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THE RADISH (*RAPHANUS L.*) IN SELECTED SOURCES FROM ANTIQUITY AND THE BYZANTINE PERIOD

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РЕПИЧКАТА (*RAPHANUS L.*) В ПОДБРАНИ ИЗВОРИ ОТ АНТИЧНОСТТА И ВИЗАНТИЙСКИЯ ПЕРИОД

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Abstract: The article deals with the role of radish (*Raphanus L.*) in ancient and Byzantine world. The study is based on selected sources written between 5th/4th c. BC and 7th c. AD. Among them authors analyzed medical treatises composed by anonymous Hippocratic author (5th/4th c. BC), Galen (2nd – 3rd c. AD), Oribasius (4th c. AD), Aetius of Amida (6th c. AD), and Paul of Aegina (7th c. AD), botanical works written by Theophrastus (4th c. BC) and Dioscurides (1st c. AD), and a treatise of different (literary, antiquarian, historical, culinary) character made by Athenaeus of Naucratis in 2nd c. AD. The vegetable under study was a common and cheap food in ancient and Byzantine times, known in many varieties and eaten often by the poorest part of society. It was also widely used by physicians in healing illnesses of different etiology, used its warming, drying and cathartic properties.

Key words: radish, ancient medicine, Byzantine medicine.

Резюме: Статията се отнася до ролята на репичката (*Raphanus L.*) в древността и византийския свят. Изследването се основава на подбрани извори, написани между V/IV в. пр. н. е. и VII в. от н. е. Сред тях авторите са анализирани медицински трактати, съставени от анонимен автор от школата на Хипократ (V/IV в. пр. н. е.), Гален (II–III в. от н. е.), Орибазий (IV в.), Аеций от Амида (VI в.) и Павел от Егина (VII в.), трудове по ботаника, написани от Теофраст (IV в. пр. н. е.) и Диоскурид (I в. от н. е.) и трактати с различен (литературен, антикварен, исторически, кулинарен) характер, създадени от Атений от Навкратис през II в. от н. е. Изследваният зеленчук бил често срещан и евтина храна в древността и във византийско време, познат в различни сортове и консумиран често от най-бедната част от обществото. Освен това той бил широко използван от лекарите при лекуване на болести с различна етиология, като те прилагали неговите затоплящи, изсушаващи и очистителни свойства.

Ключови думи: репичка, древна медицина, византийска медицина.

The radish (*Raphanus L.*) was a remarkably important vegetable, as can be inferred from ancient and Byzantine sources. The surviving source material makes it evident that in antiquity radishes were used both as a foodstuff and a medicine. They were most commonly termed in Greek as *rafanis* (ῥαφανίς). There was also an alternative name: *ráfanos* (ῥάφανος)¹.

According to the sources, radishes were cheap and widely consumed, both as a foodstuff of choice and as famine food, i.e. eaten in times where other means of sustenance were barely available.² There is plenty of evidence concerning the use of this plant and it seems suitable to quote at least a few examples.

¹ The identification of the vegetable: André, J. 1956, p. 269; André, J. 1985, p. 214–215.

² References to the consumption of radishes in antiquity: Corbier, M. 1996, p. 215, 228; Montanari, M. 1996, p. 289; Dalby, A. 2003, p. 277; Nutton, V. 1999, p. 366; Faas, P. 2005 p. 213; Alcock, J. P. 2006, p. 54; Cool, H. E. M. 2006, p. 126.

Our brief discussion shall begin with a source which may be referred to as a recapitulation of the gastronomic knowledge of the ancients. Athenaeus of Naucratis, who wrote his *Deipnosophistae* in the second century AD, described the radish as a common staple, at least such is the impression one can get from the very first sentences of the relevant section of his work. While quoting several excerpts from literature which included references to this plant, he turned to a popular etymological explanation, clearly familiar to his readers; the word *rafanís* was thus believed to be a name composed of the adverb *radíos* (ῥαδίως), i.e. ‘easily’, and the verb *fainóumai* (φαينوῦμαι), i.e. ‘appear’ [Athenaeus II, 56 d–e (48, 1–2)]. It can be taken as a suggestion that radishes, being so easy to grow, could be seen very frequently in the fields and gardens and, as a consequence, were a readily available commodity on the Mediterranean market.

Other sources confirm that Athenaeus’s remarks about radishes can be legitimately interpreted in this way. Still in the fifth century BC, Aristophanes wrote that people who were so poor that they could not afford even the *mádfa* (μάζα)³, i.e. a pap made of water and *álfíta* groats (ἄλφιτα)⁴, would fill their stomachs with radish leaves [Aristophanes 544]. It seems that the leaves of the plant were even cheaper than the *mádfa* and could be easily found in the fields and gardens. It should be also assumed that they were available in abundance so as to provide enough energy for strenuously working peasants.

This account must be slightly exaggerated, as is characteristic of comedy, but it does imply a general tendency which survived the Athenian comic playwright for many centuries to come. We read in Galen’s treatise *De alimentorum facultatibus* that during his lifetime radish leaves were eaten as poverty food at times when other foodstuffs were unavailable or when famine was looming [Galen, *Alim. fac.* 657, 8–9].

Another remarkable fact is that Athenaeus quoted in his work a passage from Amphis, a comedy playwright from the second half of the fourth century BC, who wrote that only a fool would miss an opportunity to taste good fish and instead prefer to buy radishes on the market [Athenaeus II, 57 b (48, 35–38)]. In his day, having fish in one’s diet was clearly a sign of prestige, so it may be assumed that the radish epitomised the cheapest and most easily available foodstuffs [Kokoszko, M. 2005, p. 398–403].

From the references quoted above one may conclude that the radish, as a vegetable which was easy to find and popular for precisely this reason, was so cheap that it must have been constantly present in the nutritional patterns of ancient societies. It must have been readily available as a medicinal ingredient as well. One should also note that there is no indication that in the later centuries the position of radishes on the Mediterranean menu was subject to any major changes. It was an easily available foodstuff [Koukoules, F. 1941, p. 69; Rautman, M. L. 2006, p. 76] and over time it proved to be popular in Byzantium [Anagnostakis, I., Papamastorakis, T. 2005, p. 147–174].

The above conclusions can be clearly substantiated by the data contained in the numerous medical treatises written between the first and the seventh centuries AD. The *rafanides* are mentioned very frequently in these texts. Their characteristic features are described with a fair amount of detail. Throughout the period the doctors refer to them in terms of their nutritional as well as medicinal value, which is perfectly in line with the contemporary medical doctrine⁵.

