

ORIGINAL ARTICLE

The Story of Stoechas: from Antiquity to the Present Day

Abstract

The information about herbs' medicinal properties is ample in traditional manuscripts, some of which are of value even in modern medicine. However, it is not usually easy to put it into practice. Identifying traditional herbs and determining their scientific names are very challenging, calling for many ethnopharmacological studies. One significant herb in traditional medicine is *stoechas*. Its medical properties are found in traditional manuscripts, but the true origin of the herb is not yet known. This study followed the origin of stoechas through history, from ancient Rome to the conquered lands of Islam in Spain, from North Africa to India, to find its trace in various civilizations, including their traditional medicines. The results showed that the stoechas mentioned in Dioscorides and Pliny's books was referred to as *Lavandula stoechas*. This herb was prescribed in Persia for centuries as an imported drug, and the Arabicized/Persianized name, *ostokūdūs*, was used for it. Several herbs have been used as *stoechas* due to a variety of reasons: mistranslation, miscategorization, and substitution/adulteration; the herbs were *Woodfordia fruticosa* (India, 11th cent.), *Rosmarinus officialis* (North Africa, 13th cent. Northern Iran, 17th cent.). Around 100 years ago, *L. stoechas* was substituted by *L. dentata* and around 50 years ago, it was substituted by *Nepeta menthoides* in herbal markets of Iran. All of these herbs were sold as stoechas because of its similar medicinal effects as well as its similar appearance. Some information about its effects is documented in

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various manuscripts; yet few proper studies have conducted to test them.

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Introduction

Man has used herbs as medicine since antiquity. . The word “drug” has probably been derived from the Middle Persian word “*darav*”, which means “the stem of a plant”.¹ This may imply that man has made his first medicines using herbs. In ancient Persia, alongside other ways to cure illnesses, such as spells, fire, cauterizing, and surgery, herbs were used as the only drug therapy option.² Today, lot of stored information about herbs’ medicinal properties, partly constitutes what is known as “Traditional Medicine”.¹ Such information, after being tested and verified, could be of value even in modern medicine. However, there are complications in the process of putting it to use. For instance, one major problem found in the Traditional Medicine texts is the identification of the described herbs. Herbs are often referred to, in manuscripts, by different names, rather than their scientific ones. In addition, botany has been extremely underdeveloped, not providing comprehensive descriptions of herbs. Therefore, to begin an ethnopharmacological study, the identification of the herb and a historical survey on its use are necessary.

One significant herb in Traditional Medicine is stoechas. Most medical properties ascribed to stoechas are found in manuscripts.^{3,4} Moreover, it is even still sold in apothecaries [Attaries] today.⁵ Yet the relation between the *stoechas* known today and the one in the manuscripts has not yet been investigated and clarified. The goals of this study are:

- 1) To collect various local names of *stoechas* at different times and in different locations.
- 2) To determine the scientific names of local herbs used as *stoechas*.
- 3) To extract the traditional medical usage of *stoechas* at different times and in different locations.

All of the above are aimed to form a better understanding of this plant and shed light for further ethnopharmacological studies.

Stoechas in the West

Stoechas in Antiquity

In ancient Rome, different species of lavender were used.

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1- Adhami, 2007: 34-43.

2- Pour Davood, 1977.

3- Avicenna, 1998: 55-56.

4- Aghili Khorasani, 2001:122-123.

5- Amin, 2005: 46.



The term lavender came from the Latin ‘*lavando*’ part of the infinitive ‘*lavare*’ (to bathe), for it was in frequent use in public baths for its fragrance.⁶

The first account of lavender’s medicinal use dates back to the first century AD, when Dioscorides in his prominent work ‘*De Materia Medica*’ mentions it under the name of *stoechas*:

“*Stoechas* grows in the Islands of Galatia near Messalia called the *Stoechades*, which is how it got its name. It is a herb with slender twigs and filaments similar to thyme, but longer-leaved, sharp to the taste, and somewhat bitter. A decoction of it (like hyssop) is good for disorders in the chest. It is useful when mixed with antidotes. It is also called *syncliopa*, *alcibiades*, *pancratium* or *styphonia*; the Egyptians call it *suphlo*, the Magi, *oculus pythonis*, and the Romans, *schiolebina*”.⁷

