



Is there nothing new under the sun? The influence of herbals and pharmacopoeias on ethnobotanical traditions in Albacete (Spain)



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ABSTRACT

Ethnopharmacological relevance: This paper has two overarching aims: (1) presenting the results of studying the Albacete tariff of medicines of 1526 and (2) broadly analyzing the origin and influences of medicinal traditional knowledge in the region of Albacete, Spain. We use historical and modern literature that may have influenced this knowledge. Our primary goal was to determine the ingredients used in the pharmacy in the 16th century CE in Albacete through the analysis of the tariff, and our secondary goal was to investigate until when ingredients and uses present in pharmacy and herbals persisted in later periods.

Methods: The identity of medicines and ingredients was determined by analyzing contemporary pharmacopoeias and classical pharmaceutical references. We analyzed further 21 sources (manuscripts, herbals, and books of medicines, pharmacopoeias, pharmacy inventories, and modern ethnobotanical records) for the presence/absence of ingredients and complex formulations of the tariff. Using factorial and cluster analysis and Bayesian inference applied to evolution models (reversible-jump Markov chain Monte Carlo), we compared textual sources. Finally, we analyzed the medicinal uses of the top 10 species in terms of frequency of citation to assess the dependence of modern ethnobotanical records on Renaissance pharmacy and herbals, and, ultimately, on Dioscorides.

Results: In Albacete 1526, we determined 101 medicines (29 simple drugs and 72 compound medicines) comprising 187 ingredients (85% botanical, 7.5% mineral, and 7.5% zoological substances). All composed medicines appear standardized in the pharmacopoeias, notably in the pharmacopoeia of Florence from 1498. However, most were no longer in use by 1750 in the pharmacy, and were completely absent in popular herbal medicine in Albacete 1995 as well as in Alta Valle del Reno (Italy) in 2014. Among the ingredients present in different formulation are the flowers of *Rosa gallica*, honey (*Apis mellifera*), the roots of *Nardostachys jatamansi*, and *Convolvulus scammonia*, pistils of *Crocus sativus*, grapes and raisins (*Vitis vinifera*), rhizomes of *Zingiber officinale*, bark of *Cinnamomum verum*, leaves and fruits of *Olea europaea*, mastic generally of *Pistacia lentiscus*, and wood of *Santalum album*. The statistical analysis of sources produces four well-separated clusters (Renaissance Herbals and Pharmacopoeias, Ethnobotany and Folk Medicine, Old phytotherapy, and Modern phytotherapy including Naturopathy) confirming our a priori classification. The clade of Renaissance Herbals and Pharmacopoeias appears separated from the rest in 97% of bootstrapped trees.

Abbreviations: A1526, tariff of medicines of the city of Albacete of 1526; AHPAB, Provincial Archive of Albacete (Spain); CE, Christian era; DEP, Dependent; EMA, European Medicines Agency; ETHN, Medical Ethnobotany; GTR, General time reversible nucleotide substitution model; HMPC, European Medicines Agency's Committee on Herbal Medicinal Products; ICD-10, International Statistical Classification of diseases and Related Health Problems 10th Revision; MAAC, Marginal groups and alternative or complementary systems of medicine; PCoA, Principal coordinates analysis; PHCL, Pharmaceutical classical; PHMO, Pharmaceutical modern; rjMCMC, Reversible-jump Markov chain Monte Carlo; SOU, Source; TPL, The Plant List

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Bayesian inference produces a tree determined by an initial set of two well-distinct core groups of ingredients: 64, locally used in Mediterranean Europe during centuries; and 45, imported, used in pharmacy during centuries. Complexity reached its maximum in Albacete 1526 and contemporary pharmacopoeias, gradually decreasing over time. The analysis of medicinal uses of the top 10 ingredients showed low coincidence between Dioscorides and different Renaissance herbals or medical treatises and of all of them with ethnobotany in Albacete.