In this study we wish to concentrate especially on the latter aspect of the descriptions of the plant, for it seems that it has been hitherto unaddressed, except for the article by Ilias Anagnostakis and Titos Papamastorakis quoted above (for the culinary uses, please refer to our other recent publications mentioned in footnote 2). It has to be pointed out that today the surviving Greek medical writings are very rarely discussed even by historians of medicine, which may be attributed to the decreasing competence in the Greek language of these specialists⁶. It is regrettable that even philologists and historians in the broader sense only very seldom make use of these sources, notwithstanding the fact that there is a vast body of knowledge preserved from

For radishes in Byzantium see: Koukoules, F. 1941, p. 69; Anagnostakis, I., Papamastorakis, T. 2005, p. 147–174; Rautman, M. L. 2006, p. 76; Kokoszko, M., Jagusiak, K. 2011, p. 41–42; Kokoszko, M. 2011, p. 522; Kokoszko, M. 2014, p. 184–189; Anagnostakis, I. 2013 a, p. 78; Anagnostakis, I. 2013 b, p. 157–158, 163. Radishes were also characteristic for Arab cuisine: Rosenberg, B. 1996, p. 356.

³ For this particular foodstuff see: Kokoszko, M. et al. 2014 a, p. 315–316, 346–348, 369–370, 378–380 etc.

⁴ For this foodstuff see: Kokoszko, M. et al. 2014 a, p. 339–340, 344–345, 353–354, 368–369, 375–378, 386–390 etc.

⁵ This doctrine remained in force since the time of Hippocrates and was further strengthened by Galen. See: Kokoszko, M. et al. 2014 a, p. 5–26, particularly p. 6–10.

⁶ On account of the abundant material, this study is not aimed at providing an exhaustive discussion of the subject. Instead, I shall refer only to some *exempla* which in my view are most characteristic for the medical practices of the period in question.

antiquity and Byzantium which not only offers valuable insights into therapeutics, but also provides detailed information on the history of the Greek language, the evolution of culinary art in the Mediterranean region and the economic history of its societies.⁷

Let us now turn to the doctrinal content of the Greek medical treatises. Their authors were not entirely specific about which varieties of the radish (from those available on the market) they used in their prescriptions. A closer reading of the sources, however, reveals that it might have been the case that for the medicinal uses the long-rooted *rafanides* were the preferred varieties. They must have been the most commonly available radishes on the Mediterranean market and consequently the most frequently grown varieties of the plant. First of all, a passage from Theophrastus (4th – 3rd c. BC), more specifically from his *Historia plantarum*, is helpful in determining which varieties were most commonly consumed and used in therapeutics. This particular source contains information on how these radishes looked like. Theophrastus described several varieties of the plant: Corinthian, Leiotasian (or Thracian), Cleonian, Amorenian and Boeotian, the biggest of which was the Corinthian variety. The author explained that it had a very thin epidermis and that it grew significantly above the ground, a feature which distinguished it from the tendency of other varieties (most of them tended to grow deeper in the ground). He added that the Leiotasian variety was particularly resistant to winter conditions, the Cleonian was long, while the Boeotian was round and as such differed in terms of shape from all other varieties. It was also known as the mildest in taste [**Theophrastus** VII, 4, 2, 1–12; **Athenaeus** II, 56 f (48, 17–23)]. Secondly, Dioscurides (1st c. AD.) in his *De materia medica* referred to the plant as a medicine, a *fármakon* (φάρμακον), and discussed *expressis verbis* the similarities between the radish and the horseradish (both plants were described as having long roots) [**Dioscurides**, **Mat. med.** II, 112, 2, 9]. Thirdly, the elongated shape of the radish is suggested in the preserved fragments from the work of Rufus of Ephesus (1st c. AD), who explicitly stated that the vegetable was often cut in very thin slices, i.e. *pétala* (πέταλα). It is evident that if the roots were long (rather than round), it was much easier to cut a radish of this sort in this way [**Oribasius**, **Eclogae med.** 80, 3, 10; **Aetius** III, 120, 47]. Fourthly, a seventh-century writer, Paul of Aegina, mentioned that radish seeds were used for production of a medicinal oil. On this occasion, he wrote that the plants used in the process had elongated and delicate roots: *leptorízoi rafánoi* (λεπτορίζοι ῥαφάνοι) [**Paul** VII, 23, 12, 3].

One may thus arrive at the conclusion that ancient and Byzantine doctors preferred the elongated varieties of the *rafanides*. This preference was a result of their use in therapeutic practice and of their distinctive properties⁸. One of these was its pungency: the elongated varieties were widely believed to be spicier than the round-rooted ones. The former were more desirable in terms of their medicinal value, because they were believed to facilitate the decomposition of thick organic fluids.⁹

As we now turn to the medicinal uses of the plant in ancient and early Byzantine medicine and to its role as an important *fármakon*, it has to be noted that the medical writers from the first to the seventh century AD offered fairly exhaustive and detailed information about the *rafanides*: this is a steadily continuing trend throughout the period in question.

Dioscurides mentioned the radish in both *De materia medica* and in *Euporista vel de simplicibus medicinis*. The former work offers a wealth of information on the properties of the plant (the dietary and pharmacological characteristics are inextricably linked in the description); it also enumerates the most common medicines produced from the radish. The latter work provides only recipes for the medicines.

The main chapter on radishes of the former treatise mentions the carminative effects of the plant and emphasises its agreeable taste. The author argued that they stimulated the stomach and the digestive tract (they facilitated excretion), had diuretic and warming effects and were beneficial to the bowels and to the digestive processes.

Further in his work, Dioscurides turned to the medicinal uses of the plant (as a *fármakon*). He pointed out that radishes may have been used as an emetic: when eaten before the meal, they induced vomiting. The

⁷ For the results of such analyses see: **Kokoszko, M. et al.** 2014 a, *passim*, particularly p. 357–361; **Kokoszko, M. et al.** 2014 b, p. 448–455.

⁸ This can be concluded from the quoted testimony of Rufus of Ephesus which was systematically repeated by practicing physicians until as late as the seventh century. See also the remarks on the radish as an emetic agent.

