Araştırma-Original Article

DİOSKORİDES'İN DE MATERİA MEDİCA İSİMLİ ESERİNDEKİ DROGLARIN VETERİNER HEKİMLİK ALANINDA KULLANIMLARI

Veterinary Usage Of Drugs In De Materia Medica Of Dioscorides

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ÖZ

Pedanius Dioskorides yaklaşık olarak M.S. 1. yüzyılda yaşamış bir hekimdir. Anadolu'da Adana civarında Anazarba denilen bölgede doğmuş olan Dioskorides, Roma İmparatorları Caligula (37-41), Cladius (41-54) ve Neron (54-68)'nun hizmetinde ordu hekimi olarak görev yapmıştır. Bu sayede Roma Ordusu ile birlikte pek çok yeri gezme imkânı bulan Dioskorides gezdiği yerlerde bulunan tıbbi bitkileri, özelliklerini, çeşitli dillerdeki isimlerini, kullanım ve saklama şekillerini anlatan oldukça kapsamlı bir eser yazmıştır. Eserinin Grekçe orijinal adı *Peri hyles iatrikes* olmakla birlikte, eser daha çok Latince *De Materia Medica* olarak bilinmektedir. 600'den fazla bitkisel, 35 hayvansal ve 100 kadar da madensel drogu ele alan *De Materia Medica* beş kitaptan oluşmaktadır. Eserde drogların bulundukları yerler, botanik tarifleri, özellikleri, tıbbi etkileri, kullanım şekilleri, yan etkileri, dozajları, bitki yetiştirme metotları, veteriner hekimlikte ve tıp dışı kullanımları belirtilmiştir John Goodyer'in 1655 yılında İngilizce'ye çevirdiği ve Robert Gunther tarafından hazırlanan İngilizce çevirisine göre I. Kitapta aromatik bitkiler, yağlar, merhemler, ağaçlar ve onlardan elde edilen usareler, reçineler ve meyveler; II. Kitapta hayvanlardan elde edilen droglar, hububat ve sebzeler; III. ve IV. Kitaplarda kökler ve çeşitli köklerin usareleri, yapraklar ve tohumlar; V. Kitapta ise üzümler, şaraplar ve mineraller yer alır. Tess Anne Osbaldeston başkanlığında bir tercüme grubu Robert Gunther'in gözden geçirdiği metni günümüz İngilizcesine çevirmiştir. Bu çalışmada, T.A. Osbaldeston'un ve ekibinin tercüme ettiği nüsha kullanılmıştır.

Anahtar Sözcükler: Dioscorides, De Materia Medica, Veteriner hekimlik.

ABSTRACT

De Materia Medica of Dioscorides includes the medicinal properties of over one thousand natural medicinal substances; most of these are botanical in origin, but drugs of animal and mineral origin were also enclosed. Thus it is necessary to consider this monumental work in every aspects. One of them is veterinary usage of drugs in De Materia Medica. The first English version of De Materia Medica was translated by John Goodyer in 1655 and was prepared by Robert Gunther in 1968. A group of scientist moderated by Tess Anne Osbaldeston revised Gunter's English version in 2000. In this paper, this revised version was used widely. The translations and expressions of revised version was controlled and compared with the Latin and Greek version printed in 1549. Besides the modern research studies were reached to verify the properties and usage of the herbs in veterinary medicine that Dioscorides mentioned. As a result there are seven drugs related to veterinary usage in it such as mastic tree, cedar, olive oil sediment, cuttlefish, Egyptian lupin, Hart's tongue fern (or Horse tongue), and Wild clematis. Dioscorides suggested external usage for all of them for animal diseases such as parasitic skin diseases, scabs, ulcers, dislocations, and white spots on the cornea. He does not give any dosages of these drugs but he gives application and preparing methods of them. This study shows us that the drugs Dioscorides mentiones for veterinary usage could be effective for external animal diseases.

