

Review

The Most Relevant Socio-Economic Aspects of Medicinal and Aromatic Plants through a Literature Review

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Abstract: Around the world, medicinal and aromatic plants (MAPs) play a fundamental role in the economic, social, cultural, and ecological ambits of local communities. Today, the most important uses of MAPs are their applications in the pharmaceutical, perfume, cosmetics, toothpaste, soap, beverage, and food industries. At the same time, the expression MAPs is often used with a plurality of meanings that are not always clear and well-defined. Thus, the paper aims to answer two research questions: (1) to understand how the expression MAPs has been meant over time by scholars, and (2) to realize the weight that socio-economic research regarding MAPs has assumed in this context. To these ends, a literature review was conducted using the scientific database Scopus. The results highlight that researchers started talking explicitly about MAPs in the 1950s, and the geographical focus of the literature on this theme is in India, followed by China. Researchers have published studies concerning the agronomic aspects, cultivation, characterization, and germination techniques of MAPs, but the most cited articles concern the health and beneficial properties of their essential oils. At the same time, nobody has ever wondered what MAPs are, and since 1977, the World Health Organization definition has been taken for granted, and any species with medicinal or aromatic functions is considered to be a MAP. Regarding the socio-economic weight of the research conducted on MAPs, they represent only 1% of the total academic publications, but from them, it has emerged that, especially in rural areas, MAPs depict important sources of income for several local communities. At the same time, there is a need to increase the estimation of the ecosystem services that MAPs offer, the analyses of consumer preferences in the search for new business opportunities, and the environmental impact assessment of the entire supply chain.

Keywords: MAPs; botanicals; economic aspects; medicinal and aromatic proprieties; sustainability; bibliometric and systematic analysis



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1. Introduction

Worldwide plants have always represented fundamental sources of food and medicines, especially for local populations [1]. The oldest available medicinal records date back to 5000–3000 B.C., written by the Sumerians, and show that humans understood disease and that the use of medicinal plants could help to maintain and restore good health [2]. So, herbal medicine is one of the oldest forms of healthcare known to mankind, and many medicines commonly used today are of herbal origin. Azaizeh et al. [3] classified herbal medicines into four typologies: traditional Chinese herbalism, which is part of traditional oriental medicine; Ayurvedic herbalism, which is derived from Ayurveda, the traditional Hindu system of medicine; Western herbalism; and Traditional Arabic and Islamic Medicine.

In addition to their medicinal function, in many countries, there is a strong link between plants and food uses. Stefanaki and van Andel [4] documented the variety

of culinary aromatic herb species used in the Mediterranean region, affirming that the most-used aromatic herbs in Mediterranean cookery are parsley, mint, laurel, oregano, thyme, rosemary, coriander, dill, basil, tarragon, chives, sage, marjoram, fennel, and chervil. Moreover, there are different countries in which there is a clear linkage between plant resources and religion, culture, tradition, scriptures, and lifestyle [5,6]. In some contexts, geographic, climatic, and topographic characteristics make up territories rich in diverse flora and endemic plants, including a large variety of those with important aromatic and medicinal properties [7]. Thus, in one form or another, there are several ways people benefit from plants, including medicine, nutrition, personal hygiene, body care, incense, and ritual healing [8]. In particular, the popularity of using these plants [9] and the growing demand in the markets of high-income countries [10], in which the functions of particular plants are historically linked to body care, hygiene, and aromas for perfumes, but also food or beverage uses, have been rediscovered and are causing their production to increase even more, also through their cultivation. So, today, the most important uses of medicinal and aromatic plants seem to be applications in other non-traditional sectors such as the perfume, cosmetics, toothpaste, soap, beverage, and food industries [11]. Alongside the latter, also in agriculture, researchers are looking for active ingredients of natural origin for weed and disease control [12] or for use as natural colorants [13]. These trends have been accentuated—even in European countries where their use is less widespread—by the ecological transition, one of the objectives of the Green Deal.

Starting from the different functions that certain plants perform and the valuable and important roles that they play in the economic, social, cultural, and ecological ambits of local communities around the world [8], the “category” of medicinal and aromatic plants (MAPs) was born. In particular, the FAO’s Medicinal and Aromatic Plant Working Group defines MAPs as “botanicals that provide people with medicines to prevent disease, maintain health or cure ailments” [8]. Indeed, MAPs play an essential role in global health systems, since more than 80% of the population use natural products in their primary healthcare. At the same time, different plants are used both in animal healthcare and in their production and reproduction, since they act as feed additives, growth promoters, immune boosters, reproduction enhancers, and also help in the reduction in methane and ammonia emissions [14–16]. In addition, over time, the antimicrobial, anti-inflammatory, antiseptic, draining, anti-neuralgic, digestive, and calming properties of essential oils have been extensively studied [17–24], and aromatherapy has taken on an important role in research [25–30]. Consequently, the global use of herbal medicines has exponentially increased, as well as many MAP products being introduced into the market, with many cultivation practices being applied to produce high-quality and standardized plant materials [31].