⁹ It may be inferred from Theophrastus that round radishes were milder in taste, while pungency was a desirable feature determining the medicinal properties of the *rafanis*. See below for the quoted dietary-pharmacological characteristics of the plant, particularly the most extensive analyses by Galen in his *De alimentorum facultatibus* [see esp. **Galen, Alim. fac.** 657, 9–12].

root, when eaten raw, stimulated the senses, but when boiled, it was a particularly beneficial expectorant, since it helped to stop chronic cough and to get rid of the thick mucus from the chest.

The doctor argued that the peel (*floiós*: φλοιός) of *rafanís* with *oksýmeli* (ὀξύμελι – a solution of honey in vinegar) was an even more effective emetic; it was also believed to be a remedy for hydrops and, when used as a cataplasm, for sore spleen. When mixed with honey, it was used for curing ulcerations, removing dark circles under the eyes, thickening the hair of people suffering from *alopekías* (ἀλωπεκίας), alleviating the effects of snakebites, and removing the cutaneous condition known as *fakói* (φακοί). For the latter use, it was mixed with darnel flour. It also helped in cases of mushroom poisoning (or with choking – the meaning of the verb is unclear) and was known as a means to induce menstruation.

Finally, the author mentioned that radish seeds had diuretic and emetic properties. When drunk with vinegar, they helped to decontaminate the spleen, and when boiled in *oksýmeli* (ὀξύμελι), i.e. a mixture of vinegar and honey, they were used as a rinse for curing angina (or sore throat). People bitten by a snake of the *kerástes* (κεράστης) variety drank the seeds with wine. They were also used for alleviating the inflammation on gangrenous wounds [**Dioscurides, Mat. med.** II, 112, 1, 1–2, 6].

Further in his account, he wrote that in addition to the cultivable species of the radish there was also a wild growing variety; it was called *armorákion* (ἀρμοράκιον) by the Romans. Its leaves resembled the cultivated species, but were even more similar to the green parts of the wild cabbage, i.e. *lampsáne* (λαμψάνη: *Brassica arvensis* L). The root of this variety was elongated, hard, rather dry and pungent in taste. It was used as a culinary ingredient. Both the root and the leaves were edible, but the leaves had to be blanched before serving. The plant, pungent in taste, had warming and diuretic properties [**Dioscurides, Mat. med.** II, 112, 2, 7–11].

It should be noted, even though it is difficult to identify the plant with absolute certainty, that Dioscurides must have been referring to the horseradish, i.e. *Armoracia rusticana* (G. Gaertn. et al.), another representative of the cabbage family.

In addition to the medicinal uses mentioned in *De materia medica* and discussed above, some additional information about the therapeutic qualities of the radish can be found in the other treatise by Dioscurides. In his *Euporita vel de simplicibus medicinis* he recommended using the plant in curing aural disorders. Thus, when a patient felt ringing in the ears (*échos*; ἦχος), the author prescribed rinsing the inner part of the auricle with juice squeezed from the epidermis of radishes. It was administered with a hollow stem of the *kalamís* (καλαμίσ) reed. The bottom part of the reed was fitted with a wick (*ellychnion*; ἐλλύχνιον) which was set on fire so that the warm liquid could flow through the stem; the temperature and other properties of the liquid were believed to alleviate the condition [**Dioscurides, Euporista** I, 60, 2, 1–5]. Other relevant remedies included: a mixture of *garum* (i.e. fish sauce), honey and rose oil, a liquid medicine made of almond oil and honey, and a mixture of chestnut oil and goose fat.

Dioscurides also noted that radish seeds were used for production of a medicinal oil. The procedure was described in a passage of *De materia medica* discussing the properties of castor oil: *élaion kíkionon* (ἔλαιον κίκιονον). The sun-dried ingredients were crushed in a mortar and boiled in water. The oily layer was then scooped from the surface with mussel shells and placed in containers for storage [**Dioscurides, Mat. med.** I, 32, 1, 1–2, 6]. The Greek term for radish oil was *élaion rafáninon* (ἔλαιον ραφάνινον). In a fairly short passage of Book I of *De materia medica* the author recommended using it for skin conditions caused by lice and other factors, especially resulting in coarse skin, which he referred to as *trachýtes* (τραχύτης). He also noted that the oil was very commonly used as a culinary ingredient in Egyptian cuisine [**Dioscurides, Mat. med.** I, 37, 1, 1–4]. One of his observations was that the properties of *élaion rafáninon* were similar to those of black caraway oil (the plant was known to the Greeks as *melánthion*: μελάνθιον), i.e. *Nigella sativa* L. The oil was commonly named *élaion melánthinon* (ἔλαιον μελάνθινον) [**Dioscurides, Mat. med.** I, 37, 1, 5–6].

The doctor of Anazarbos discussed further uses of radish oil in his *Euporista vel de simplicibus medicinis* in a markedly distinct passage devoted to the treatment of lice infestation, a condition referred to in Greek as *phtheiriásis* (φθειρίασις). The infested parts of the body were treated by rubbing in radish oil or a mixture of licebane seeds (*Delphinium stafisagria* L.) or realgar (red arsenic sulfide) ground with olive oil, ivy juice mixed with honey and vinegar, cedar oil and many other substances. The doctor in the same passage mentioned another remedy, namely wine with finely ground coriander seeds and oregano [**Dioscurides, Euporista** I, 101, 1, 1–9].

The medicinal uses of the radish were also discussed by Galen of Pergamum, arguably one of the best known doctors of antiquity, second only to Hippocrates, and one of the ultimate authorities for many later generations of medical doctors. He wrote about a century after Dioscurides and devoted as much attention to the plant (if not more) as his predecessor, most notably in his magnificent treatise on diet: *De alimentorum facultatibus*. Galen wrote that in his day city dwellers would eat radishes in order to detoxify alimentary canal, i.e. treated the radish as a *fármakon*. The *rafanides* were thus served as a side dish, seasoned with *garum* or wine vinegar. People living in the countryside, however, did not use the plant as a medicine. In rural areas it was used as a most common staple eaten raw with bread. It is worth noting that the category of such foodstuffs (referred to more generally as *ópsa* [ὄψα]) was rather vast and included (from among the plants which were eaten raw) oregano, cress, thyme, savory, catmint, lemon thyme, mint, calamint (*Calamintha* Mill.), pellitory and rocket.

The author seems to suggest that some people would eat radish flower shoots, but only if other foodstuffs were unavailable (rather than for flavour). The root was the most commonly used part of the plant for culinary uses, particularly as a snack to be eaten with bread rather than the dominant part of a nutritious meal. The doctor added that the roots dilute organic fluids and have significant warming properties because of their spicy taste.