Keywords: Dioscorides, De Materia Medica, Veterinary usage

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INTRODUCTION

Dioscorides was born in the Cilicia Region of Anatolia (Anazarba, near Adana of modern Turkey) and he lived in the first century A.D. He was a military physician in the Roman Army during the period of the Roman Emperors Caligula (37-41), Claudius (41-54) and Neron (54-68). In addition being a good physician, he was interested in botanical sciences and in pharmacognosy. His travels with the Roman Army were a big opportunity to study plants of many different regions. So this military service provided Dioscorides with ample opportunity to travel and collect plants from Anatolia, Egypt, Arabia, Persia, Galia, North Africa and Caucasia.He used this advantage to write the most important book on botany and pharmacognosy.

The name of his great book is *Περί ύλης ιάτρικης* (Peri hyles iatrikes) in Greek. But this monumental work is mostly known by its Latin name, *De Materia Medica* means On The Medical Materials. It includes more than 600 herbal drugs, about 35 drugs from animal sources, and about 90 drugs prepared with minerals, and most of those drugs are depicted in paintings. In addition, it includes detailed information about those drugs, such as their cultivation places and cultivation methods, botanical descriptions, medical effects, usage methods, side effects, dosages, veterinary usage and non-medical usage.[1] In De Materia Medica; he gives the Greek synonym for each plant together with its native name. According to Dioscorides the proper storage of medicines is important to preserve their efficacy. The work of Dioscorides served as the corner stone for western and also eastern pharmaceutical and herbal writing for the next 1500 years. It was undoubtedly a monumental work. De Materia Medica discusses the medicinal properties of over one thousand natural medicinal substances; most of these are botanical in origin, but drugs of animal and mineral origin were also included. Dioscorides listed over 4740 different uses for the *materia medica* in his herbal, and lists over 360 varieties of medicinal actions.

De Materia Medica consists of five books. According to its English version which was translated by John Goodyer in 1655 and was prepared by Robert Gunther, aromatic plants, oils, oinments, trees and their juice, resin and fruits are mentioned in the first book; drugs from animal sources, cereals and vegetables are mentioned in the second book; roots and their juice, leaves and seeds are mentioned in the third and fourth books; grapes, different types of wine and minerals are mentioned in the fifth book. His classification system, though sometimes obscure, was better organized and more logical than that of any of his predecessors.

MATERIAL AND METHOD

The aim of this study is to expose the veterinary usage of drugs in De Materia Medica of Dioscorides, expose their current chemical and pharmacological properties by reference research. For this purpose, first by using De Materia Medica translation of T.A. Osbaldeston, the valuable drugs in terms of veterinary medicine have been stated. Because this De Materia Medica version is translated to modern English, this translation is available in internet media. The other translation (Robert Gunther's) is in old English, and it could be found in ARIT (American Research Institute in Turkey) Istanbul Library. Afterwards the information in this translation has been compared to Latin and Greek version of De Materia Medica, also this version could be found in internet media. T.A. Osbaldeston gave the modern systematic names of the drugs, by using these names the chemical and pharmacological properties of these drugs have been researched on manuscripts and books which are available in internet media too. With all these informations evaluated in 2014-2015.

Veterinary Usage of Drugs in De Materia Medica

There are seven drugs which have veterinary usage in De Materia Medica (*Table 1*). Three of them, schinelaion, kedros and amorge are in first book of De Materica Medica. Two of them, sepia and thermos emeros are in the second book of it.[2] Phullitis is in the third book of De Materia Medica and ampelos melaina is in the fourth book of it.[2]

Schinelaion

The schinelaion is the 50th drug of the first book of De Materia Medica. T.A. Osbaldeston gives some suggested names for schinelaion such as *Schinus molle* L., *Anacardiaciae*, *Pistacia lentiscus* L., *Anacardiaciae, Bursera gummifera* (L.) Sarg., *Burseraceae, and Sideroxylon mastichodendron* Jacq., *Sapotaceae* (Mastic Tree, Pepper Tree, Herb Mastic, and Oil of Mastic). According to this translation: *"Schinelaion [lentiscinum] is made from ripe berries the same as oil of bay, and thickened before use.... It heals parasitic skin diseases on beasts of burden and dogs."*[2] But in Latin and Greek version of Materia Medica of Dioscorides it says "*This itch of cattle and dogs heals advantage of the worst...*"[3]

The parasitic skin diseases are not mentioned in this version of Dioscorides.