Pliny, the Elder, the Roman author, naturalist, natural philosopher, and contemporary with Dioscorides, in his encyclopaedic work, *Naturalis Historia*, provides similar descriptions: ‘*Stoechas* grows only in the islands of the same name, a fragrant plant with the foliage of hyssop and a bitter taste. Taken in drink, it is an emmenagogue, and relieves pains in the chest. It is also an ingredient of antidotes’.⁸

Dioscorides’ geographical clues, Massalia and Galatia, lead to the location of the *Stoechades* Isles. Massalia is the old name for modern city of Marseille in southern France. *Galatia* is the Greek name of what was called *Gallia* in Latin: Gaul—the region in Western Europe where the Gauls live. Therefore, the Isles of *Stoechades* are in the south of Marseille in France. There is only one prominent set of isles there, which are now known as *Îles d’Hyères*.⁹ The only species of lavender growing there is *Lavandula stoechas*, which is also known as French lavender. In short, *stoechas* mentioned at the time of Dioscorides is *Lavandula stoechas* (Table 1).

Stoechas’s medicinal properties were identified gradually by Galen and his successors, useful for snake bites stings, stomach aches, liver, renal and gall disorders, jaundice and dropsy. Later on, in medieval Europe, *stoechas* usage remained as it was in antiquity; i.e., no new usage was found.¹⁰

Stoechas in the East

1. Stoechas in Persia

Records prove that *L. stoechas* does not grow in Iran.^{11,12} However, in old sources, there are so many references to its use. According to Dioscorides, for instance, the Magi,

6- Lis-Balchin, 2002: 35-50.

7- Dioscorides, 2000: 399-400.

8- Pliny, 1956: 401.

9- Oxford Latin Dictionary, 1968.

10- Lis-Balchin, 2002: 35-50.

11- Jamzad, 2012: 950-54.

12- Mozaffarian, 2007.



Table 1: Morphological description and other characteristics of herbs known as stoechas throughout history. The identification of herb's scientific name was achieved by comparing traditional morphological description as well as local name and habitat with current information.

Local Name	Descriptor	Time and place of using this name	Traditional morphological description	Historical habitat	Current morphological description	Identification	Key of identification
Stoechas	Pliny the Elder, Dioscorides	1 st century, Roman empire	Slender twigs and filaments similar to thyme, but with longer leaves. Fragrant.	Îles d'Hyères (France)	Flowers: composed of closely set fertile bracts that house the corollas (actual flowers) and topped by a tuft of large, showy, sterile bracts, which are the more conspicuous part of the inflorescence. Leaves: narrow, linear, stalkless, untoothed, with (rolled) margins, covered with a fine grey down, usually giving a grey-green overall appearance.	<i>Lavandula stoechas</i>	Habitat and morphological description
Dhurum	Dīnawarī	9 th century, Arabian peninsula	Fragrant	Sarat (Arabian peninsula)	Flowers: clusters at the end of the slender grey stems and consisting of violet-blue, papery bracts and tiny, paler violet-blue flowers. Leaves: toothed, greyish-green, highly aromatic and sticky and borne in rosettes up the woody stem	<i>Lavandula dentata</i>	The only lavender grows in this area is still <i>L. dentata</i> with the same local name
Al-thamīlah	Azdi, Ibn al-Baytar	12-13 th centuries, Muslim Spain	Flowers: Acorn-shaped Leaves: Similar to those of Southern wormwood (<i>Arimisia abortivum</i>)	Al-Andalus (Spain)	A perennial plant, 50—60 cm high, sometimes 1.50 m high, pubescent-viscidulous. Stems erect oppositely branched. Leaves bipinnatisect, lobes short, oblong-linear, rarely linear, acute. Spikes solitary or paniculate, linear, densely flowered; bracts shortly puberulous, oblong, acuminate shorter than the calyx, nerved; calyx puberulous oblong-cylindrical, teeth triangular acute the upperst one larger and somewhat broader than the others; corolla twice as long as the calyx; stigma ovate. Flow. February to March.	<i>Lavandula multifida</i>	The only herb with this description and local name which grows in Spain is <i>L. multifida</i>