The shoots mentioned above were eaten in spring, i.e. when they appeared on the plants. They were usually cooked and then served with olive oil, *garum* or vinegar (young shoots of turnips, mustard or lettuce were also served in this way). The author also noted that the dish was more nutritious than the roots eaten raw and, because it was cooked, less spicy in taste than the parts growing in the ground. Some people, he added, would cook not only the shoots, but also the root. The doctor of Pergamum knew of the practice of serving raw radishes after the evening meal with a view to stimulating digestion. However, he did not approve of this and believed that it would do more harm than good [**Galen, Alim. fac.** 656, 16–658, 8, vol. VI].

Galen discussed the uses of the radish in ancient therapeutics also in his other treatise, namely in *De simplicium medicamentorum temperamentis ac facultatibus*. Following Dioscurides, he wrote that the *rafanis* is a powerful warming and drying agent. These properties were characteristic especially of the wild growing varieties. Another analogy between Galen and the author of *De materia medica* is the distinction between the seeds of the plant on the one hand and the green parts and the root on the other. The seeds, Galen believed, had more powerful effects, particularly for removing dark circles under the eyes (*hypópia*; ὑπόπια) and other parts of the body [**Galen, Simpl. med.** 111, 17–112, 4, vol. XII].

The latter use was discussed again in his *De simplicium medicamentorum temperamentis ac facultatibus* where the doctor referred to the therapeutic characteristics of saliva. He wrote that some people would chew some bread with radish and apply the pulp on sore spots. It was believed to be a remedy for *hypópia* or other *ekchymótata* (ἐκχυμώματα), i.e. contusions, particularly in the case of children or in the treatment of delicate tissues. The combined properties of radishes and saliva were thus considered to help in removing subcutaneous contusions and strengthen the effects of the cataplasm [**Galen, Simpl. med.** 289, 6–10, vol. XII].

Galen also described the use of radishes in the treatment of circles under the eyes and other contusions in his *De compositione medicamentorum secundum locos*; in doing so, he referred to the works of Archigenes [**Galen, Comp. med.** 808, 15–809, 1, vol. XII]. Archigenes wrote two generations before Galen and was a famous doctor in the Rome of Emperor Trajan (98–117). According to Galen, his predecessor prescribed an ointment called *keroté* (κηρωτέ), which was based on the juice (or an infusion: Galen and Archigenes used the term *chýlisma* [χύλισμα]) of the plant (or based on hyssop). It was believed to be a powerful remedy for subcutaneous contusions and had to be applied on skin immediately after injury, before the contusion developed [**Galen, Comp. med.** 808, 15–809, 1]. The author returned to the topic while excerpting some fragments from the writings of Apollonios (1st – 2nd c. AD), who in such cases prescribed a mixture of honey and radish root epidermis [**Galen, Comp. med.** 815, 6–7, vol. XII].

A more detailed piece of information is contained in one of Galen's excerpts from the works of Crito (1st – 2nd c. AD). The latter author recommended various medicaments for contusions, including radish and sea water, or a solution of salt in water (which he referred to as *hálme*: ἅλμη). It may be inferred from the text of *De compositione medicamentorum secundum locos* that Crito soaked a sponge in the hot liquid and wiped the sore spot, which he then covered with a compress made of radish epidermis and honey. The text indicates that he smeared the radish and honey pap on a piece of cloth and placed it on the sore spots [**Galen, Comp. med.** 817, 8–11, vol. XII].

In a way similar to that of Dioscurides, Galen wrote extensively on the use of the radish in detoxifying therapies. There is a considerable amount of relevant material, for the purposes of this article I shall quote only a few examples. In his *De compositione medicamentorum secundum locos* the doctor of Pergamum recommended the use of emetic properties of the radish in the diet prescribed for headaches caused by hypothermia [Galen, *Comp. med.* 503, 10–512, 10, vol. XII]. In addition to drinking wine (of fine particles) and physical exercise, he recommended a hot bath and vomiting triggered with the use of the *rafanis* [Galen, *Comp. med.* 512, 8–10, vol. XII]. The cited work contains also a recommendation to use the plant as a remedy for headaches which were not caused by the condition of the head itself, but rather by some other ailments of other parts of the body. Such cases occurred, as the Greeks would have it, ‘through sympathy’: *katá tén sympátheian* (κατὰ τὴν συμπάθειαν) [Galen, *Comp. med.* 559, 9–560, 7, vol. XII]. The doctor of Pergamum also recommended detoxifying the body by vomiting (triggered by eating radishes) and by applying warm compresses, both wet and dry [Galen, *Comp. med.* 560, 4–7, vol. XII]. Finally, it is important to note that the radish must have been a popular emetic agent, as is illustrated in the numerous passages of the treatise *De methodo medendi* [Galen, *Meth. med.* 251, 16; 261, 5; 262, 18].

In the time of Galen, the *élaion rafáninon*, known from the writings of Dioscurides, was also used in therapy. The properties of the radish oil were first discussed in the treatise *De simplicium medicamentorum temperamentis ac facultatibus*, where the relevant passages can be found in the context of the medicinal uses of olive oil [Galen, *Simpl. med.* 868, 3–869, 1, vol. XI].

The detailed discussion of the author seems to suggest that all substances of this sort (i.e. all liquid fats similar to the product obtained from olives) were generally categorised as moisturising and moderately warming. However, oils produced from unripe crop (for instance, from unripe olive fruits) were believed to have astringent properties, as was manifest in their sour taste, and for this reason considered as cooling agents. The doctor also wrote that liquid fats, as soon as they matured and grew to the peak of their value, began going stale and as a result of this process they had more powerful warming and diaphoretic effects. He added that this tendency could be illustrated with the example of the *omfákinon* (ὀμφάκινον) oil, which would lose its astringent qualities and gradually acquire the properties of oil pressed from ripe fruits. This type of oil, even if stored for longer periods, retained some of its acidity, which was its dominant feature since the production¹⁰.

As far as the radish oil is concerned, the doctor mentioned it twice in this particular passage. In the first instance, it is simply included in a list of other oily ingredients produced for culinary and medicinal uses (together with sesame oil, almond oil and many other varieties) [Galen, *Simpl. med.* 870, 4, vol. XI]. The other reference to the *élaion rafáninon* is described in more detail. It is discussed as a medicine, analogous to the ripe olive oil – particularly the variety produced in Italy in the land of the Sabines (radish oil, however, had more powerful warming effects than the latter, and was less powerful than mustard oil). In a way similar to that of Dioscurides, Galen mentioned the analogies between the *rafanis* and black caraway oils as regards their properties and therapeutic uses [Galen, *Simpl. med.* 870, 11–16, vol. XI].

