



BIOLOGICAL SCIENCES

Nineteenth century zootherapy in Benedictine monasteries of Brazil

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Abstract: Research on the past use of animals in medicine, particularly in Brazil, is still scarce. This work aimed to perform a dialogical analysis of information retrieved from historical documents composed in the nineteenth century about the therapeutic use of animal species in Benedictine monasteries in Brazil and their contemporary medicinal applications. Cross-referencing of seven written codices from the nineteenth century Benedictine monasteries infirmaries was performed for taxonomic identification and with therapeutic indications. Animal species provided 13 zootherapeutic resources, which were related to 17 therapeutic indications. Insects, birds and mammals concentrated the greatest number of pharmaceutical actions (37%, 32% and 16% of the therapeutic indications). Medicinal animals used in the past are species commonly applied in the European medicine over centuries. This reveals that the practiced medicine in Benedictine monasteries was influenced by medical concepts from Europe. Also, it shows that still today this European medicine is the basis of therapeutic practice. Such research is essential for a better scientific understanding of the history of medicine, focusing on how different cultures have contributed to the actual therapeutic practice. In this way it is possible to trace a history zootherapy in Brazil, demonstrating the persistence of their use over the time.

Key words: Catholic-religious-benedictine medicine, historical ethnobiology, medical-pharmaceutical information, medicinal animal resources, therapeutical practices.

INTRODUCTION

Humans groups of diverse backgrounds used and continue to use medicines, spells and amulets from animal products, such as bones, beaks, claws, bird-wing spurs, nails, shells, teeth, lard, bezoars, excrement, etc., for use in all kinds of medicine systems. A considerable number of printed and handwritten sources, which constitute valuable tools for research into the interrelationships that have been established between people and animals of different environments and over a long historical time, are now available. These documentary sources preserve information about the concepts that

different human societies had regarding the application of animal resources in the past.

With the “discovery” of the Americas, chroniclers, missionaries and explorers wrote documents that provided information about the ways of life of the native people-population, and in which are reported the species of animals and techniques used by hunter-gatherers and farmers (Ingold 1994, Medeiros 2010). In the case of Brazil, documents that portray the local importance and economic potential of animal species and, in particular, the application of these resources to human health, were written from a European point of view. Testimonies of this history can be found, for example, in the treatises of Gabriel Soares de Souza (1587

[1851]) and George Marcgrave (1942 [1648]) and Guilherme Piso (1948 [1648]). Likewise, Martius (1844 [1979]), refers to the great value that Indians attributed to zootherapy, such as alligator teeth as a preventive against the bite of poisonous snakes; the head and tail of rattlesnakes that, after cooking with chicken, was used to cure chronic rashes and syphilis; and lard, which was used to destroy worms that cause ulcers. Thus, these historical documents serve as a valuable source of indirect ethno-zoological information.

A variety of present-day ethnozoological studies have documented the use of fauna in therapy practiced by different human cultures and societies (Lev 2003, Alves & Rosa 2006, 2007a, Mahawar & Jaroli 2008). In Brazil, specifically, several recent publications have demonstrated that animals are still in use in all regions of the country (Alves et al. 2007, 2010, 2013a, b, Ferreira et al. 2012, 2013, 2016), revealing the persistence of this form of fauna use, which had been previously recorded in ancient historical documents. However, research on the past use of animals in medicine in Brazil is still scarce.

In this sense, the present work aimed to perform a dialogical analysis of the use of animals in therapeutic practice performed in Benedictine monasteries in Brazil. Thus, this work attempts to undertake a parallel discussion between the information retrieved from historical documents composed in the nineteenth century about the therapeutic use

of animal species and their contemporary medicinal applications.

MATERIALS AND METHODS

To form a narrative from this historical perspective, this research began with the analysis of historical documents, using them as an element to investigate the medicinal use of animals.