Dhar	Biruni, Aghili	5-18 th centuries, India	---	Dhaka (Dhak, Jahan- girnagar) (Bangla- desh)	Leaves ovate-lanceolate or ovate, rarely falcate, ± oblique, 1.8-11.1 cm long, 8-30 mm broad. Cymes 3-16-flowered. Hypanthium 9-11 mm long, 2-5 mm broad. Petals 3-4.5 mm long, 0.5-0.75 mm broad, brick-red.	<i>Woodfordia fruticosa</i>	The only herb with this local name which grows in Dhaka is <i>W. fruticosa</i>
Aklil ul-Jabal	Dunash ibn Tamm	13 th century, Northern Africa	Flowers: Whitey flowers among the leaves Leaves: Long narrow aggre- gate dark fragrant leaves.	Tiaret (Algeria) Kairouan (Tunisia)	A shrubby plant, 1-1.20 cm high or sometimes somewhat more, branches erect, densely leafy. Leaves persis- tent, coriaceous, linear, 1—2.5 cm long, revolute-margined, olive-green at upper surface, canescent at lower. Flowers sessile, opposite, arranged in axillary racemes 2—3 cm long; bracts minute, oblong to ovate, caducous; calyx pubescent-canescent; corolla twice and a half as long as the calyx. Flow. February to March.	<i>Rosmarinus of- ficialis</i>	The describer's declaration and tra- ditional description
Terom	Mo'men- Tonekaboni	13 th century, Northern Africa 18 th century, Tonekabon, Iran	---	Tonekabon (Iran)		<i>Rosmarinus of- ficialis</i>	Terom in today's Ma- zanderani language is used to name rosemary.
Ostokudus	Hooper	First half of 20 th century, Tehran, Iran	Flowering spikes with rose- mary and camphor odor	---		<i>Lavandula dentata</i>	Botanical identi- fication of market samples.
Ostokudus	Armin, Amiri	Second half of 20 th century, Tehran, Iran	---	Iran		<i>Nepeta menthoi- des</i>	Botanical identifica- tion of market (or field) samples.

Zoroastrian priests, recognized *stoechas* as *Occulus Patonis*.¹³

Ibn Masawaih (Mesue the Elder in Latin), the tenth-century pharmacist of Gundeshapur College (Gundeshapur city, Persia), knew *stoechas*, and noted its smell as a distinguishing feature.¹⁴

The continuation of the use of *stoechas* (اسطوخودوس) (*ostokūdūs*) among Persian physicians in the following centuries suggests that in spite of not being a native plant, *stoechas* was accessible to them. We found evidence in Akhawayni Bukhari's *Hedayat ul-Mota'allemin* (tenth century), the oldest medical book in Persian:¹⁵ in this book, the author often suggested medicinal formulas which he himself used. In addition, the book was aimed to be a textbook for students of medicine in then Bukhara-where the book was written-so the material should have been compatible with resources at that time. Since the readers were the native people of Bukhara, the author used common names to make more sense. Therefore, if the author only used the arabicised name of *stoechas*, it would indicate that there was no common name for it in Bukhara. According to all this evidence-alongside *stoechas* not being an indigenous herb-the import of *stoechas* did not seem to be difficult. This easy access enabled Persian physicians to prescribe it more often, and led to the discovery of *stoechas*'s new effects. The prominent physician of the eleventh century, Avicenna, in his great book, *The Canon of Medicine*, introduced new medicinal effects of *stoechas*, whose effects was never mentioned by Galen.¹⁶

It is also of importance to stress a point about the word '*ostokūdūs*' in Persian and Arabic texts. William Turner highlights, in his book, *A New Herbal*, that the Greek and the Latins call it '*stechas*' or '*stichas*'; yet, it is known among the apothecaries as '*stichados*'.¹⁷ This illustrates that '*ostokūdūs*' is the arabicised form of '*stichados*', and the Muslims, or the Persians before them, knew *stoechas* via commerce with the Europeans, not via translation of texts.