The properties of radish oil are also discussed in Galen’s *De simplicium medicamentorum temperamentis ac facultatibus*, in a passage on the therapeutic qualities of animal fats [Galen, *Simpl. med.* 323, 16–331, 16, vol. XII]. The doctor believed that all substances of this kind became more loose with time (*leptós*: λεπτός) as their particles were getting smaller (it thus became a substance of small particles: *leptomerés* [λεπτομερής]). As a result, they became more pungent in taste. Another important observation was the fact that the diaphoretic properties of radish oil, as was true of all other fats, increased over time: ever more considerably, it stimulated perspiration and as a result had an increasingly beneficial effect on hardened tissues (*sklerynómēna*: σκληρυνόμενα) and became a powerful remedy for diseases resulting from clotting fluids (*dýslyta*: δύσλυτα) [Galen, *Simpl. med.* 328, 17–329, 12, vol. XII]. It should also be noted that in the same treatise radish oil was included into the category of *araiotiké dýnamis* (ἀραιωτική δύναμις), i.e. the substances which made tissues less compact by opening the pores and facilitating perspiration [Galen, *Simpl. med.* 752, 8–12, vol. XI]. Galen also suggested that radish oil, owing to its warming properties, was used for the treatment of inflammations, i.e. *flegmonái* (φλεγμοναί), particularly those of milder character which did not cause a significant rise in temperature of the inflamed part of the body [Galen, *Simpl. med.* 734, 8–12, vol. XI]. This characteristics indicates that it was used externally for tumours, swellings or bruises resulting from disorders

¹⁰ It thus had more powerful warming properties, was a diaphoretic agent, and still had its astringent properties: at the same time, it lost its initial cooling ability.

in the humoral balance; supposedly, these conditions could be healed by loosening and dispelling the fluids which had caused the inconvenience.

The works of Oribasius (4th c. AD) indicate that radishes continued to be used in therapeutics. There seem to have been no significant changes regarding their properties and applications. For the alimentary uses, Oribasius provided a résumé of the information contained in Galen's *De alimentorum facultatibus*. Book II of *Collectiones medicae* presents a fairly short characteristics: the radish is included in the category of warming foodstuffs of pungent taste [**Oribasius, Coll. med.** II, 26, 1, 1–2]. The plant appeared also in Book III of *Collectiones medicae*, where the author enumerated thirty-four dietary categories arranged on the basis of divisions which had been established for centuries and were accepted into the canon of Byzantine medical literature. The radish appears in a long passage on diluting foodstuffs [**Oribasius, Coll. med.** III, 2, 1, 1–26, 2; III, 2, 3, 2]. This vegetable is also included into the category of *kakóchyma* (κακόχυμα), i.e. the foodstuffs of uneven humoral balance [**Oribasius, Coll. med.** 16, 1, 1–18, 3; III, 16, 14, 3]. The doctor mentioned this particular product among other detoxifying and dense–humour–cutting agents which unblocked the functioning of inner organs [**Oribasius, Coll. med.** III, 24, 1, 1–16, 7; III, 24, 14, 1]. Finally, it appears in the group of warming substances, i.e. the *thermainonta* (θερμαίνοντα) [**Oribasius, Coll. med.** III, 31, 1, 1–8, 4; III, 31, 4, 1]. Book XVI of Oribasius's *opus magnum*, i.e. *Collectiones medicae*, contains the characteristics of the radish as a *fármakon* (the author closely followed the observations of Dioscurides subsequently repeated by Galen). The doctor wrote that the plant had third-degree warming properties and was a second-degree desiccant. These two properties were even more pronounced in the case of the wild growing varieties, while the seeds of the plant were highly effective owing to their diaphoretic properties [**Oribasius, Coll. med.** XV, 1:17, 1, 1–4, 1].

Judging by the number of therapeutic uses of the *rafanis* discussed in the treatise, radishes must have been used fairly often by Oribasius in his medical practice. The available material is so abundant that I have to refer only to a few *examples*. In keeping with the conclusions of Galen, he included the plant in his list of healthy diets and ways of life (particularly in the diet aimed to dilute the thick organic fluids) [**Oribasius, Coll. med.** III, 2, 1, 1–26, 2; III, 2, 3, 2]. He also knew of the practice of eating the *rafanis* with a view to detoxifying the alimentary canal, i.e. in the method of detoxification called by the Greeks *katá* (κατά; downwards). To quote but one example from Book II of his *Collectiones medicae*, he mentioned – in keeping with Galen – the popular method of detoxification: through defecation induced by eating sour fruits with fenugreek, radish and mallow with some oil and *garum* [**Oribasius, Coll. med.** II, 66, 1, 1–4; II, 66, 1, 2]. However, he recommended that people suffering from gout and arthritis should abstain from eating radishes (and other foodstuffs, including leeks, turnips and lentils) [**Oribasius, Eclogae med.** 75, 4, 5–5, 19; 75, 5, 7].

In his voluminous work, Oribasius mentioned several interesting details concerning the emetic properties of the plant (as has been pointed out with reference to earlier medical writers). For instance, he included a passage from Archigenes on the ways to induce vomiting with radishes. This method was presented as an introductory phase in the practices of detoxification with the use of *helléboros* (ἐλλέβορος), i.e. white hellebore (*Veratrum album* L. or *Helleborus orientalis* [L.] Spreng/*Helleborus cyclophyllus* L.). He warned that eating radishes to this particular end may result in abdominal pain and nausea; in extreme cases it could lead to the loss of consciousness by blocking the trachea.

Drawing on the experience of his predecessor, the doctor wrote that patients were told to eat about a pound (*litra*) of radishes (but not more than one and a half). He argued that both pungent and mild varieties had medicinal uses, and recommended that in the latter case one should use the epidermis, the leaves and the core.

Before vomiting was induced, one had to abstain from eating other foodstuffs, drink large amounts of water and evacuate the alimentary canal. This introductory phase should take at least one day, unless more was necessary in some justified cases. If the patient had problems with emptying the intestines, additional stimulation was administered by injecting an enema. It was then recommended to take a walk in a place of mild climate; in summer, well-aired and shaded places facing the north were most suitable for this purpose.