The scope of the source material for this research encompassed written evidence from seven manuscript sources from Brazil dating from the nineteenth century (Table I). The theme of the selected documentary set focuses on medical-pharmaceutical documents that served as official consultation records for the practices of the healing arts at the time. The codices are unpublished prescriptions written by doctors who were hired by the Benedictine monasteries to serve the slaves, religious community and the general population. These codices record the daily medical and pharmaceutical practices performed in the wards of Benedictine monasteries, and list the preparations of formulas for each patient in according with its diagnosis. These manuscripts have technical skills composed by a ferro-gallic ink on paper form of writing, and their leaf faces contain medical information. Prescriptions were consulted directly in the archives of the Benedictine Monastery (Mosteiro

Table I. The documentary set selected for analysis of zootherapeutic material referenced to Brazil in the Nineteenth Century.

Source	Years	Location
<i>Pharmacopeia of Dr. Serpa</i> (codex number 91)	1823 to 1829	AMSBO
<i>Livros de receitas de medicamentos</i> (codex numbers 138 to 143)	1837, 1838 1839, 1840, 1860 and 1880	AMSBRJ

AMSBO = Archive of the Mosteiro de São Bento of Rio de Janeiro; AMSBTJ = Archive of the Mosteiro de São Bento of Olinda.

de São Bento) of Rio de Janeiro (state of Rio de Janeiro, Southeast Brazil) (Livros de Receitas de Medicamentos 1837, 1838, 1839, 1840, 1860 and 1880) and of the Benedictine Monastery (Mosteiro de São Bento) of Olinda (state of Pernambuco, Northeast Brazil). (Pharmacopeia of Dr. Serpa 1823 to 1829).

The methodological procedure adopted for the documentary analysis of the compiled prescriptions began with an initial phase of approximation, in which a pre-reading of the evidence was undertaken to identify the essential elements for subsequent data collection (Medeiros 2010). The next phase was an in-depth reading of the documentary set, transcribing the information on a continuous writing, keeping the same paleographic. In this manner, a spreadsheet of data on the popular terms that allude to the animal resources used in that period was constructed. For taxonomic identification of the popular terms present in each formulation, they were compared with information of the medical literature of the time (Gomes 1876, Chernoviz 1908). To track taxonomy, the scientific names were updated by consulting zoological specialists. Cross-referencing were also performed with therapeutic indications, when the indications for medical use were presented in the prescriptions of the Benedictine monastery (Mosteiro de São Bento) in Olinda in the work of Schmalz (1966), as well as information collected from Chernoviz (1908) and Gomes (1876).

RESULTS AND DISCUSSION

Species and resources of animal origin with medicinal purposes

Benedictine prescriptions revealed the record of formulations containing the use of animal and animal resources (such scrapings of horn

deer and honey) to treat different therapeutic indications.

The animals present in the formulations of the nineteenth century prescriptions represent four taxonomic categories and eight families as a whole (Table II). Six species were identified as used in the pharmacy and infirmary of the Benedictine monastery (Mosteiro de São Bento) of Rio de Janeiro and five for the monastery of Olinda. For two of the zootherapeutic (animal derived) resources, such as “gastric juice” (see Table II), no taxonomic information could be found. The groups with the largest number of species were mammals, with four species and one indeterminate species, followed by insects, with two species. On the other hand, of the animals whose taxonomic identities could be tracked at the species level, the classes from which they, and thus their resources, came from and in which are concentrated the greatest number of pharmaceutical actions, were Insecta, Aves and Mammalia (37%, 32% and 16% of the therapeutic indications, respectively) (Table II). The records of the use of zootherapeutic resources proved the importance and antiquity of the use of medicinal animals in Olinda and Rio de Janeiro (Brazil), and reinforced the historical record verified in other works left by medical doctors and naturalists of the seventeenth, eighteenth and nineteenth centuries. Examples of this source of information are the writings of Piso – *História natural do Brasil ilustrada* (originally published in 1648) and *História natural e médica da Índia Ocidental* (1658) –, in which 29 medicinal animals are indicated (Almeida 2005). Similarly, highlighted is the medical treatise of Simão Pinheiro Morão – *Queixas repetidas em ecos nos arrecifes de Pernambuco contra os abusos médicos que nas suas capitanias se observam tanto em dano das vidas de seus habitantes*, written in 1677 – as well as that of João Ferreyra da Rosa – *Tratado único da constituição*

Table II. Animal taxa and respective zootherapeutic resources used in the composition of therapeutic formulations of the Benedictine monasteries of Rio de Janeiro and Olinda during the Nineteenth Century.