McKenna et al. [32], unlike FAO, distinguished medicinal from aromatic plants, making an interpretation of the multiple definitions of MAPs offered in academic research, industry associations, and regulatory bodies. In particular, the authors identified as “medicinal” those plants with botanical components proven or believed to be beneficial to health, often called botanicals or herbal drugs, while “aromatic” plants (primarily used in cosmetics, as spices, as flavoring, and in aromatherapy) were those which produce or exude volatile compounds known as essential oils. At the same time, McKenna et al. [32] stated that, in sectoral analyses and trade studies, the terms medicinal and aromatic are often used as synonymous. Thus, in our opinion, the expression MAPs is often used with a plurality of meanings that are not always clear and well defined.

Over time, there have been several reviews that have studied MAPs, most of which focused on single species and their ethnobotanical uses, phytochemical content, pharmacological activities, cultivation, and propagation [10,33–42]. Contrary to that, the present review wants to give a comprehensive overview of the academic studies on MAPs to discover how the expression MAPs has been understood by scholars over time and, more specifically, to realize the weight that socio-economic research regarding MAPs has assumed in this context.

2. Materials and Methods

2.1. The Review Process

According to the aim of the paper, a systematic and bibliometric review of the literature on the expression Medicinal and Aromatic Plants was conducted to outline the geographical focus of the literature; how the academic world approaches the study of MAPs; and what the current and future research lines are. As stated by Denyer and Tranfield [43] and Merli et al. [44], this type of analysis allows for providing a transparent and reproducible process of selecting, analyzing, and reporting on the previously conducted research on a specific topic. As in other studies [43–46], the review process followed some steps: research questions definition; documents collection; quali–quantitative analysis; documents selection; qualitative analysis and grouping; and documents evaluation (Figure 1).

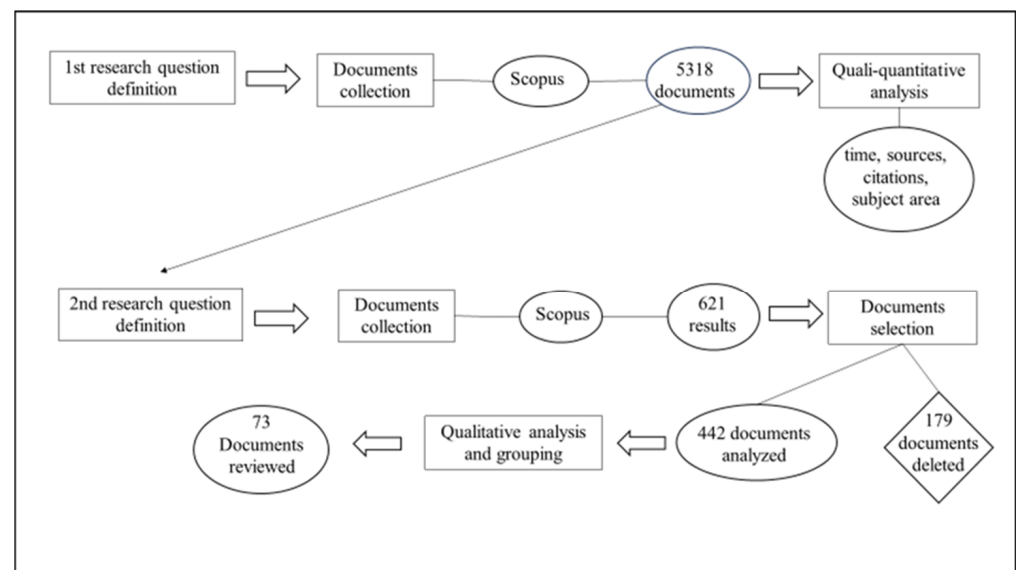


Figure 1. Schematization of the review process.

The scientific database Scopus was used for the documents collection. This database was chosen because it is one of the most comprehensive scientific databases [47,48] and facilitates the implementation of reliable bibliometric studies [49]. To collect all MAPs studies across the scientific community, in the first step, the generic expression “Medicinal and Aromatic Plants” was used and the research criterion “Title, Author, Keywords, Abstract” was employed. All types of documents were used as units of analysis (article, review, book chapter, conference paper, book, short survey, editorial, note, letter, erratum, data paper, retracted, and conference review) and in all languages. No chronological restriction was employed and the query on the database was performed on 5 April 2023. From 1947, Scopus returned a total of 5318 documents. Thus, on one hand, a quantitative analysis of the distribution and evolution of manuscripts on MAPs over time, sources, number of citations, and thematic areas was performed; on the other, a qualitative analysis was made of the abstracts to understand when and in what terms the scholars talked about MAPs.

