. The Abbasids ruled from the year 750, and consciously patronized the translation of Greek medical and scientific works into Arabic. Beginning with the translations of Hunayn ibn Ishaq, known in the west as Johannitius (809–873) a significant corpus of medical writings appeared in the Muslim world, and these were followed by original works.

Among the Persian authorities, almonds enjoyed far more extensive use in both medicine and cuisine. Rhases (al-Razi, 865–925) claimed that they are good for gaining weight, and for increasing bone marrow and fortifying the brain. This is an idea that will resonate directly in Indian medicine. In his *Almansorem*, as it was known in Latin, he adds that it augments the quantity of sperm, thus serving as an aid to conception.<sup>11</sup>

The most important figure in the Persian tradition was Ibn Sinna (980–1037) or, as he was known in the West, Avicenna, who actually came from Bukhara, along the Silk Road. His *Al-Qanun fi l-tibb* or *Canon* became not only the standard medical text in medieval Europe, but was the primary means of Greek humoral medicine reaching Asia, particularly in Indian Unani medicine, in which the *Canon* is still the principal authority. The word Unani refers to 'Ionian' Greek, meaning the west coast of Asia Minor, what is now Turkey, from which many scientists and physicians hailed.

Regarding almonds, Avicenna makes a clear distinction between sweet and bitter almond, the latter only serving as medicine. Comparing almonds to walnuts, he claims that they are less oily, but more prone to corruption, notwithstanding almonds are more slowly digested and thus less likely to convert to cholera. Almonds are also highly nutritious 'and eating sweet almonds is fattening.' Most interestingly, repeating Greek ideas and passing them on to Asia, 'sweet almonds comfort coughs and spitting of blood ... they open clogs of the liver and spleen on account of their bitterness. They even open clogs occurring in the extremities of the veins and if eaten fresh with the peel, clean humidity in the stomach.' They are difficult to digest however, but with sugar speed through the system more quickly.<sup>12</sup>

The Arab authors directly inherited the Greek medical system as well as Greek ideas about the use of almonds, particularly how they are abstersive and aperitive, opening obstructions in the chest and liver. Along with the medicinal almond soup mentioned above, there were also a number of culinary preparations which might be considered unique contributions of Persian culture. A Baghdad cookbook, the *Kitab al-Tabikh*, for example records a number of sweet recipes, among which are *lauzinaj*, *faludhaj* and *samal wa-agras*.<sup>13</sup> The Arabic word for almond is *lewze* or *lauz*, from which we are said to get the word lozenge, presumably the shape in which some of these were cut. The *lauzinaj* recipe begins with finely pounded sugar and pounded almonds, kneaded together with rose-water. This is essentially marzipan, and also comes with various flavourings such as camphor or musk. These are ancestors of a number of dishes introduced into India, such as *badam barfi*, *halwa*, and similar almond sweets throughout central Asia and as far as China.

The exchange of almonds in medicine and cuisine can be traced directly to the trade between Abbasid civilization and the T'ang emperors in China, when almonds were introduced along the Silk Road. The Chinese not only imported them, but they were sent

as tribute to the Emperor, and in 851 the Arab merchant Soleiman reported that the tree was cultivated there.<sup>14</sup> He may have mistaken the tree for the Chinese almond, but there is no doubt that the Chinese knew almonds and associated them with Persia. In Persian the name for almonds is *badam*, or in middle Persian *vadam*. This word was adopted in Chinese as *p'o-tam* or *bwa-dam*. It also entered Tibetan as *ba-dam*, and in Sanskrit as *vātāma* or *bātāma*. It is first mentioned in Chinese in the *Yu yan tsa tsu* where it is called a flat peach said to derive from Po-se (i.e. Persia). It is essentially merely a description of the tree and its taste: 'The meat is bitter and acrid, and cannot be chewed; the interior of the kernel, however, is sweet, and is highly prized in the Western Regions and all other countries.'<sup>15</sup> The later *Pen Tsao Kang Mu* by Li Si-cen mentions that almonds come from the land of the Mohammedans and occurs everywhere West of the Pass – which is Kan-su and Sen-si.

With the almonds came Western, originally Greek, ideas about their medical use. From the T'ang Dynasty there survive fragments of pharmacopoeias or 'Food Canons' (*Shih ching*). Among the earliest was one from the seventh century by Meng Shen. These mention almonds and a number of exotic foods imported from the West and grown in imperial gardens. The *Hsin T'ang shu* (New T'ang History) is especially detailed in this regard and describes plants grown in western Asia, grapes and figs from Iran, as well as almonds. Among the exotic delicacies presented to the Emperor and served by his 'provost of foods' (*shang shih*) were almonds of Kucha.<sup>16</sup> T'ang Dynasty emperors were actively interested in Western expansion, but also took a keen interest in Western fashions, horses – even sports like polo – and of course food items and medicine. They imported drugs, medical texts, even physicians themselves. The interest in Muslim medicine, or even specifically Greek medicine, is evidenced by the appearance of a court physician in Tibet who showed up in the seventh century and called himself *Galenos*, or *Galen*.<sup>17</sup>