However, Mohammad Mo'men-Tonekaboni, the seventeenth-century scholar from the city of Tonekabon in the southern margin of the Caspian Sea, in his book *Tohfatul-Mo'menin* mentions *terom* as the common name for *stoechas* in Tonekabon.¹⁸ This means that *stoechas* used to grow, or still does, in the area. The name is still in use, yet with a little different pronunciation, among the native people; they use '*terem*' for *Rosmarinus officinalis*.¹⁹ It appears that Hakim Mo'men has confused rosemary with *stoechas* due to their

13- Dioscorides, 2000: 399-400.

14- Biruni, 2004: 216-17, 679.

15- Minavi, 1950: 497-510.

16- Avicenna, 1998: 55-56.

17- Turner, 1995: 584.

18- Momen Tonekaboni, 2007: 41-42.

19- Joohi, 2016.



resembling features.

In manuscripts in the recent centuries, there are some clues to the places from which *stoechas* was imported: in the book *Makhzan ul-Advia*, Aghili (eighteenth-century scholar) cites a species of *stoechas*, growing in Hejaz, which has satisfactory effect.²⁰ Moreover, in a field study conducted by three teams, consisting of American and European scientists from 1929 to 1934, medicinal plants were accumulated from several cities' bazaars, including Tehran's, and were known there. The results showed that the so-called *stoechas* distributed in Tehran's bazaar was actually *Lavandula dentata*.²¹ Since *Lavandula stoechas* was used for medicinal purposes in the eighteenth-and-nineteenth-century Europe, the study proved that *stoechas* was imported from somewhere else, rather than Europe. The study also indicated that *stoechas* (*L. dentata*) was transported to Tehran from Shiraz. As the herb grew neither in Shiraz nor anywhere else in Iran, it was presumably shipped from Hejaz to Shiraz, and then to Tehran.

From the mid-twentieth century, a new herb called *Nepeta menthoides* replaced *L. dentata* in the market.^{22,23} Except for the shape of the leaves, *Nepeta menthoides* shared many properties, with the *stoechas* described in traditional medicine books. It grew in Iran, and had inflorescence like cypress, with purple flowers, and camphor-like fragrance.²⁴ It seems that this resemblance made the substitution possible, and then the similar effects made it permanent. Morphological descriptions of the discussed herbs can be found in Table 1.

2. *Stoechas* in Arabia

For the Bedouin of the Arabian Peninsula, *stoechas* has been known as *Dhurm*. The tenth-century Persian botanist, Ābu Ḥanīfah Dīnawarī, recalls his talk with an Arab nomad from Sarat about *Dhurm*:

'*Dhurm* is a fragrant herb, and its fumes are also fragrant. And since the bees have a propensity for it, it is applied to the inside of the man-made hive for the bees to encourage them to pick it as their hive and start producing honey'.²⁵

Recent studies indicate that a herb with the local name of *Dhurm* still grows in Arabia.²⁶ The herb grows in Asir region near Sarat, closely resembling *L. stoechas*, and has been named *L. dentata* because of its jagged leaves.

In the westernmost part of the conquered lands of Islam in Al-Andalus, *stoechas* has its unique story: the Arabs resid-

20- Aghili Khorasani, 2001:122-123.

21- Hooper, 1937:134.

22- Amin, 2005: 46.

23- Amini, 1997.

24- Ghahreman, 2011.

25- Dīnawarī, 1974: 210.

26- Atiqur Rahman, 2004: 149-161.



ing there knew *stoechas* as ‘*ostokūdūs*’. To them, the word ‘*ostokūdūs*’ was not the arabicised form of *stoechas*, and was not derived from the name of the Isles of *Stoechades*; it had a separate meaning: “Keeper of the Psyche”.²⁷ The name had probably come from the medicinal effects of the herbs known to them, namely “to prevent the deterioration of the mind, and assure its health”.²⁸ Still, the description of *stoechas*’s appearance has its own story in the conquered lands in the west.