Then, to identify a representative sample of relevant papers from an economic point of view, the subject area “Social Science” and the strings “Medicinal and aromatic plants” + “economy”, “Medicinal and aromatic plants” + “market”, “Medicinal and aromatic plants” + “business”, and “Medicinal and aromatic plants” + “trade” were used with the research criterion “Title, Author, Keywords, Abstract”, as performed previously. In this case, Scopus returned a total of 621 results, of which, after removing duplicates, 442 documents were considered. The latter, through a qualitative analysis, were analyzed in detail and grouped into research areas.

Finally, we further skimmed the results of this research by considering only the papers which actually make significant contributions to the study of the socio-economic aspects of MAPs, eliminating those containing the search terms economy, market, business, and trade in a vague way. Thus, a sample of 73 documents was thoroughly reviewed, as reported in Figure 1.

2.2. The Science Mapping

Science mapping is one of the two categories of techniques for a bibliometric analysis that examines the relationships between research constituents [50], and, according to the aims of the present review, the co-word analysis was used to explore the relationships among topics by focusing on the written content of the publications. VOSviewer software (version 1.6.20) was used to extract and analyze the semantic contents of the titles, abstracts, and keywords of the publications, relating them to the citation count data and generating network maps to visualize the results [51]. As in Muley and Medithi [52], default parameters were used for the analyses and creation of the network maps. The font size of the words in the network map indicates their frequency of occurrence. If two words co-occurred in the evaluated publications more frequently, they are nearer to each other. Only words that had a minimum number of occurrences of 10 (for the 5318 documents), 5 (for the 442 economic papers), and 2 (for the selected 73 economic papers) were analyzed and visualized. Two unit of analysis (“all keywords” and “author keywords”) were used to create the maps and the full counting method was used, meaning that each co-occurrence link carried the same weight. The default “association strength method” was used for the normalization of the co-occurrence matrix with default values of attraction and repulsion.

As specified in Donthu et al. [50], in the network visualization maps created using the VOSviewer software, each node in a network represents a keyword, wherein: (1) the size of the node indicates the occurrence of the keyword (i.e., the number of times that the keyword occurs), (2) the link between the nodes represents the co-occurrence between keywords (i.e., keywords that co-occur or occur together), (3) the thickness of the link signals the occurrence of co-occurrences between keywords (i.e., the number of times that the keywords co-occur or occur together), (4) the bigger the node, the greater the occurrence of the keyword, and (5) the thicker the link between nodes, the greater the occurrence of the co-occurrences between keywords. Each color represents a thematic cluster.

3. Results

3.1. The Quali–Quantitative Analysis of the Literature on MAPs

The first article on MAPs dates back to 1947 and it was a study on perfume and medicinal materials from overseas France [53], in which the terms “aromatic” and “medicinal” were found among the keywords as adjectives of the term substances. On the contrary, the first papers explicitly referring to the expression “medicinal and aromatic plants” date back to the 1950s (Table 1). Furthermore, the definition of “medicinal plant”, given by the World Health Organization (WHO) in 1977, is reported only in 2014 by Chauhan et al. [54].

Table 1. First papers explicitly referring to the expression MAPs.

Document Title	Year	Reference
(1) Planting of aromatic and medicinal plants in 1950	1950	[55]
(2) Cultivation of medicinal and aromatic plants in 1950, in Czechoslovakia	1950	[56]
(3) Medicinal and aromatic plants from the pharmaceutic and industrial viewpoint	1951	[57]
(4) History of medicinal and aromatic plant culture with particular consideration of development in Germany	1951	[58]
(5) Value of variety selection in cultivation of medicinal and aromatic plants	1952	[59]

The number of publications referring to MAPs started to grow from 1998 ($n = 34$). A steady increase in research articles has been observed since then, with peaks occurring in 2002 ($n = 72$), 2011 ($n = 214$), 2016 ($n = 309$), and 2022 ($n = 520$) (Figure 2), according to the remarkable increase in the global demand for spices, herbs, and MAPs and the growing interest of the healthcare sector in the therapeutic properties of the phytochemicals associated with indigenous medicinal plants [60]. In addition, the highest number of publications was recorded in the two-year period of 2020–2022 ($n = 1463$), representing 28% of the total publications found on Scopus.

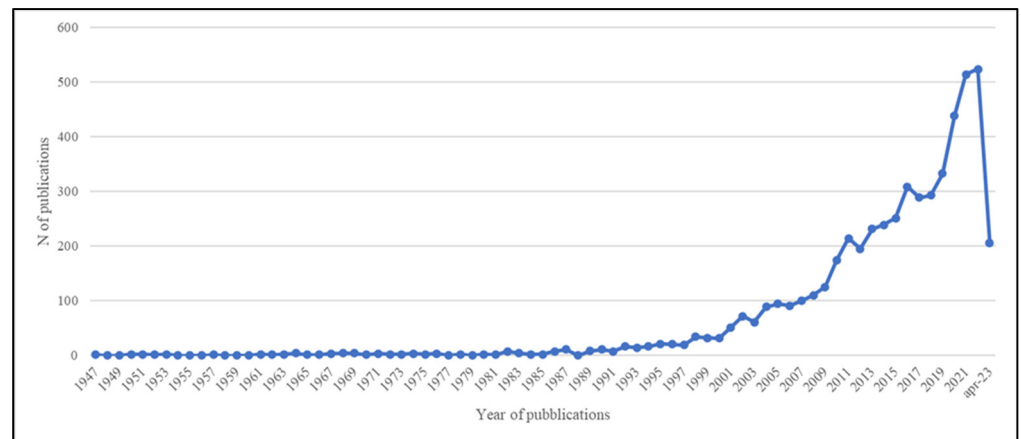


Figure 2. Trends of publications on MAPs.