Phylum or Class Order/Family	Species or subspecies	Zootherapeutic resource	Therapeutic indication
Aves Galliformes/ Phasianidae	<i>Gallus gallus domesticus</i> (Temminck, 1758)	Egg yolks (<i>Gemas de ovos</i>) ¹	Hemorrhage, spasmodic conditions, indigestion, intestinal colic, inflammation, emollient
Clitellata Hirudinea/ Hirudinidae	<i>Hirudo medicinalis</i> (Linnaeus, 1758)	Leeches (<i>Sanguesugas</i>) ²	Pleurisy
Insecta Coleoptera/ Meloidae	<i>Meloe vesicatorius</i> (Linnaeus, 1758)	Cantharides plaster (<i>Emplastro de cantaridaz</i>) ² Vesicatory plaster (<i>Emplastro vesicatório</i>)	Pneumonia, inflammation, rheumatism
Insecta Hymenoptera/ Apidae	<i>Apis mellifera</i> (Linnaeus, 1758)	Norbana honey (<i>Mel de norbana</i>) ^{1,2} Honey (<i>Mel de abelhas, Mel de abelhas</i> or <i>Mel</i>)	Heal wounds, cuts, syphilis, purgative
Mammalia Artiodactyla/ Cervidae	<i>Cervus elaphus</i> (Linnaeus, 1758)	Deer scrapiaing (<i>Raspas de viado</i> or <i>Ponta de viado</i>) ^{1,2}	Inflammation, emollient
Mammalia Artiodactyla/ Bovidae	<i>Bos taurus</i> (Linnaeus, 1758)	Milk (<i>Leite</i>) ¹	Undefined
Mammalia Artiodactyla/ Suidae	<i>Sus domesticus</i> (Erxleben, 1777)	Pork lard (<i>Banha de porco</i>) ¹	Undefined
Mammalia Rodentia/ Castoridae	<i>Castor fiber</i> (Linnaeus, 1758)	Castor oil (<i>Castoreo</i> or <i>Castorio</i>) ^{1,2}	Antispasmodic
Mammalia	-	Ivory (<i>Marfim</i>) ²	Undefined
Nematoda	-	Helminth (<i>Helminto cortox.</i>) ¹	Cough, emollient
Crustacea	-	Crab eyes (<i>Olhoz de carangueijos</i> or <i>Olhoz de caranguejez</i>) ²	Undefined
-	-	Animal charcoal (<i>Carvão animal</i>) ¹	Undefined
-	-	Gastric juice (<i>Suco gástrico</i>) ¹	Undefined

¹ = Codex 138 to 143 of the Archive of the Mosteiro de São Bento do Rio de Janeiro; ² = Codex 91 of the Archive of the Mosteiro de São Bento de Olinda.

pestilencial de Pernambuco, dated 1694, which contain 22 and 19 species of medicinal animals, respectively (Rosa 1956, Morão 1965, Almeida 2010). Species recorded in these documents continue to be used for medicinal purposes in the present day, as reported in studies on traditional medicine in countries of the Americas, Europe, Africa and Asia (Adeola 1992, Kakati et al. 2006, Mahawar & Jaroli 2008, Quave et al. 2010). Examples are the species introduced in Brazil, such as *Gallus gallus domesticus* (Temminck 1758), *Apis mellifera* (Linnaeus 1758), *Bos taurus* (Linnaeus 1758) and *Sus domesticus* (Erxleben 1777), which were incorporated into traditional Brazilian medicine (Ferreira et al. 2012, 2013), as well as in other traditional medical systems in Latin American countries (Martinez 2013, Castillo & Ladio 2019).

In relation to the greater representativeness of mammals and insects integrating the local pharmacopoeias, current researches has also recorded this incidence in several municipalities of all regions of Brazil, as evidenced by several ethnozoological studies (for example, Costa Neto 1999, Alves et al. 2008a and Ferreira et al. 2013). The preference for mammals is not surprising given these animals are among the main groups used in various traditional medicine systems around the world, providing various products commonly used in human and animal diseases treatment (Alves 2009, Alves et al. 2016a, b, Van Vliet et al. 2017).