Table 1. The brief information of drugs in De Materia Medica of Dioscorides using in veterinary medicine.

Greek name given by Dioscorides	Latin (According to	English	On Which Animal(s)	For Which Disease(s)	Preparing Method	Application Method
Schinelaion	Pistacia lentiscus L., Anacardiaciae	Mastic tree	Beasts of burden and dogs	Parasitic skin diseases	Oil of berries are thickened.	There is no information but it probably is applied externally.
Kedros	Cedrus libani A.Rich., Pinaceae	Cedar	Beasts, dogs and oxen	Lice, scabs and ulcers caused by shearing	Oil or decoction of cedar	Strongly rubbing
Amorge	Sedimentum oleum	Sediment of olive oil	Beasts	Scabs	With decoction of lupins and white chamaeleon	Rubbing
Sepia	Sepia officinalis L., Sepiidae	Cuttlefish	Cattle	White spots on cornea and pterygium	For white spots on cornea there is no preparing method but it should be pulverized. For pterygium it is pounded into small pieces with salt.	For white spots it is blown into eyes. For pterygium there is no information about application method.
Thermos emeros	Lupinus albus L., Leguminosae	Egyptian lupin, White lupin	Sheep	Scabs	It boils with the root of black chamaeleon.	Washing the scabs with a lukewarm decoction of it.
Phullitis	Asplenium scolopendrium L., Aspleniaceae	Hart's-tongue fern	Four footed beasts	Snake bite	Decoction of the leaves	Pouring in through the mouth (with wine).
Ampelos melaina	Vitis nigra Bedevian, Vitaceae	Wild clematis	Beasts	Ulcerated and dislocated necks of labouring beasts	The leaves of it are smeared on with wine	There is no information but it probably is applied externally.

Chemical and Pharmacological Properties of Pistacia lentiscus

Pistacia lentiscus is one of the resin rich herbs. Resins are complex, lipid-soluble mixtures of various compounds. Resins are usually secreted by specialized structures in woody angiosperms. All resins are sticky and harden when exposed to the air. In general, most resins are antimicrobial and wound healing in animals.[4]

Nahida et al. indicated phytochemistry and properties of *Pistacia lentiscus*.[5] According to them the resin of *Pistacia lentiscus* contains α-pinene, β-pinene, limonene, terpene-4-ol and also essential oil from leaves contains β-caryophylline (31.38%), germacrene (12.05%) and γ-cadinene (6.48%). And also they mention the antiatherogenic, antimicrobial, antioxidant, hepatoprotective, antiarthritic, antigout, anticancer, wound healing and lipid lowering activities of *Pistacia lentiscus*.[5] But they do not specify antiparasitic activity of it. But Landau et al. explain antihelmintic activity of it.[6] And also Djerrou at al. studied on effects of *Pistacia lentiscus* on the treatment of dermal burns on rabbits.[7]
Pistacia lentiscus due to its constituents especially terpenes derivatives can be good for itchy (scratchy) skin problems. But Dioscorides did not mention any dosage of it.