The distribution of all publications by countries shows that 17% of them were from India (1129), 6% were from China (394) and 15% were from the United States (351), Brazil (315), and Iran (313), as reported in Figure 3.

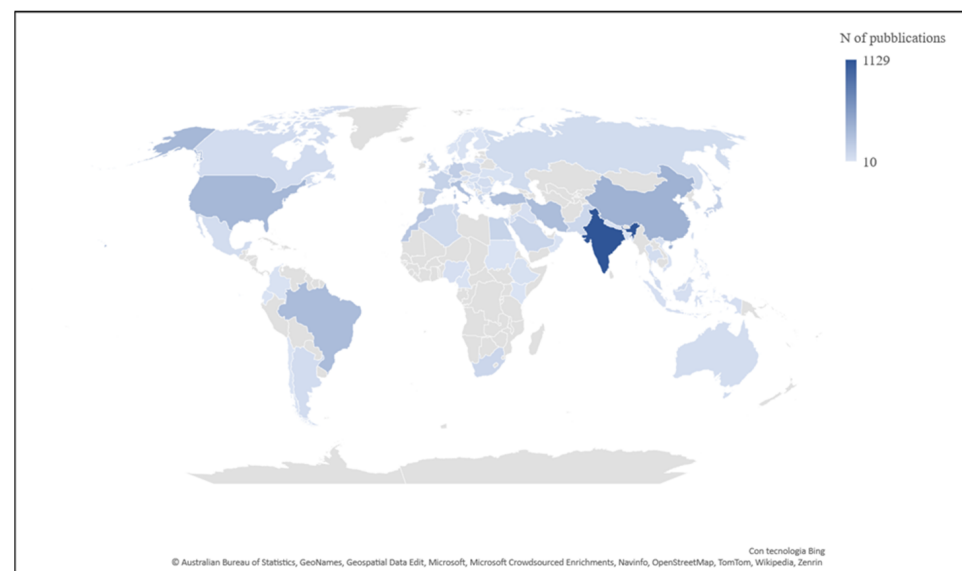


Figure 3. Distribution of the total publications ($n = 5318$) by countries.

Most of the published manuscripts were original articles (3988; 75%), followed by review papers (608; 11%), book chapters (322; 6%), and conference papers (283; 5%). About 90% of the manuscripts (4683) were published in journals and the top ten source types are listed in Table 2. The latter shows that the main research areas can be assigned to three main groups: one addressing agronomic and cultivation aspects and techniques;

one characterized by chemical, pharmacological, and pharmaceutical items; and another one of a more environmental nature.

Table 2. The top ten contributor sources.

Source Title	N of Publications	% of Publications
Acta Horticulturae	201	4%
Industrial Crops and Products	149	3%
Journal Of Ethnopharmacology	95	2%
Molecules	75	1%
Journal Of Essential Oil-Bearing Plants	63	1%
Journal Of Natural Products	58	1%
Plants	48	1%
Zeitschrift Fur Arznei Und Gewurzpflanzen	48	1%
Journal of Applied Research on Medicinal and Aromatic Plants	45	1%
Natural Product Communications	45	1%
Total of the top ten contributor sources	827	4%
N of manuscripts published in journals	4683	88%
N of documents related to MAPs	5318	100%

Figure 4 shows that, considering the five sources with the highest share of publications, *Acta Horticulturae* (the book series with the highest number of publications in absolute) maintained leadership until 2012, while *Industrial Crops and Products* has incremented its contribution to the MAPs topic since 2013. The *Journal of Ethnopharmacology* published its first article back in 1982, but has contributed significantly to the research topic in the last years. *Molecules*, present since 2011, contributed significantly only starting in 2020, confirming the growing interest in MAPs also from other sectors (chemistry). On the contrary, the scientific contribution of the *Journal of Essential Oil-Bearing Plants* was concentrated from 2014 to 2021.