Abdullah bin Mohammad Azdi (aka Ibn Zahabi), the twelfth-century scholar— who spent a while in Al-Andalus, and died in Valencia—cited the fragrance, acorn-shaped flowers, and leaves, being similar to those of Southern wormwood (*Artemisia abortanum*) and having the features of *ostokūdūs* in his *Al-Maa*, the first great dictionary of medicine in Arabic.²⁹ There is a significant difference in this description of *ostokūdūs* from prior ones, and that is the similarity of its leaves to *Southern wormwood*’s.

Ibn al-Baytar, the thirteenth-century, Malaga-born botanist, in his *Commentary on Dioscorides* confirmed the assumption about Azdi’s *ostokūdūs*: he pointed out that the herb known in then Al-Andalus as *stoechas* did not match Dioscorides’ portrayal.³⁰ He also indicated the common name of the herb as *Al-thamilah* (التميلة) (/ælhθæ’mi:læ/), which was close to the modern Spanish name for *L. multifida*: *alhucemilla* (/ælhθe’mi:æ/)³¹. All this evidence showed that *ostokūdūs* in Al-Andalus was *L. multifida*. Still, the herb, due to its dissimilar leaves from other lavender species, is known by the common name of *fern-leaved lavender*.

A bit to the south, in northern Africa, the Arabs used to recognize a different herb as *ostokūdūs*: Ishbili (13th century) quoted from Dunash ibn Tamim that the people of Tiaret (in today’s Algeria) and Kairouan (in today’s Tunisia) knew *Ak-lil al-Jabal* (*Rosmarinus officialis*) as *stoechas*.³² This was probably the result of the herbs’ close resemblance; the same thing happened in the seventeenth-century Persia. Today the term *Dhurum* is used as a common term for the whole *lavandula* species³³ and ‘*ostokūdūs*’ has no place in current Arabic language. A comparison of the traditional and recent morphological information regarding the discussed herbs can also be found in Table 1.

3. *Stoechas* in India

As commerce between India and the Roman Empire was

27- Gharashi, 2000: 263.

28- Ibid.

29- Azdi, 2008: 437-38.

30- Gharashi, 2000: 263.

31- Anonymous, *Vernacular names*, 2014.

32- Ishbili, 1995: 507.

33- DHURM, 1986.



at a flourishing rate, it is quite likely to assume that *stoechas* was among the traded goods.³⁴ The Indians also knew an indigenous herb called *stoechas*. Biruni, the Persian eleventh-century polymath, who was known as ‘the father of Indology’, in his book *Saydanah* [Pharmacy], described this indigenous herb further. He acknowledged the differences between the herb’s appearance and that of the Roman kind. He also stated that its growing place was near *Dhak* and its common name was *Dhar*.³⁵ This Indian kind of *stoechas* is traceable in the following centuries’ medicinal records. Aghili, the eighteenth-century Persian scholar, who spent most of his life in India, at the entry of *stoechas* in his *Makhzan ul-Advia* highlighted the distinction between the Indian kind and the Roman and Hejazi kinds. He acknowledged that the Indian kind was less effective than others.³⁶ Aghili also cited its common name as *Dhar*, but he believed that its growing place was Jahangirnagar. Having considered Biruni’s and Aghili’s descriptions, we infer that *Dhak* and Jahangirnagar must be the same region. Today, Jahangirnagar is the city of *Dhaka*, the capital of Bangladesh, and the only herb with a name similar to *Dhar* is one called *Dhari*, *Dhai*, or *Dhava*.^{37,38} The herb’s botanical name is *Woodfordia fruticosa*³⁹ and as Biruni and Aghili wrote, the Indian and the Roman types differ in term of their appearance. The reason why the Indians mistook this herb for a kind of *stoechas* was probably because of the fact that that they never saw the fresh Roman *stoechas*; they had access only to its dry and sprinkled form which was imported to India, and herbs usually look similar when sprinkled.