The list of species used in monasteries includes animals such as *Cervus elaphus* (Linnaeus 1758), *Castor fiber* (Linnaeus 1758) and *Meloe vesicatorius* (Linnaeus 1758), which occur in the Northern Hemisphere and, in the case of the latter two, in Europe (A.L. Carvalho 2007, personal communication). Thus, the therapeutic arsenal used by the monasteries included animals not native to Brazil, being four wild e three domestics, that have been created

in the country. This same situation is also evident in the seventeenth century works of Piso (1948[1648], 1957[1658]), which indicate the historical use of exotic species as resources for medicinal therapy. Thus, for the preparation of medicines in Brazil, the animal-based material frequently had to be imported. By observing these documental evidences of the medical practice in the past, there is an indication that the idea of introducing this material into Brazil for therapeutic use came from the assimilation of European zootherapeutic knowledge by Brazilian physicians, and the overlapping of an academic medical culture that primarily followed the European discourse of health care, that was based on the Hippocratic and Galenic theories. Although there was an exchange of knowledge among the Amerindian, African and European peoples, fundamental archetypes of Brazilian culture, and although official medicine had been influenced by the Amerindian and African medicines, by incorporating different materials of therapeutic value, it imposed practices that were fundamentally guided by what was learned in European apothecaries (pharmacies) and universities (Silva 1866). In this sense, Alencastro (2000) writes that from a very point in the historical relationship between the Portuguese metropolis and the Brazilian colony, which began in the sixteenth century, Portuguese doctors associated the diseases of the American continent with European academic nosology, leaving aside the medicines derived from indigenous and Afro-Brazilian knowledge. Thus, the practice of European medicine in Brazil was dependent on the importation of medicinal products, even if they lost their quality due to the long period of transportation from one continent to another, as evidenced by Almeida (1946). Currently, the situation is totally different, as shown by the work of Alves et al. (2013b), that reported the use of 354 medicinal

animal species in Brazil, 96% of which are wild caught. Obviously, as these animals are obtained from nature, there is an impact on the natural populations, showing the need to integrate zootherapy into strategies to conserve and manage faunistic resources in Brazil (Alves & Rosa 2006, Alves et al. 2007, Alves & Souto 2015). Despite the wealth of animals currently used in Brazilian popular medicine, there are no animal products readily incorporated into therapeutic practice, except honey, which is often sold in pharmacies across the country. It is noteworthy that the federal government's National Policy of Pharmaceuticals (Política Nacional de Medicamentos, Portaria no. 3916/98) specifies that *the support to research aiming to use the therapeutic potential of the national flora and fauna, with emphasis on certification of their medical properties, should be continued and expanded.*

Therapeutic indications and preparations

The total set of animal species used by the monasteries provided 13 zootherapeutic resources, which, when used in synergistic action with other components of formulations, minerals and plants, were related to 17 therapeutic indications (see Table II). The zootherapeutic resources of three species, namely *Cervus elaphus* (Linnaeus 1758), *Castor fiber* (Linnaeus 1758) and *Apis mellifera* (Linnaeus 1758), were of common use at both monasteries (Rio de Janeiro and Olinda) (Table II).

Among these three classes (Insecta, Aves and Mammalia), four species were indicated for more than one disease condition, such as was found for the use of zootherapeutic resources from, for example, *Gallus gallus domesticus* (Temminck 1758) (indicated for six disease conditions), *Apis mellifera* (Linnaeus 1758) (four conditions) and *Meloe vesicatorius* (Linnaeus 1758) (for three) (see Tables II and III). There were

also cases of a single therapeutic indication being related to different animal's species. These involved formulas with personal indications for inflammation (18% of the zootherapeutic species), spasmodic conditions and as emollient (12% each) (Table III). These conditions of disease treated by zooterapics in the nineteenth century differ from those normally found in current studies, in which diseases of the respiratory system are predominant in pharmacopoeias of local communities in northeastern Brazil, such as Bahia (Costa Neto 1999, Alves & Rosa 2006, Ferreira et al. 2013) and Paraíba (Alves et al. 2008b). This difference between diseases treated in the past and nowadays could be related to the factors of time, region, and social issues. So, it is possible that health and disease necessities could change in time, from one geographical region to another and by conditions of life of the human population treated with zootherapeutic remedies. On the use of different animal species for the same therapeutic purpose may indicate that these species have similar pharmacological properties, safety in its use, apparent signals and organoleptic characteristics noted by human populations. Also, this condition of different animals being applied for the same medicinal use may be related to the factor of disponibility and access to zooterapic species in different regions. In addition, species with the same therapeutic target, and the use of species for multiple therapeutic indications, are related to the zootherapeutic resources used and/or to the preparations. In this regard, Iwu (2014) states that the chemical constituents of animals are potentiated precisely by the part of the animal, by the manner of preparation, or by the dosage used in the zootherapeutic remedy.