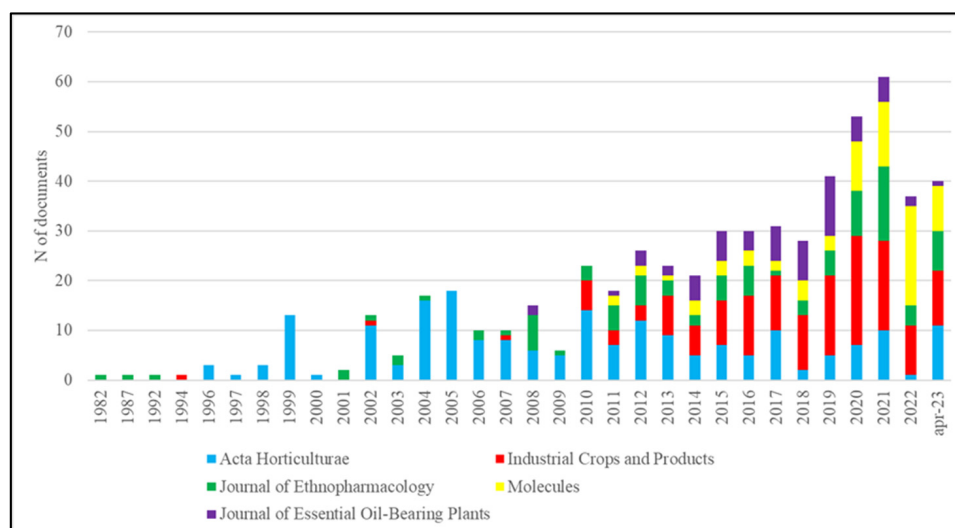


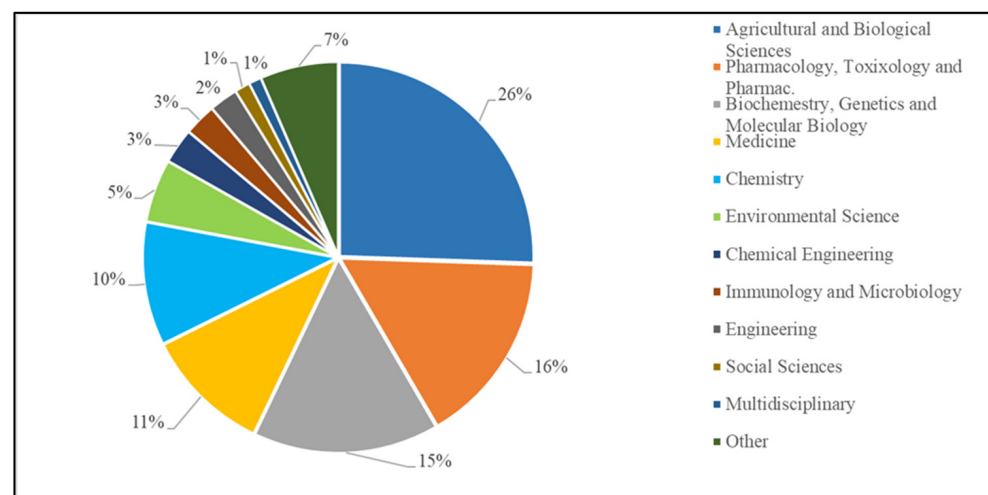
Figure 4. Time trend of the five sources with the highest share of publications.

Contrary to the above, the top ten cited articles dealt with essential oils' properties, MAPs' radical scavenging activity, and the antitumor activities of flavonoids, curcumin, and clove (Table 3). Therefore, on the one hand, researchers published studies concerning the agronomic aspects, cultivation, analysis, and germination techniques of MAPs, and on the other hand, the most cited articles concerned the health and beneficial properties of essential oils.

Table 3. The top ten cited articles.

Manuscripts Title	N of Citations
Biological effects of essential oils—A review [61]	5198
Screening of radical scavenging activity of some medicinal and aromatic plant extracts [62]	1515
The antitumor activities of flavonoids [63]	590
The targets of curcumin [64]	586
Curcumin, demethoxycurcumin, bisdemethoxycurcumin, tetrahydrocurcumin and turmerones differentially regulate anti-inflammatory and anti-proliferative responses through a ROS-independent mechanism [65]	536
Solvent-free microwave extraction of essential oil from aromatic herbs: Comparison with conventional hydro-distillation [66]	517
Antimicrobial properties of plant essential oils against human pathogens and their mode of action: An updated review [67]	490
Correlation between chemical composition and antibacterial activity of essential oils of some aromatic medicinal plants growing in the Democratic Republic of Congo [68]	468
Composition and antimicrobial activity of essential oils from aromatic plants used in Brazil [69]	419
Clove (<i>Syzygium aromaticum</i>): A precious spice [70]	399

Referring to the subject areas, those most represented were Agricultural and Biological Sciences (2497); Pharmacology, Toxicology, and Pharmaceutics (1571); Biochemistry, Genetics, and Molecular Biology (1513); Medicine (1035); and Chemistry (1003), representing together 78% of the total (Figure 5).