Kedros

Kedros is also placed in the first book of De Materia Medica as the 105th drug. In this subtitle Dioscorides mentions kedros and also kedros mikra. Osbaldeston suggested names for kedros such as *Cedrus libani* A.Rich., *Pinaceae* [The synonyms of *Cedrus libani* are *Cedrus libanotica* Link., *Pinaceae, Pinus cedrus* L., *Pinaceae, Abies cedrus* (L.) Poir., *Pinaceae, Larix cedrus* (L.) Mill., *Pinaceae* (Cedar of Lebanon)] for kedros as scientific names.[2] And Osbaldeston suggested *Cedrus deodara* (Roxb. ex D.Don) G.Don., *Pinaceae* [Synonyms of *Cedrus deodara* are *Larix deodara* (Roxb. ex D.Don) K.Koch., *Pinaceae, Pinus deodara* (Roxb. ex D.Don) G.Don., *Pinaceae* (Deodar, Himalayan Cedar, Indian Cedar)] for kedros mikra scientifically.[2] Dioscorides says both of them are poisonous. According to him, however their oil could use for medical purpose. Dioscorides indicates its veterinary usage as: *"The cedar is a great tree from which cedria [oil of cedar] is gathered…. The best cedria is thick and very clear with a strong scent; poured out it falls by drops and is not diffused…. An oil is made of the moisture which is separated from the cedria [oil of cedar] by a fleece laid over it during boiling (as we have said in the chapter on pitch) good for the same purposes as cedria. Particularly the oil, strongly rubbed in, cures scabs on beasts, dogs and oxen; and when applied it kills ricinos [lice], and heals ulcers on those which came from shearing."*[2]
In Latin and Greek version of Materia Medica of Dioscorides it says *"All the same to use privately vehemence smeared skin animals, dogs, cattle, heals, and adhere to the ricin kills, wounds received from shearing, leads to scars."*[3]

Chemical and Pharmacological Properties of Cedrus deodara

According to Chaudhary et al. the chemical constituents of *Cedrus deodara* are wikstromol (dibenzylbutyrolactol), matairesinol, isopimpillin, lignans, 1, 4 diaryl butane, benzofuranoid neo lingam, isohemacholone, sesquiterpenes LIII: deodarone, atlantone, deodarin, deodardione, limonenecarboxylic acid, α-himachalene, β-himacholone, cedrin, taxifolin, cedeodarin (6-methyltaxifolin), dihydromyricetin and cedrinoside.[8] And also, traditionally using areas of *Cedrus deodora* are belching inflammations, dyspepsia, insomnia, hiccoughs, fever, urinary discharge, epilepsy, skin disease, pulmonary disorder, urinary disorder, bronchitis, itching, elephantitiasis, tuberculous glands, leucoderma, ophthalmia, piles, disorders of the mind and ulcers.[8] In addition to this Chaudhary et al. put forward protective effect of *Cedrus deodora* and *Pinus roxburghii* Sarg., *Pinaceae* from gastric ulcer in another research study.[9]

Amorge

Amorge is the 134th drug of the first book of De Materia Medica. The amorge or amurca means sediment of olive oil. According to Dioscorides amorge could be used with vinegar, wine, and honey. For veterinary usage of amorge Dioscorides says: *"It heals scabs on beasts rubbed on with a decoction of lupins (Thermos emeros* [Dioscorides]. See 2.5) *and white chamaeleon."*[2]
In Latin and Greek version of Materia Medica of Dioscorides uses almost the same expressions.[3]
But it is convenient to give the effects and properties of white chamaeleon under this chapter. Because the white chamaleon can have the active ingredient in this compound with olive oil sediment. White chamaeleon is named scientifically as *Atractylis gummifera* Salzm. ex L., *Compositae*.

Chemical and Pharmacological Properties of Atractylis gummifera:

Atractylis gummifera (White chamaeleon) is a type of thistle found mainly in dry areas of the Mediterranean. Especially all underground parts of it contain two types of toxic diterpenoid glucosides: atractyloside and carboxy-atractyloside.[10] Neither which part of *Atractylis gummifera* was suggested, nor its dosage was given by Dioscorides for using with amorge. But in third book of De Materia Medica, Dioscorides gives some information about white chamaleon. He describes its properties and usage. And also he says: *"Taken as a drink with wine it is an antidote to poison.*

Kneaded with polenta then diluted with water and oil it kills dogs, swine, and mice..."[2] As it is seen Dioscorides does not mention its toxic effects. He was not be able to observe this toxicity, because atractyloside poisoning is the long latency between the administration of atractyloside and the appearance of the first toxic symptoms, also when the compound is given intravenously.[10] But Dioscorides indicates its poisonous effects on dogs, swine and mice.