Zootherapeutic resources were employed in drug composition in different ways, including as a base, adjuvant, corrective, carrier or intermediate of formulations. These resources were obtained

Table III. Percentage distribution of animal taxa by therapeutic application according to zootherapeutic use in the Benedictine monasteries of Rio de Janeiro and Olinda during the Nineteenth Century.

Therapeutic indications	Species	No. spp.	% spp.
Hemorrhages	<i>Gallus gallus domesticus</i> (Temminck, 1758)	1	6
Spasmodic conditions	<i>Castor fiber</i> (Linnaeus, 1758) <i>Gallus gallus domesticus</i> (Temminck, 1758)	2	12
Indigestion	<i>Gallus gallus domesticus</i> (Temminck, 1758)	1	6
Intestinal colic	<i>Gallus gallus domesticus</i> (Temminck, 1758)	1	6
Inflammation	<i>Cervus elaphus</i> (Linnaeus, 1758) <i>Gallus gallus domesticus</i> (Temminck, 1758) <i>Meloe vesicatorius</i> (Linnaeus, 1758)	3	18
Emollient	<i>Gallus gallus domesticus</i> (Temminck, 1758) <i>Cervus elaphus</i> (Linnaeus, 1758)	2	12
Pneumonia	<i>Meloe vesicatorius</i> (Linnaeus, 1758)	1	6
Rheumatism	<i>Meloe vesicatorius</i> (Linnaeus, 1758)	1	6
Heal wounds	<i>Apis mellifera</i> (Linnaeus, 1758)	1	6
Cuts	<i>Apis mellifera</i> (Linnaeus, 1758)	1	6
Syphilis	<i>Apis mellifera</i> (Linnaeus, 1758)	1	6
Purgative	<i>Apis mellifera</i> (Linnaeus, 1758)	1	6
Pleurisy	<i>Hirudo medicinalis</i> (Linnaeus, 1758)	1	6

through pharmaceutical operations, which included, for example, calcination (in the case of obtaining animal “charcoal”) and cooking (“cantharides plaster”). Equally differentiated were the pharmaceutical forms used, ranging from melites, emulsions, plasters, ointments, and *in natura*. The methods of preparation and administration of formulations in monasteries during the nineteenth century continue to be reported in current studies on animals used in local medical systems in Brazil (Alves & Rosa 2007a, b, 2010, Alves et al. 2007).

“Egg yolks” (Table II), which constitute the part of the body secreted in the ovary and completed in the oviduct of female domestic chickens (*Gallus gallus domesticus* (Temminck 1758)) (Gomes 1876), served as an emulsion of resinous and oily substances (Chernoviz 1908).

“Cantharides plaster”, also called “vesicatory plaster” (Table II) is obtained by mixing and heating lard, yellow wax, laurel and powdered cantharides (*Meloe vesicatorius* (Linnaeus 1758)) in water (Gomes 1876). In addition to being used for cases of pneumonia, inflammation and rheumatism, as indicated by the manuscripts of the monasteries of Rio de Janeiro and Olinda (Table II), it was also indicated for sciatica pain, and for rashes, nervous hiccups, paralysis and hydropsy (Chernoviz 1908).

“Norbana honey”, “bee honey” or just “honey” (Table II), constitutes the saccharin portion of the combs built by the bee *Apis mellifera* (Linnaeus 1758), and is yellow in color and of a semi-fluid consistency (Gomes 1876). In addition to being considered a healthy food at the time, as it is now, it formed the basis of pharmaceutical preparations known as melites, which possess the properties of laxative, emollient, diluent, relaxant, and agent of preservation. Melites are internally indicated for bronchitis and for topical use against cracks of the skin (Chernoviz 1908). Honey of *Apis mellifera* (Linnaeus 1758) can be

administered pure or combined with plants in different regions of Brazil (Alves et al. 2007).