The use of almonds eventually became a permanent fixture in traditional Chinese medicine. A dietary of the Mongol Era dating

to 1330, the *Yin-Shan Cheng-Yao* by Szu-Hui gives the following information about almonds, which reflects Muslim medical ideas ultimately stemming from Greece. 'Almonds are sweetish in flavour and lack poison. They control coughing and bring down *ch'i*. They disperse impeded pressing of the chest and abdomen. (This fruit comes from Muslim fields.)'<sup>18</sup> The coughing reference obviously comes from Greek medicine, as does the idea of cleansing passages in the chest. *Ch'i*, however, is a Chinese medical concept, generally translated as life force, or the energy which enables the body to heal itself. The original humoral recommendation has thus been grafted onto a native system. The idea of health as a balance of humours has a parallel in the Chinese idea of balancing yin and yang forces, which can also be described as cold and hot. Thus the almond and ideas about its use, being hot and cleansing, were easily adopted in a system with comparable parameters and similar ways of thinking about food as therapy.

Almonds became a regular import into Chinese cuisine as well. Li Shizen in the sixteenth century included it among the exotic fruits in his *Bencao Gangmu*, an extensive classification of *materia medica*. He states that they come from the West: 'It comes from the lands of Hui people and is now in all the lands of the west. ... The tree is like an apricot but its leaves are smaller; the fruit is pointed and small, the flesh thin. Its kernel is like a plumstone, the skin is thin and the almond is sweet and nice. It is eaten for tea, its taste is similar to that of the hazelnut. The people in the west consider it a local speciality.'<sup>19</sup>

Almonds were also introduced to India via the Persians. This explains why almonds in Hindi are called *badam* which comes from the Sanskrit *vatama*, in turn from old Persian *vadam*. This exchange occurred roughly the same time as in China in the Middle Ages, though more directly after the Mughal invasion of India. The Mughals were Mongols who had conquered and settled in Persia then established a dynasty in India in the sixteenth century. But even at that time, in the reign of Emperor Akbar, almonds

were still expensive, though plentiful.<sup>20</sup> Extensively used in Indian cuisine, there were confections like *badam burfi* mentioned above and *badam-kijali*. They were made into almond milk or *badam kbeer*, used to flavour tea, stuff samosas, and garnish rice dishes such as the pulaos – a descendant of the Persian pilaf. Indian food expert K.T. Achaya says that though the pulao was known since early times in Sanskrit, the biryani was introduced by Muslims (*birinj* = rice in Persian), especially the elaborate forms incorporating almonds, pistachios and raisins. Ain-i-Akbari mentions that the Mughal emperor loved growing fruits and that at the Delhi market ‘melons, grapes, watermelon, peaches, almonds, pistachios, pomegranates are everywhere to be found.’<sup>21</sup>

Almonds also figure prominently in the Indian Ayurvedic medical system. They are used primarily to strengthen mental functions and memory, an idea which echoes the Arab author Rhazes. There are also many ideas which hark back to the Greek system, principally their classification as a ‘hot’ food. Like Greek medicine, Ayurveda considers health to consist in a balance of elemental forces, or *doshas*, which are not exactly humours but energy principles that regulate physiological functions. Almonds are said to enhance the *kapha dosha*, which maintains the structural integrity of the body, but they also suppress an excess of the *vata dosha*, which is the principle of movement and transportation in the body. That is, a thin overactive body in which nourishment dissipates quickly can be cured with a regimen including almonds. The classic texts in this tradition, the *Caraka Sambhita* and *Susruta Sambhita* and the many accretions to these texts over the centuries claim that ‘*Vātāma (Bādāma)*...are heavy, hot in potency, unctuous, sweet, strength promoting, alleviator of *Vata*, nourishing, aphrodisiac and aggravator of *Kapha* as well as *Pitta*.’<sup>22</sup>

Almonds, as in the Greek system, are considered difficult to digest (i.e. aggravator of *Pitta*, the *dosha* which controls digestion), but highly nutritious. As such they serve as an aphrodisiac, since an excess of nutrition was believed to directly stimulate the

production of sperm, an idea found medieval Arab writings and in Unani medicine, which is based on the writings of Avicenna. In the Rasayana tradition, which is designed to promote longevity, almonds are said to provide vital energy,<sup>23</sup> what are described as the *ojas*, a concept comparable to the Chinese concept of *ch'i* and the Greek concept of *pneuma*. These support the immune system and contribute to longevity.

The most extensive use of almonds in Ayurveda is in the form of oil, used for various skin ailments and to warm the body in massage and other therapies. ‘Almond oil is used in various *vata* disorders, chronic constipation, dry cough, semen disorders, leucorrhoea and dysmenorrhoea. It is a good aphrodisiac, galactagogue and health tonic.’<sup>24</sup> Furthermore, ‘Juice of almonds mixed with sugar is used in cough. Almonds soaked in honey overnight and taken in early morning are a very nutritious food for all those who wish to build up a strong and healthy constitution.’<sup>25</sup>

The similar medicinal and culinary uses for almonds in these separate traditions, their classification as a hot food which scours the body’s passages, their use in coughs, for weight gain and as an aphrodisiac cannot be coincidental. While the exact mode of transmission of these ideas was probably never recorded, the medical authorities do provide fairly consistent evidence that Greek ideas passed through Persian texts and made their way to both India and China.