Sepia

De Materia Medica includes also about 35 drugs from animal sources, parts of animals and animal products. The sepia is one of them. The sepia is the 23rd drug of the second book of De Materia Medica. It is named *Sepia officinalis* L., *Sepiidae* (cuttlefish). About its veterinary usage Dioscorides says: *"It is good for white spots on the cornea (in the eyes) of cattle blown into them. It removes pterygium [membranes on eyes] pounded into small pieces with salt and applied."*[2]

There are the same expressions for *sepia* in Latin and Greek version of Materia Medica of Dioscorides.[3]

There is a recipe called Wen-She decoction as a Chinese herbal formula which resolved acute upper digestive tract hemorrhage in an open sequential controlled trial. It includes cuttlefish bone (Os sepia) and some herbs such as *Codonopsis pilosa* Chipp, *Campanulaceae, Atractylodes macrocephala* Koidz., *Compositae, Poria cocos* Wolf, *Fomitopsidaceae, Glycyrrhiza uralensis* Fisch., *Leguminosae, Zingiber officinale* Roscoe, *Zingiberaceae, Astragalus membranaceus* (Fisch.) Bunge, *Leguminosae*, and halloysitum rubrum (red halloysite is a mineral of silicate salt of polyhydrate kaolinate group, containing mainly hydrated aluminium silicate).[11]

Thermos Emeros

Thermos emeros is the 132nd drug of the second book of De Materia Medica. T.A. Osbaldeston suggested *Lupinus albus* L., *Leguminosae* [Synonym of *Lupinus albus* is *Lupinus termis* Forssk., *Leguminosae* (Egyptian Lupin, Termus)] for thermos emeros as scientific classification. For veterinary usage of thermos emeros Dioscorides says: *"Boiled with the root of black chamaeleon* they cure scabs on sheep that are washed with a lukewarm decoction of it."*[2]

And also, there are the same expressions for lupine in Latin and Greek version of Materia Medica of Dioscorides.[3]

Chemical and Pharmacological Properties of Lupinus termis

According to Guemes-Vera at al. *Lupinus sp.* contains non-nutritional ingredients such as tannins, alkaloids and oligosaccharides, and also a lower concentration of lectins, phytates and saponins than soybean. In addition to this lupine is free of haemagglutinins, isoflavones and other components typical in legumes.[12]

As it is seen lupine is used with black chamaeleon (*Echinops sphaerocephalus*). Previous phytochemical reports indicated the presence of various tricyclic and tetracyclic sesquiterpenes, polyacetylene thiophenes, simple quinoline alkaloids, sesquiterpene lactones, and benzothiophene glycosides in the roots of the investigated Echinops species. The various biological activities (e.g., antitumor, phototoxic, antifungal, antifeedant, as well as insecticide and antivirus activities) of thiophenes containing natural products have been proven.[13]

Due to the properties of both lupine and black chamaeleon emphasized above, it can be spoken of these plants can be using to treat scabs and to induce wound healing faster.

Phullitis

Phullitis is the 121st drug of the third book of De Materia Medica. T.A. Osbaldeston gives some suggested names for phullitis such as *Asplenium scolopendrium* L., *Aspleniaceae, Scolopendrium vulgare* Sm., *Aspleniaceae, Scolopendrium officinarum* Sw., *Aspleniaceae, Phyllitis scolopendrium* (L.) Newman, *Aspleniaceae, Adiantum scolopendrium* L., *Aspleniaceae* (Hart's Tongue Fern, Horse Tongue).[2] About its veterinary usage Dioscorides says: *"A decoction of the leaves (taken as a drink with wine) is good for those bitten by snakes. It is helpful for four-footed beasts poured in through the mouth."*[2]

There are the same expressions for phullitis in Latin and Greek version of Materia Medica of Dioscorides.[3]