In addition to being indicated for pleurisy, “leeches” (*Hirudo medicinalis* (Linnaeus 1758)) (Table II) were also indicated for situations of cerebral congestion and ophthalmia (Chernoviz 1908).

The “deer scraping” (Table II) are from the horns or antlers that are located on the forehead of *Cervus elaphus* (Linnaeus 1758), and could be found being sold in whole or in scrapings; the scrapings were gray-white in color and contained a gelatin used in cooking for treatment of diarrhea (Chernoviz 1908).

“Milk” (Table II), the liquid secreted by the mammary glands of female *Bos taurus* (Linnaeus 1758), was not to be skimmed (Gomes 1876), and used for chest diseases, organic diseases of the stomach and intestine, cutaneous conditions, joint rheumatism and rickets (Chernoviz 1908). Fat and oils mammals as *Sus domesticus* (Erxleben 1777) and *Bos taurus* (Linnaeus 1758) are cooked and used for massages, gargling and teas (Alves et al. 2007, 2016b).

“Pork lard” (Table II), is the adipose connective tissue of the abdominal cavity of pigs (*Sus domesticus* (Erxleben 1777)), and was to be disregarded for medicinal use if it were not fresh (Gomes 1876). Prepared lard, that is, cooked and strained, was to be stored in an airy place in non-porous, low capacity vessels (Gomes 1876). Pork lard constituted the vehicle of several active principles, and served as the base of ointments (Chernoviz 1908). In current researches, such as the one performed by Alves et al. (2012), among the animal parts with medicinal applications registered by the authors, there is a predominance in the use of lard in local pharmacopoeias. This zootherapeutic practice, perpetuated over the centuries, can be justified by the higher concentration of this product in vertebrates and also by the fact that

the lard has property that assists in the exercise of massage and physical consistency similar to that of pharmaceutical ointments (Alves et al. 2008a).

Considered antispasmodic, “castoreo” or “castorio” (Table II) are the follicles and respective secretions that accompany the genital organs of *Castor fiber* (Linnaeus 1758). They are pyriform sacs rich in a dark yellow-colored substance, which has a strong odor and a bitter and pungent taste (Gomes 1876, Chernoviz 1908).

“Animal charcoal” (Table II), also called “bone charcoal” or “calcareous charcoal”, was a mixture of charcoal obtained by the calcination of the bones of animals in an enclosed vessel (Gomes 1876). Its use in pharmacies was tied to its property of purifying liquids and removing the color from of some substances (Chernoviz 1908).

CONCLUSIONS

The present work was able to retrieve information on the species of animals used in medicine performed in the nineteenth century in Benedictine monasteries, confirming the importance of these zootherapeutic resources in the communities of Rio de Janeiro and Olinda. The list of documented animals used for therapeutic proposes is composed by species that are commonly applied in the European medicine practice over centuries. This reveals that the medicine that was practiced in the Benedictine monasteries during that time was strongly influenced by the concepts and practices imported from Europe, including the animal based therapy. Also, those past information shows that still today this European mode of viewing the human body, its health and its diseases is the one that is in the basis of nowadays therapeutic knowledge and practice.

As this knowledge about the use of zootherapeutic remedies is confirmed over centuries it is essential for a better scientific understanding of the history of medicine, to know how different cultures have contributed to the actual therapeutic practice. In this way it is possible to trace a history and perpetuation of the use of animal species for therapeutic purposes in Brazil, demonstrating the persistence of their use over the past few centuries. Research of this nature is still scarce and studies with different approaches are needed to add to the results presented here. It is suggested, therefore, that future studies be carried out using different sources of information that have been safeguarded until the present time. It is also suggested that efforts be made to educate present-day society about the historical perspective of the use of animals, thus broadening the discussion about their medicinal use, while reflecting, in parallel, on the impacts caused by the poor hunting practices used to obtain these resources from varied phytogeographical domains.

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MFTM collected, analyzed and interpreted the data, and also has written the manuscript. RRNA performed the interpretations and was a major contributor in reviewing and writing the manuscript. All authors read and approved the final manuscript.