The actual emetic procedure consisted of eating radishes with honey followed by further portions of the vegetable seasoned with white and purified salt or *oksýmeli*. The latter ingredient had to be used sparingly, no more than a half *kotyle*, to make sure that the dish was at least moderately palatable. The author recommended that *oksýmeli* should consist of vinegar with an admixture of sea onion (*Scilla maritima* L.), while the variety of honey used for this purpose should be produced on the basis of nectar from thyme flowers. To increase the

efficiency of the process, one could season the radishes with either oregano and ground salt, or salt alone, or hyssop (all used in moderate amounts). Also *oksýmeli* should be used in moderation: it should only add some moisture to the other ingredients.

It was recommended that the patients should lie down for a while after the meal. They should also have their legs massaged and after that take a short walk. After the walk the patients were told to sit down and, with no rush, start vomiting. The text suggests that the emetic procedure should be carried out very thoroughly and that the patients should be encouraged to make an intense effort (the preserved fragments from the works of Rufus of Ephesus enumerate mechanical measures for this purpose).

In describing the vomit itself, the doctor observed that it was initially watery and phlegmatic (i.e. with a substantial amount of phlegm), while in some cases it could grow bitter in taste later on. He also noted that one should select radishes of good quality – otherwise the treatment may turn out to be ineffective.

After vomiting one should rinse the throat with *hydrómeli* (ὕδρόμελι), i.e. water with honey, or with clean water, and lie down to have another leg massage. After that it was recommended to take a nap and let the bowels pass the gas accumulated in the digestive system during the process. To this end, the doctor recommended taking another walk and a hot bath. After that one should have a meal, preferably something of a pronounced flavour. For example, one should eat a side dish made of salted meat, i.e. *tárichos* (τάριχος), provided that it was not too fatty and definitely appetising. The meal should also contain some poultry or other food of similar properties.

If the emetic procedure did not bring satisfactory results, then it should be repeated before the evening meal and preceded with a visit to the baths. Before the actual detoxification with the use of *helléboros* one should take some rest rather than indulge in eating too much [**Oribasius, Coll. med.** VIII, 1, 26, 1–41, 3].

A significant amount of detailed information is contained in *Eclogae medicamentorum* by Oribasius, particularly in a sizeable chapter on emetic agents titled *Perí emetikón* (Περὶ μετικῶν). It was written on the basis of the medical writings of Rufus of Ephesus, whose work was foundational in this respect for later generations of doctors (i.e. not only for Oribasius, but also for Aetius of Amida and Paul of Aegina). Oribasius's writings provide more data on the kathartic properties of the radish. The author began his narrative by stating that emetic procedures are used to detoxify the body in a number of chronic ailments, particularly the diseases which manifested themselves by local hardenings or swellings, conditions which occurred as a result of the accumulation of excessive amounts of phlegm or other thick fluids. More specifically, the author mentioned that there were used in the treatment of gout, arthritis, shaking, weakness, apoplexy, epilepsy caused by sore stomach, general health conditions resulting in the loss of immunological defence, elephantiasis, jaundice, hydrops and other diseases. The author noted that radishes were a popular medicine included into the group of *emetiká* (ἐμετικά) as they were believed to be a relatively mild emetic agent (in cases where a stronger emetic agent was necessary, physicians resorted to using hellebore). In order to make sure that it was effective, it was administered before meals and other emetic procedures: three or four times before the main meal, or, if the patient was observing fast, only once or twice.

For this particular purpose one should use young radish roots, especially those that had a pronounced pungent taste. They were cut in thin slices and soaked for two or three hours in *oksýmeli*. Sprinkled with this mixture, the slices were then administered to the patients, who had to eat as much as they could. For this particular purpose, radishes were also seasoned with white *helléboros* (*Veratrum album* L.). The radishes were punctured with sharp reeds to make holes which had to be filled with hellebore roots. The following day the roots were taken out. The radishes were then cut into thin slices and soaked in *oksýmeli*. This procedure served to produce a more powerful emetic agent. The doctor added that the patients had to walk and drink large amounts of warm water for two hours after they had eaten the radishes. After that they were told to induce vomiting by stimulating the palate with a finger or a feather [**Oribasius, Eclogae med.** 80, 1, 1–4, 8; 80, 3, 1–4, 8].

The therapeutics of the fourth century retained the practices known from the earlier stages of the development of medicine. This observation refers not only to the detoxifying procedures, but also to the use of the *rafanis* as a remedy for subcutaneous contusions. The preserved works of Oribasius provide a few more details to what has been presented above. In his most important treatise, i.e. *Collectiones medicae*, the author included excerpts from the writings of Lycos (1st c. BC), who had collected various prescriptions for both internal and external uses (including cataplasms). One of these is a commentary on compresses prepared either on the basis of radishes or radish juice. Lycos and Oribasius recommended that the former should consist of radish roots crushed with a pinch of salt. The mixture should then be applied on bruises resulting

from hitting a hard surface or on petechiae around the ankles and forearms, a condition characteristic of old age. The authors wrote that this type of compresses quickly restored the appropriate colour of the skin. They also noted that compresses made of bread, a pinch of salt and radish juice were a highly effective remedy for petechiae (in Greek *ekchymómata*) [Oribasius, *Coll. med.* IX, 54, 1, 1–2, 3].

It is worth noticing that Oribasius's writings provide further information on using radishes for the treatment of mushroom poisoning (discussed earlier by Dioscurides, although in a more general manner). In such cases, Oribasius prescribed radish juice administered as a drink or an enema [Oribasius, *Eclogae med.* 132, 1, 1–5, 4; 132, 4, 1–2].

The doctor discussed also the use of radish seed oil, which may serve as evidence for continuity in using this particular ingredient in medical procedures. His analyses are not as detailed as those of Galen, but nevertheless the discussed applications are consistent with the practice of earlier physicians. It may be inferred from the passage of *Eclogae medicamentorum* where Oribasius, in keeping with the tradition promoted by Dioscurides, described *élaion rafáninon* as a remedy for lice infestation. Other remedies included realgar, ivy juice with honey, mustard and vinegar, cedar oil, tar and crushed laurel berries. In cases where lice infested the whole body, another recommended remedy was larkspur with olive oil [Oribasius, *Eclogae med.* 6, 1, 1–4]. In addition to the above uses, radish seed oil was applied on skin after a medicinal plaster had been removed. Oribasius in his work on medicines recommended it for removing the mixture used as a remedy for bites of rabid animals [Oribasius, *Eclogae med.* 117, 1, 1–9, 5].