How these three distinct medical systems came to resemble each other is a complex and contentious topic, some scholars suggesting that there was direct contact among theorists, others insisting that the similarities are essentially superficial and that the classification of disease types and the drugs used to treat them are worked out in very different ways in each system. Nonetheless, the similar classification of almonds in each system suggests that along with the foreign nut, ideas about its uses in medicine and cuisine were also imported, and were subsequently adapted to fit into the conceptual schema of the Asian systems.

## NOTES

I am grateful for the assistance of Professor Eugene Anderson, who offered ample advice regarding Chinese food and medicine, and for his position that almonds are no longer grown in China today in any significant measure. This impression was confirmed by the California Almond Board's 2006 Delegation to China's Almond Producing Regions, as reported by Christi Heintz, Research Consultant, which found that almonds cultivated in China do not constitute a commercial crop. I also wish to thank the Almond Board of California for sponsoring this research.

In rendering Chinese words into the Latin alphabet, I have not attempted to choose between the Giles-Wade or Pinyin system and have left all transliterations in their original form as encountered in the primary and secondary sources. The same holds true for other languages as well.

1. Jean Bottéro, *The Oldest Cuisine in the World: Cooking in Mesopotamia* (Chicago: University of Chicago Press, 2004), 103.
2. *Hippocrates*, Vol. IV, translated by W.H.S. Jones (Cambridge: Harvard University Press, 1967), 337.
3. Athenaeus, *The Deipnosophists*, translated by Charles Burton Gulick (London: Heinemann, 1927), 233. Only fragments of the works of Diocles survive, embedded in the compilation of 2nd–3rd century AD Alexandrian food writer Athenaeus. The same is true of Diphilus quoted in note 4.
4. Athenaeus, 235
5. Pliny the Elder, *The Natural History*, translated by John Bostock and H.T. Riley (London: Taylor and Francis, 1855), 23:75.
6. Pliny, 15:24.
7. Galen, *On Food and Diet*, translated by Mark Grant (London: Routledge, 2000), 132.
8. *Apicius*, translated by Christopher Grocock and Sally Grainger (Totnes, Prospect Books, 2006), 153.
9. E.N. Anderson, *The Food of China* (New Haven: Yale University Press, 1988), 168.
10. Frederick Simoons, *Food in China: A Cultural and Historical Inquiry* (Boca Raton: CRC Press, 1991), 269–70.
11. P. Peyre and H. Schéhadé, *Les Amandiers: Indigènes et Exotiques, Histoire, Légendes, Littérature* (Paris: Éditions Jouve, 1941), 61.
12. Avicenna, *Liber Canonis* (Hildesheim: Georg Olm Verlagsbuchhandlung, 1964), 93v–94. Only the first book of *Canon* has been translated into English, see Gruner in the bibliography. Like him, I translated the Latin of Gerard of

Cremona (c. 1114–87), who in turn translated from Arabic.

13. *A Baghdad Cookery Book*, translated by Charles Perry (Totnes: Prospect Books, 2006), 99.
14. Simoons, 269–70; Schafer in K.C. Chang ed., *Food in Chinese Culture* (New Haven: Yale University Press, 1977), 98.
15. Berthold Laufer, *Sino-Iranica* (Chicago: Field Museum, 1919), 405–9.
16. Edward H. Schafer, *The Golden Peaches of Samarkand: A Study of T'ang Exotics* (Berkeley: University of California Press, 1963), 141.
17. Frances Garrett, 'Critical Methods in Tibetan Medical Histories', *Journal of Asian Studies* Vol. 66, No. 2 (May) 2007, 374.
18. Paul D. Buell and Eugene N. Anderson, *A Soup for the Qan* (London: Kegan Paul, 2000), 575.
19. Georges Métaillé, 'The Bencao gangmu of Li Shizhen: an innovation in natural history?' in Elizabeth Hsu, ed. *Innovation in Chinese Medicine* (Cambridge University Press, 2001), 248–9.
20. K.T. Achaya, *A Historical Dictionary of Indian Food* (Oxford University Press, 1998), 20.
21. K.T. Achaya, *The Story of Our Food* (Himayatnagar, Hyderabad: Universities Press, 2000), 72.
22. L.P. Gupta, *Biogenic Secrets of Food in Ayurveda* (Delhi: Chakhamba Sanskrit Pratishtan, 1999), 48.
23. Harbans Singh Puri, *Rasayana: Ayurvedia Herbs for Longevity and Rejuvenation* (NY: Taylor and Francis, 2003), 59–60.
24. V.M. Gogte, *Ayurvedic Pharmacology and Therapeutic Uses of Medicinal Plants* (Mumbai: Bhartiya Vidya Bharan, 2000), 718.
25. L.D. Kapoor, *Handbook of Ayurvedic Medicinal Plants* (Boca Raton: CRC Press, 2001), 272.

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