As depicted in Table 2, different herbs have been referred to as *stoechas* in diverse times and places. The interesting point about these herbs is that although they are of separate entities, they have similar therapeutic effects.

Discussion

Causes of the Change in *Stoechas*

1. Mistranslation and change in *stoechas*

Just as today, written sources were the main means of transferring and imparting knowledge. In the ninth century, Harun al-Rashid, the 5th Abbasid Caliph established the translation centre, library and school called *Baytul-Hikma* or ‘House of Wisdom’, which embarked on a project to translate Greek texts into Arabic.⁴⁰ One of those texts was Dioscorides’ *De Materia Medica*, the greatest pharmacopoeia of the time, which was translated by Stephen bin-Basil. But his translation was censured by physicians and pharmacists in the next

- 34- Daniel, 1991.
- 35- Biruni, 2004: 216-17, 679.
- 36- Aghili Khorasani, 2001:122-123.
- 37- Biruni, 2004: 216-17, 679.
- 38- Anonymous, *The Ayurvedic Pharmacopoeia*, 2014.
- 39- Biruni, 2004: 216-17, 679.
- 40- O’ Leary, 2001.



centuries so much that a new translation was commissioned. Its main defect was deemed to be its literalness and the misleading choice of words which might confuse the reader.⁴¹ A very good example of this inappropriate choice of words was the description of *stoechas* :

‘The herb grows in Islands of Galatia, near Messalia called the Stoechades, giving its name to the herb. It has slender twigs, and longer leaves, but its wisps are like *sa’atar*. And it is spicy and bitter in taste. And it is good for pains in the chest, and may be favourable being used in some potions’.⁴²

Table 2: Local names, scientific names, and traditional uses of *stoechas* in different regions from 1st to 20th century.

Local name	Scientific name	Region	Time	Traditional therapeutic effects	Note
Stoechas	<i>Lavandula stoechas</i>	Roman empire	1 st century	Chest disorders, Antidote	43
Stoechas	<i>Lavandula stoechas</i>	Roman empire	1 st century	emmenagogue, Chest pain, Antidote	44
Stoechas	<i>Lavandula stoechas</i>	Roman empire	1 st century	General tonic, Anti-infective, Antidote	45
Dhurm	<i>Lavandula dentata</i>	Arabian peninsula	10 th century	Beekeeping	46
Dhar	<i>Woodfordia fruticosa</i>	India	11 th century	---	47
Ostokūdūs	<i>Lavandula stoechas</i>	Persia	11 th century	Neuralgia, Epilepsy, Melancholia, Tonic for urinary organs	48
Ostokūdūs	<i>Lavandula multifida</i>	Muslim Spain	12 th century	Beekeeping	49
Al-thami-lah	<i>Lavandula multifida</i>	Muslim Spain	13 th century	---	50
Aklil al-Jabal	<i>Rosmarinus officinalis</i>	Maghreb region of North Africa	13 th century	Beekeeping, Palpitation disorders	51
Terom	<i>Rosmarinus officinalis</i>	The southern margin of the Caspian Sea	17 th century	---	52

- 41- A’lam, 2004.
 42- Dioscorides, 1952: 252, 257.
 43- Dioscorides, 2000.
 44- Pliny, 1956.
 45- Lis-Balchin, 2002.
 46- Dīnawarī, 1974.
 47- Biruni, 2004.
 48- Avicenna, 1998.
 49- Azdi, 2008.
 50- Gharashi, 2000.
 51- Ishbili, 1995.
 52- Momen Tonekaboni, 2007.