Conclusions: Regarding our question: is there something new under the sun? In some aspects, the answer is “No”. The contrast between expensive drugs, highly valued medicines, and unappreciated local wild medicinal plants persists since the Salerno’s school of medicine. Old medicine in Mediterranean Europe, as reflected by Albacete 1526 tariff of medicines, involved strict formulations and preferences for certain ingredients despite other ingredients locally available but underappreciated. This confirms the fact that any system of medicine does not get to use all available resources. Ethnobiological records of materia medica, in rural areas of Albacete, describe systems with a high degree of stability and resilience, where the use of local resources, largely wild but also cultivated, is predominant in contrast with the weight of imported exotic products in pharmacy.

1. Introduction

All ethnopharmacological research refers to one, several, or numerous plant or animal species, fungi, algae, microorganisms, minerals, or rocks that unambiguously are subject of ethnopharmacological uses. Recently, Leonti et al. (2010) questioned that to what extent studies on contemporary medicinal plant use in Europe over the last two to three decades contain autochthonous traditional knowledge. They estimate that for Campania (Italy), Matthioli’s effect is not negligible and lies between 14% and 25% with a high probability.

Leonti (2011) denounced, “apart from empirically learned medicinal and pharmacological properties, the selection of medicinal plants is dependent on cognitive features, ecological factors and cultural history”.

At the beginning of the 16th century CE, the repertory of single and compound medicines officially used by physicians in Western Europe was still strongly influenced by the medical school of Salerno (south of Naples, Italy) and medieval works of Mesue, Nicolao Salernitano, and al-Razi (Anonymous, 1513, 1519, De Laredo 1534, Razi, 1529, Sylvio, 1550). Extremely complex herbal formulations involving dozens of expensive substances were usual. Their complexity and frequent adulteration made necessary the definition of standards for crude drugs, processing, and formulations. The pharmacopoeias codified these standards.

The first official pharmacopoeia, issued in Florence (Tuscany in Italy) in 1498 under the name of “*Nuovo Ricettario*”, intended to secure uniformity in the kind, quality, composition, and strength of remedies approved to prevent fraudulent or inappropriate substitutions and manipulations (Fittipaldi, 2011; I-Dodici-Reformatori, 1567, 1574; Urdang, 1951). The kingdoms of Aragon and Valencia in Spain soon adopted these standards.

In this context, it prevailed among physicians a preference for expensive complex medicines prepared with exotic products and an underestimation of cheaper local wild medicinal plants. One of the aphorisms of the school of Salerno outlines this: *Res dare pro rebus, pro verbis verba solemus. Pro vanis verbis, montanis utimur herbis. Pro caris rebus, pigmentis et speciebus* that could be translated as “things pay for things, words pay for words in kind. For vain words give the cheapest herbs you find (the herbs in the mountains). For high fees give such precious drugs, as are pigments and spices” (Meaux-Saint-Marc, 1861; Odrónaux, 1870).

However, since early 16th century CE, the works of Ruel (Ruellio) (1516) and Fuchs (1542) critically revised the European *materia medica* followed by the numerous editions of Matthioli (1544, 1549, 1563, 1565, 1573) in Italian or in Latin (id. 1565), and the Spanish versions of Jarava (1557) and Laguna (1555, 1566, 1570) (Fig. 1). Overall, these works revalorized numerous local wild plants, always referring to the authority of the encyclopedic work of Dioscorides, compiled in the first century CE. In addition, these works gave a new approach to the use of medicinal plants, focusing on European species,

questioning complex mixtures that included many Asian species (due to the frequency of fraudulent substitutions), and opening the door to the introduction of American species.

Leonti et al. (2009) mention that Dioscorides’ *De Materia Medica* had few or no competition for most of the time, and therefore, this book was able to homogenize knowledge about medicinal plants all over Europe and the Mediterranean.

Recently, one of the present authors (Candelaria Moreno) recovered from the Provincial Archives of Albacete (Spain) several manuscripts dated from the 16th century CE onward pertaining to the area of pharmacy. These manuscripts were a promising source of information,



Fig. 1. Dioscorides’ *Materia Medica* edited and commented by Laguna, published in Anvers 1555 CE (National Library of Spain).

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