It seems that medicines based on this particular plant must have been used in medical practice after the time of writing of *Collectiones medicae* and *Eclogae medicamentorum*. One can find evidence in support of this claim in the work *Iatricorum libri* compiled by Aetius of Amida in the sixth century. Basic information on the *rafanis* is included in Book I of this encyclopaedia and provides a description of the radish as a *fármakon*. The description is based on the work of Galen and repeats the well-known doctrines discussed above¹¹. Following his predecessors, the doctor of Amida provided some information on *élaion rafáninon* [Aetius I, 103, 1–2]; his discussion of this type of oil is analogous to the established knowledge. It is worth noticing that the physician referred to the same analogies used by his predecessors and as a result insisted that the properties of radish seed oil are similar to those of castor oil, i.e. *élaion kikinon* [Aetius I, 101, 1–6]. Following this analogy, he suggested that radish seed oil (and castor oil) was widely used for dermatological conditions. For instance, it was an effective remedy for rash of the *alfós* (ἄλφος) type, various colorations of skin (such as freckles) and the so-called *fakói* (φακοί), i.e. moles or lentigines resembling lentil seeds. Aetius wrote that both varieties of oil were applied on the skin in places which required treatment. One should also note that Aetius of Amida included radish seed oil in the category of the dietary-pharmacological products described in Book II of his *Iatricorum libri*. The concepts are analogous to those established in all earlier treatises and the oil is presented as a warming and diaphoretic agent [Aetius II, 198, 12; II, 235, 5].

As regards the use of the plant in specific medicines, it seems worthwhile to quote a few examples to illustrate the continuity of ancient traditions. First of all, the pharmacological characteristics contained in Book I of *Iatricorum libri* illustrates that the radish was a highly effective medicine used for removing contusions (*pelidná: πελιδνά*), particularly around the eyes (*hypópia*)¹².

Secondly, the radish in the sixth century continued to be used as an indispensable ingredient for cathartic procedures. Aetius is another medical writer who included in his encyclopaedia a significant portion of the

¹¹ The radish was thus a third-degree warming agent, a second-degree desiccant and a diaphoretic agent. For this reason it was used for eye circles and other subcutaneous contusions (*pelidná: πελιδνά*). In such cases it was applied in the form of a cataplasm. It was also recommended in the diluting diet (*leptýnousa diaita: λεπτόνουσα διαίτα*), which combined the warming properties with the ability to dilute the humours. The doctor added a remark (known from *De alimentorum facultatibus* of Galen) that some people recommend eating raw radishes after the meal as a means to stimulate digestive processes. This practice was in his view bizarre and confusing, since it was in fact detrimental to health, as could be easily concluded from practice. See Aetius I, 340, 1–7. See also the second part of the encyclopaedia, where some information is repeated and some supplemented. The radish is a third-degree warming agent – Aetius II, 201, 1–10 (the radish – II, 201, 9); a second-degree desiccant – Aetius II, 211, 1–7 (the radish – II, 211, 5); it dilutes thick fluids – Aetius II, 240, 1–46 (the radish – II, 240, 5); may lead to humoral imbalance – Aetius II, 253, 1–37 (the radish – II, 253, 29); the plant (as a substance of small particles) is numbered among cutting, detoxifying and unblocking substances – Aetius II, 260, 1–26 (the radish – II, 260, 14).

¹² See the information on the properties of the radish in Book I of *Iatricorum libri*.

writings of Rufus of Ephesus concerning emetic agents¹³. It is not necessary to quote extensively from the doctrines, since they are analogous to those referred to previously (particularly to the discussion of Oribasius's work) [Aetius III, 120, 1–50]. It may be worthwhile, however, to add that Rufus in his list of mild emetics included not only radish roots, but also radish seed oil. Interestingly, this particular detail seems to have escaped the attention of the doctor of Julian the Apostate [Aetius III, 120, 39–42; III, 120, 41].

We may also infer from *Iatricorum libri* that some procedures prescribed by Rufus were at times modified. For instance in Book VII, which contains quotes from the works of Demosthenes (1st c. AD) concerning the treatment of blindness (referred to in the preserved text as 'eye paralysis' [*Paralysis ophthalmion*; παράλυσις ὀφθαλμῶν]) [Aetius VII, 51, 1–36], the doctor recommended detoxifying by means of vomiting induced by the *rafanis*: the emetic agent, however, was not eaten raw, but boiled. The eyes of the patient had to be banded and the whole procedure should not result in excessive spasms [Aetius VII, 51, 34–36]. Thus it may be presumed that boiled radishes were considered to be a less powerful emetic than raw and as such a safer ingredient for the procedures affecting the particularly delicate organs of the senses. It is worth noticing that most references to the radish in the work of Aetius of Amida have to do with the uses of the plant as an emetic.

One should also note that Aetius pointed out that the outer layer of radish roots was believed to be not only an effective emetic, but also a strong diaphoretic agent. This observation was taken by the author from excerpts from Antyllos (1st/2nd c. AD), who in his turn had drawn on the work of Poseidonios (2nd/1st c. BC). Radish seed oil was used to the same effect, but had to be applied externally and rubbed into skin [Aetius III, 157, 1–16]. This particular use of the *rafanis* has not appeared as yet in this discussion, but it has to be seen as a consequence of the traditional view concerning the plant which was believed to have diaphoretic properties.

The treatise *Iatricorum libri* demonstrates that in the sixth century the radish continued to be used as an ingredient in complex medicines. One such medicine was the ointment called *keroté rafanine* (κηρωτή ῥαφάνινη) [Aetius II, 49–50]. It appears to have been made on the basis of wax (*kerós*: κηρός) with an admixture of a decoction of radish seeds or radish seed oil. Given that the recipe was not included in the medical writings, one may presume that it was widely known in medical practice and rather simple. It was used to alleviate the pain resulting from schiatica referred to as *ischias* (ἰσχιάς) [Aetius II, 42–50]: Aetius of Amida recommended the patients that they should apply an ointment made of radish, clay and cow and goat dung on the affected parts of the body [Aetius II, 48–50].