Local name	Scientific name	Region	Time	Traditional therapeutic effects	Note
Ostokūdūs	<i>Lavandula dentata</i>	India Persia	18 th century	Epilepsy, Melancholia, Psychosis, Dementia, Catarrh, Antidote, Liver disorders	53
Ostokūdūs	<i>Lavandula dentata</i>	Iran	Early 20 th century	Catarrh, Malaria, Washing wounds and eruptions	54
Ostokūdūs	<i>NepetaMenthoides</i>	Iran	Late 20 th century	Stomachache, Sedative, Antipyretic	55
Ostokūdūs	<i>Nepeta menthoides</i>	Iran	Late 20 th century	High blood pressure, Bone pain, Nervous disorders, Rheumatism, Blood depurative	56

- 53- Aghili Khorasani, 2001.
- 54- Hooper, 1937.
- 55- Amin, 2005.
- 56- Amini, 1997.
- 57- Dioscorides, 1952: 252, 257.
- 58- Dioscorides, 2004: 175.
- 59- Biruni, 2004: 216-17, 679.
- 60- Crowfoot, 1932: 49-84.
- 61- Avicenna, 1998: 55-56.
- 62- Al-Zahrawi, 2004: 1243.

The misinterpretation occurred in this translation is the use of ‘*sa’atar*’ instead of ‘thyme’, as in this version, *sa’atar* is equal to thumbra.⁵⁷ Although the error was rectified in the next translation in the twelfth century,⁵⁸ it could not prohibit the error entering pharmaceutical texts.

Sa’atar (سعتار/صعتار) (ṣā’tar/sá’tar) is an Arabic word, probably derived from Syriac word ‘*satre*’.⁵⁹ Depending on the region and culture, the name is associated to different herbs: *Satureja thymbra*, *Thymbra spicata*, *Oreganum syriacum* and some species of thymus and calamintha,⁶⁰ all with conical or cylindrical inflorescence. Both Dioscorides and ancient portrayals of *stoechas* have emphasized its quality. But all of the abovementioned herbs have dissimilar leaves compared to those of *stoechas*. One who intends to identify the herb via Stephen bin-Basil’s account will definitely stray.

With the entrance of *sa’atar* in the category of *stoechas*, other errors have ensued. The rather similar spellings of *sa’atar* (سعتار) and *sha’eer* (شعير), which is in fact barley, made Avicenna and Zahrawi, the tenth-century scholars, misconstrue: ‘*stoechas*: a herb with red wisps as those of barley, yet with longer leaves than that of barley’.^{61,62} This mistake has been repeated in the following centuries.

2. Absence of botanical classification

But the absence of a botanical systematic classification was more important. While the botanical texts improved greatly



in the sixteenth century, in all periods, this study covers; herb identification was limited to likening the herbs' features to others. So the mistranslation of 'thyme' -to 'sa'atar'-resulted in a false description of *stoechas*'s leaf, and all that led to the identification of *L. dentata* and *L. multifida*, despite their dissimilar leaves' conspicuous, as *L. stoechas*.

3. Adulteration and change in *stoechas*

To respond to the market demand was another reason for the substitution of *stoechas* with other herbs: the apothecaries, when faced a shortage of supply, especially of the imported items, tried to resolve it by replacing the scarce herb with its most resembling indigenous counterpart. Yet this was not always the case, as sometimes, in spite of the fact that the indigenous herb was cheaper, the counterparts were sold as the genuine items and at a higher price. The substitution of *Nepeta menthoides* for *stoechas*, if not an adulteration, was possibly due to the scarcity of *L. dentata* in the market (presumably because of the limitation in obtaining the plant from Arabia as a result of the growing demand in Persia and the expanding population).

4. Similar therapeutic effects and change in *stoechas*

Some of these mistakes, adulterations, or replacements stood firmly, and in some cases, permanently. For centuries, *L. dentata* was used as *stoechas* (up until the early twentieth century). *L. multifida* followed the same path, as well. Even today, though their clear dissimilarity has become evident, *N. menthoides* is still sold as *stoechas* in Iran. But how have these replaced herbs survived? It appears what has made these changes enduring is their use (medicinal effects): For instance, when rosemary was used instead of *stoechas* in North Africa in the sixteenth century and Northern Iran in the seventeenth century, it did not remain for long, mainly because of its different medicinal effects.