Chemical and Pharmacological Properties of Asplenium sp

Irudayaraj and Johnson say that *Asplenium sp.* have four major chemical components such as alkaloids, flavonoids, triterpenoids and glycoside.[14]

Sohn et al. indicated terpenoid constituents from aerial parts of *Asplenium scolopendrium* and they mentioned four compounds such as lutein, (6S, 9S)-roseoside, icariside B2, and picrionoside A.[15]

According to Irudayaraj and Johnson, terpenoids have a lot of activities such as anti-malarial, anti-tuberculosis, anti-plasmodial, antifungal and anti-cancer.[14] And also alkaloids are important for the protection, defence, and survival of plants because they provide their survival against microorganisms (anti-bacterial and anti-fungal activities) insects and herbivores and also against other plants by means of allelopathically active chemicals. Flavonoids especially have the putative role in prevention of cancers and cardiovascular diseases. Cardiac glycosides are used therapeutically in the treatment of congestive heart failure and cardiac arrhythmia.

Ampelos Melaina

Ampelos melaina is the 185th drug of the fourth book of De Materia Medica. Osbaldeston gives some suggested names for ampelos melaina such as *Vitis nigra* Bedevian, *Vitaceae*, *Clematis vitalba* L.*, Ranunculaceae,* (Wild Clematis, Traveller's Joy, Biting Clematis, Hedge Vine).[2] Dioscorides indicates its veterinary usage as: *"The leaves (smeared on with wine) are good for the necks of labouring beasts that are ulcerated, and they are applied similarly for dislocations."*[2]

And also there are the same expressions for *Ampelos melaina (Vitis nigra)* in Latin and Greek version of Materia Medica of Dioscorides.[3]

Chemical and Pharmacological Properties of Clematis vitalba

Yesilada and Küpeli have isolated C-glycosylflavon, 4-O-coumaroyl-isovitexine as the main active ingredient of the aerial parts of *Clematis vitalba*.[16] And also, anti-inflammatory, antinociceptive and antipyretic effects of aerial parts of *Clematis vitalba* have been shown by Yesilada and Küpeli.[16]

CONCLUSION

In this study, veterinary prescriptions in De Materia Medica and their properties revealed by modern researches are tried to expose. For veterinary usage Dioscorides gives 8 drugs, 7 of them herbal, one of them animal sources. However his treatments are mostly for domestic animals such as sheep, cattle, oxen, dog, beasts of burden. Dioscorides suggests amorge (sediment of olive oil) and ampelos melaina (wild clematis) for all animals.

These sections of De Materia Medica give us some information about animal diseases in Dioscorides' time. He mentions mostly external animal diseases such as parasitic skin diseases, scabs, ulcers, dislocations, and white spots on the cornea. As it was noticed Dioscorides suggests generally external applications for these diseases such as rubbing, and washing. He suggest orally use for only phullitis (*Asplenium scolopendrium* L., *Aspleniaceae* – Hart's-tongue fern). Although the herbs Dioscorides recommended in veterinary medicine have no dosage recommendations but he gives application and preparing methods. Dioscorides mostly mentions therapeutic usage of these drugs. However, in the section of white chamaeleon, he indicates its poisonous effects on dogs, swine, and mice.

The modern researches show us that the ampirical knowledge of Dioscorides on veterinary usage of herbs is very appropriate. However it is examined one by one, it will be noticed that the chemical ingredients and properties of these herbs confirm their external usage on wound healing and also poisonous effects on animals. This work could be an attempt to search on materia medicas of ancient times in terms of veterinary usage. Thence these materia medica works could be compared with respect of veterinary applications.

INFORMATION

**Chamaileon melas* Dioscorides, *Carduus sphaerocephalus* Bauhin, *Compositae*, *Echinops sphaerocephalus* L., *Compositae*, (Globe Thistle); other usage *Cardopatium corymbosum* L. (Pers.), *Compositae, Brotera corymbosa* Willd., *Compositae* (Black Chamaeleon) (Osbaldeston, 2000, 378).

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