**Figure 5.** Distribution of documents by subject area.

From the co-word analysis of all the keywords of the 5318 collected documents, the “complexity” of the concept of MAPs emerged. Indeed, the descriptive analysis carried out through the co-occurrence networks showed that the semantic cores of this complexity were the biochemical and analytical aspects, although the agronomic and genetic aspects, as well as the ethnobotanical ones, were present with a certain importance. Furthermore, the top five most recurring words were: article (occurrences: 1576), nonhuman (occurrences: 1492), medicinal plant (occurrences: 1376), unclassified drug (occurrences: 11,111), and essential oil (occurrences: 1091) (Figure 6).

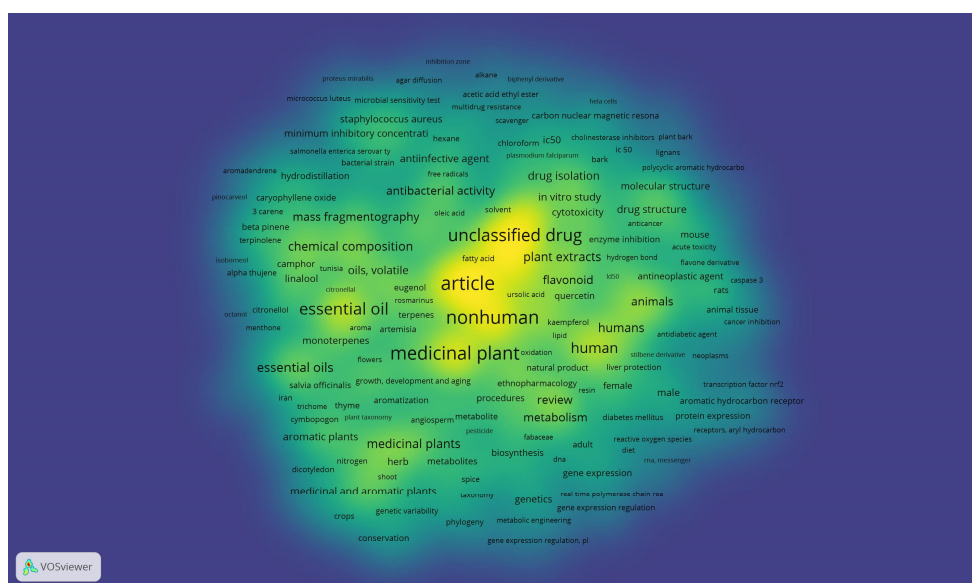


Figure 6. Density map visualizing words from titles, abstracts, and keywords of the 5318 documents.

At the same time, to unravel the complexity of the MAPs concept, the unit of analysis “author keywords” was used and the corresponding network visualization map (Figure 7) showed that the most recurring keywords were essential oil/essential oils (534 and 249 occurrences, respectively); medicinal plants (312 occurrences); medicinal and aromatic plants (199 occurrences); and antioxidant activity/antioxidant (158 and 149 occurrences, respectively).

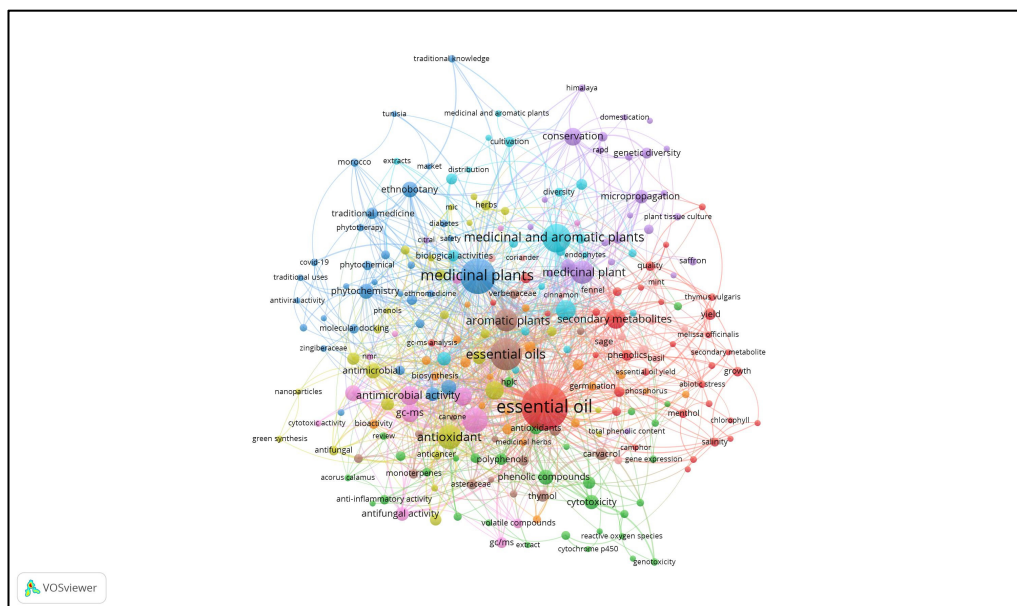


Figure 7. Co-word (keywords co-occurrence) network visualization map.