Radish seed oil also continued to be used in the medical practice of the sixth century. It was part of a remedy prepared for little children for ulcerations on the head and for dandruff: a mixture of lead oxide, white lead, fruits of tree heath (*Erica arborea* L.) and frankincense crushed with wine and radish seed oil [Aetius IV, 22, 1–11]. The passage in question testifies to the actual use of *élaion rafáninon* in dermatology, as could be seen in the list of *haplá farmaka* contained in Book I of Aetius's work.

Our brief discussion of the prescriptions presented in *Iatricorum libri* ends with the use of radish seed oil in the treatment of anal conditions. In Book IX of Aetius's work one can find a reference to the writings of Antyllos, who recommended *élaion rafáninon* for prolonged constipation, i.e. *teinesmós* (τεινεσμός) [Aetius IX, 41, 1–56]. The doctor prescribed in such cases a suppository called *trochískos* (τροχίσκος), which was made of dry tar, asphalt and sulfur. The former two ingredients were melted down with a drop of vinegar. The mixture was then added to sulfur in order to form suppositories. After that, the suppositories were smoked on extinguished charcoal. They were inserted into the anus with the use of diluted *ptisáne* (πτισάνη)¹⁴. The base was made of radish seed oil, or, if it was unavailable, a mixture of garlic, ladanum and a small portion of wax. All ingredients were slightly warmed up on simmering fire, scooped with a fluff of wool and applied on the anus [Aetius IX, 41, 22–32].

The last source to be analysed in this discussion is the *Epitome* by Paul of Aegina from the seventh century. It indicates that there were no significant changes in the use of the radish in therapeutic practices. To illustrate this point, one has to refer to some fundamental issues. The doctor of Aegina included his characteristics of the radish in Book I of his work where it was one element of the description of root plants [Paul I, 76, 1, 1–25]. The passage in question refers to the diluting and warming properties of the plant and to its use in

¹³ It includes a significant number of details concerning the preparation and use of cathartic procedures with the radish (and hellebore) as an emetic agent.

¹⁴ A certain type of barley porridge of numerous medical uses. See: Darmstaedter, E. 1933, p. 181–201; Kokoszko M., et al. 2013, p. 282–292; Jagusiak, K. 2016, p. 79–90.

detoxifying procedures (with the traditional proviso that to this effect one should eat radishes before the actual meal [seasoned with vinegar or *garum*] and refrain from eating them after the meal) [Paul I, 76, 1, 13–16]. All this information clearly testifies to the continuity of the medical doctrine in this respect.

It is small wonder then that the *rafanis* in the writings of Paul of Aegina features mainly as an emetic indispensable in preparation for the treatment with the use of *helléboros*, i.e. *helleborismós* (ἑλλεβορισμός). The physician did not introduce any changes to the scope of the established procedures, which is a sign of continuity in medical practice. This also means that there was no development in this field. The rules prescribed by Rufus of Ephesus were still in force, the same rules that were referred to by Oribasius and Aetius of Amida [Paul VII, 10, 1, 1–2, 17; VII, 10, 3, 1–5, 19].

Interestingly, nowhere in the writings of Paul of Aegina do we find any instances of using the radish as a remedy for contusions. The doctor did nonetheless recommend eating this plant in order to improve the colour of the complexion. The radish was thus recommended as a foodstuff (beside leeks and chickpeas), but the author did not leave a list of additional ingredients or a recipe for serving [Paul I, 27, 1, 1–9; I, 27, 1, 2].

Paul of Aegina provided some basic information on radish seed oil. His account largely corresponds to the earlier characteristics discussed above [Paul VII, 23, 12, 1–3]. It should be noted that in his *Epitome* the doctor discussed the technology of production of this type of oil. The data indicate that it did not differ from the methods used in earlier centuries (the author suggests that it was produced by boiling a seed pulp and skimming the upper fraction of the decoction) [Paul VII, 20, 1, 11–16]. The encyclopaedia of Paul contains also some more detailed information on the plant in a passage devoted to aromatic substances. The physician wrote that such substances had warming and softening properties (they belonged to the group of *malktiká* [μαλκτικῶν])¹⁵, facilitated the autodigestion of thick fluids (and as such represented the class of *sympetetiká* [συμπεπτικῶν]), and served as a drying agent. They were also used for cutting thick humours (i.e. belonged to the *tmetiká* [τμητικῶν]) and toning (*tonotiká* [τονωτικῶν]) [Paul VII, 20, 3, 1–15]. Following Galen, Paul characterised radish seed oil by referring to olive oil and, as may be inferred from his narrative, subscribed to the views of his great predecessor [Paul VII, 3, 5, 21–30]. Consequently, there is no reason to believe that this ingredient was used for therapeutic purposes in other cases than those presented above.

To conclude, we shall begin with reiterating the evident observation that the radish was commonly available on the market and widely used as a foodstuff and medicine in antiquity and the early Byzantine period.

The information collected above indicates that its dietary and pharmacological characteristics was not subject to changes and that essentially the foundations for this characteristics had been formed before the first century BC, i.e. before Dioscurides¹⁶.

The case study concerning the radish allows to conclude that the dietary doctrines in the given period remained unchanged and that the Byzantine period in the history of medicine is a straightforward continuation of the achievements of antiquity in this regard, particularly those described in the writings of Dioscurides and Galen. Oribasius, whose work was based largely on that of Galen and included the doctrines of other authors, proved to be highly influential for the early Byzantine physicians in terms of the form of the dietary and pharmacological characteristics.

There is no evidence to substantiate the claim that the use of the *rafanis* for medicinal purposes was subject to changes. The results obtained by pharmacists were thus the same both at the beginning and towards the end of the period in question. The analysis presented above indicates that radishes were a widely available medicine: they were inexpensive and the relevant recipes for medicaments did not include exotic ingredients which would have markedly increased the cost of the prescribed medicines.

¹⁵ It seems that they acquired these properties owing to their diaphoretic ability.

¹⁶ It has to be noted that its most important elements were included into medical doctrines long before the time of Dioscurides. It is evident from the characteristics of the plant included in *De diaeta*. The author/authors wrote in this treatise that radishes provided moisture for the body and diluted the phlegm with their pungency. The leaves were less effective than the root. It was not recommended for patients suffering from arthritis. The root (which is difficult to digest) may have had a greater negative effect when it was left on the surface of the digested foodstuffs: Hippocrates 54, 11–13. It is worth remembering that Poseidonios of Apamea was the second earliest author writing about the medical uses of the radish (after the author of *De diaeta*).

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