***Stoechas* and New Therapeutic Evidence**

Some recent studies have looked into many of *stoechas*'s traditional indications based on Traditional Medicine suggestions (Table 3). Although few studies investigated *stoechas*, there are sufficient evidences to suggest some important points. *Stoechas*'s psycho-neurological effects-such as anti-epilepsy, anti-dementia, and anti-depression-have been highlighted by Muslim scholars such as Avicenna and Aghili, and have been provided here under *Lavandula dentata* and



Lavandula stoechas entries (Table 2). These therapeutic effects could be seen in *stoechas*'s recent substitute, *Nepeta menthoides*, as well (Table 3). This corroborates the theory presented in previous sections about the substitution of herbs: *Nepeta menthoides* remained in Iran's market as *stoechas* not only because of its resemblance to it, but also for its similar therapeutic effects and close effectiveness. This can be

Table 3: Pharmacological activities of different *stoechas* species. Recent studies and old indications are in the same line.

	Therapeutic effects	Type of study	Part used	Note
<i>Lavandula stoechas</i>	Anti-reproductive damage, Anti-oxidative stress	Animal study	Essential oil	63
	Anticonvulsant	Animal study	Essential oil	63
	Anticonvulsant, Antispasmodic	Animal study	aqueous-methanolic extract	65
	Anti-inflammatory, Antioxidant, Apoptotic	Animal study	Methanolic extract	66
	Antimicrobial	In vitro	Essential oil	67
	Insecticidal	In vitro	Essential oil	68
<i>Lavandula dentata</i>	Antiprotozoal	In vitro	Methanolic extract	69
	Cytotoxic	In vitro	Ethanollic extract	70
	Anti-tyrosinase, Antioxidant	In vitro	Aqueous extract	71
<i>Lavandula multifida</i>	Anti-inflammatory	Animal study	Ethanollic extract	72
	Antimicrobial	In vitro	Essential oil	73
	Antifungal	In vitro	Essential oil	74
<i>Nepeta menthoides</i>	Anti-depressant	Clinical Trial	Dried aerial part	75
	Anti-dementia	Animal study	Aqueous extract	76
	Memory enhancer	Animal study	Aqueous extract	77
	Anti-apoptotic	Animal study	Hydroalcoholic extract	78
	Cytotoxic, AChE Inhibitor, Antioxidant	In vitro	Essential oil	79
	Insecticidal	In vitro	Methanolic extract	80
	Antimicrobial	In vitro	Essential oil	81

63- Sebai, 2015.
 64- Zaidia, 2009.
 65- Gilani, 2000.
 66- Amira, 2012.
 67- Kirmizibekmez, 2009.
 68- Traboulsi, 2002.
 69- Al-Musayeb, 2012.
 70- Ali, 2014.
 71- Sariri, 2009.
 72- Sosa, 2005.
 73- Benbelaid, 2012.
 74- Zuzarte, 2012.
 75- Firoozabadi, 2015.
 76- Ahmadian-Attari, 2014.
 77- Sarahroodi, 2012.
 78- Azizzadeh Delshad, 2013.
 79- Kahkeshani, 2014.
 80- Khanavi, 2012.
 81- Sonboli, 2009.



extrapolated to other herbs recognised as *stoechas* such as *Lavandula multifida*, and it would not be unlikely that it might possess similar therapeutic effects. Therefore, more research in this area is encouraged.

Few recent studies on *stoechas* have only been conducted up to animal testing stage; therefore, clinical studies of *stoechas*'s anti-epilepsy and anti-dementia effects could be the aim of future studies. Also, *stoechas*'s effect on respiratory ailments which has been reported as one of *stoechas*'s oldest therapeutic effects has remained unnoticed so far, and could be inspected further.

Overall, *Stoechas* is one of the oldest herbs used in traditional medicine. It has been substituted with other herbs over time. This study shows that even though mistranslation, absence of botanical classification, and/or substitution/adulteration of the herbs by apothecaries might have led to misidentification of *stoechas*, and hence its replacement with another herb, such replacement is still believed to be true mainly because they have had similar therapeutic activities with the original *stoechas*. This means that those who have used these herbs achieve their expected results from using, say, either *Lavandula dentata* or *Nepeta menthoides*. Ethnopharmacological and clinical studies on the original *stoechas* (*Lavandula stoechas*) and all its substitutes would be fruitful.

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