The 237 keywords that had a minimum of 10 occurrences in the “author keywords” of the 5318 analyzed documents were divided into 10 clusters, easily visually distinguishable because they were marked with different colors, but difficult to interpret because they contained words that were very semantically different from each other, confirming, once again, the complexity of this concept. Moreover, the color of a keyword circle is deliberated by the cluster to which it belongs.

From the manual analysis of the extrapolated Scopus database, the expression “medicinal and aromatic plants” occurred in the titles of 692 documents, especially in those published in the last decade (representing 64% of the total), and in the keywords of 1258 manuscripts. At the same time, a focus on this expression with VOSviewer software (Figure 8) allowed us to understand the co-occurrences with the expression “medicinal and aromatic plants” and the research areas to which it was most closely linked. Thus, Figure 8 shows that the expression MAPs was strongly linked, above all, to the extraction/production of essential oils, then to secondary metabolites, their properties (above all, antioxidant and antifungal activity), and their compounds (as polyphenols). Not marginal areas of research included traditional medicine and ethnobotany, conservation, cultivation, breeding, sustainability, climate change, and markets.

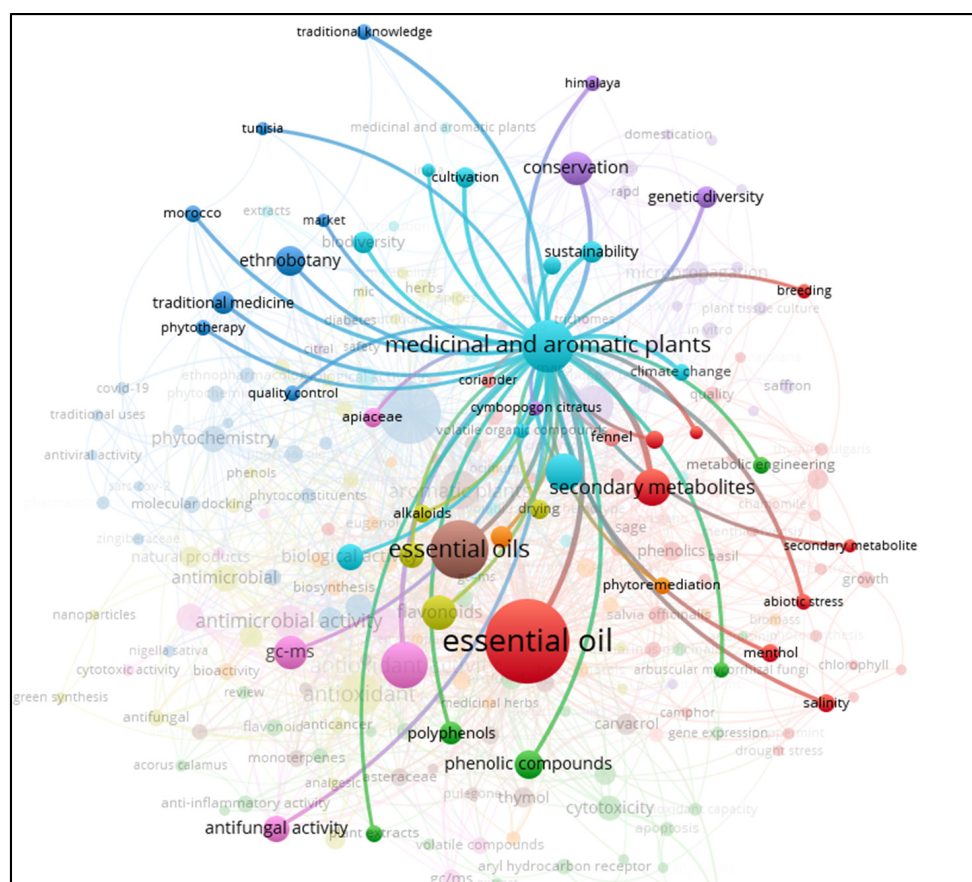


Figure 8. Co-word (author keywords co-occurrence) network visualization map: focus on the keyword “medicinal and aromatic plants”.

3.2. The Analysis of the Socio-Economic Literature on MAPs

To understand the economic importance of MAPs over time among scientists, a focus was conducted on manuscripts belonging to the subject area “Social Science” and on those documents with a certain correlation with the terms economy, trade, markets, and business to avoid omitting any assigned to some other subject area, as specified in the materials and methods. This screening revealed that socio-economic aspects have a limited weight in the current meaning of MAPs. In fact, only 442 articles (just over 8% of the total) mentioned these aspects, but in any case, these were references of little relevance compared to the topics addressed and the contents produced.

The analysis of the various source types shows that these 442 documents have been published in as many as 288 different sources and that the top five with the highest number of manuscripts are *Acta Horticulturae* ($n = 31$); *Foods* ($n = 13$); *Plant Cell, Tissue and Organ*

The first economic paper dates back to 1957 (Figure 11) and concerned the investigation of the economic importance of the MAPs of the sands of the Danube in Yugoslavia [71]. Then, there was a lack of papers of this type until 1992, when Verlet [72] published an overview of the French situation at the beginning of the twentieth century, where he reported that there was widespread harvesting of herbs in many regions of France, and this period also represented the apogee of the French perfume industry.

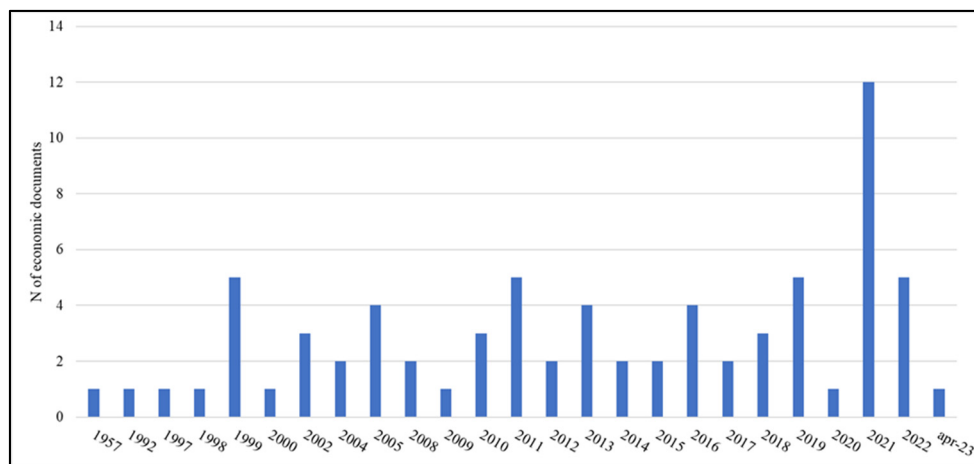


Figure 11. Time trend of the economic results.

In the 1990s, only eight papers were published, including Nepal's politics, laws, and trade [73,74] and data on the turnover of MAPs and essential oils in the most important markets places of Santo Domingo [75]. In this period, the first works began to take into account the increase in interest in MAPs by making considerations about supply, safety, and sustainability in the USA marketplace as result of the general increase in the interest and use of MAPs as natural products for food and pharmaceutical applications [76], and the biological and economical aspects of the utilization and exploitation of wild growing medicinal plants in middle and south European regions [77], while Hüsni Can Başer [78] focused on the steady upsurge of interest in the industrial utilization of medicinal plant products, as reflected by the growing market worldwide.

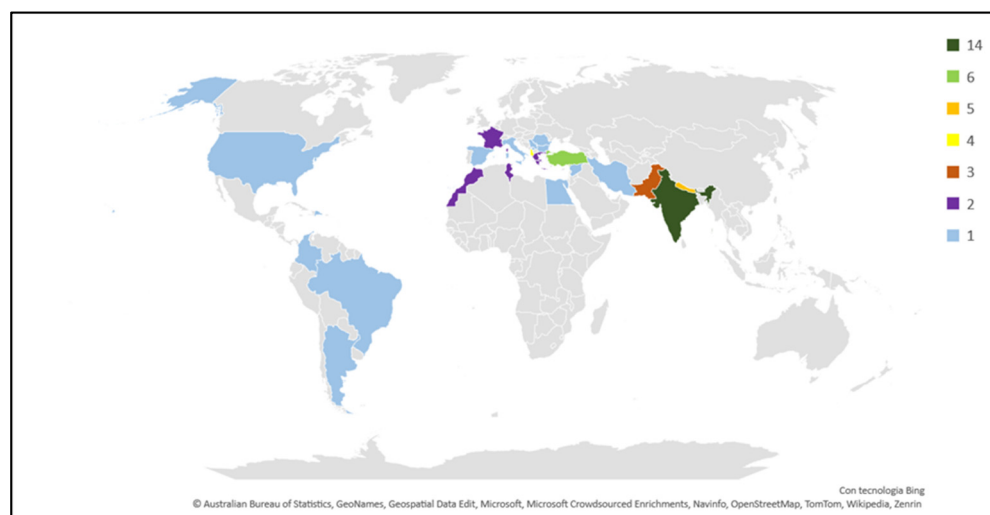
In the first ten years of 2000, thirteen papers on MAPs of economic interest were published, and between 2010 and 2020, this scientific production tripled, above all in India, where MAPs are a source of economy, sustainable livelihood, and employment for many rural communities [79]. In the most recent years (2021–2023), 18 economic papers were published, 12 of which only in 2021 (Figure 6).

To deepen the theme further, four structural dimensions were detected, and, for each of them, some analytical categories were used to systematize the socio-economic documents. The results are reported in Table 5. Referring to the structural dimension "Research methodology/type of research", the economic documents on MAPs were divided into five approaches to research: precisely modeling, case studies, statistical data analysis, review, and survey/interviews. The most employed were survey/interviews (34%) and statistical data analysis (23%).

Economic papers on MAPs were categorized into three levels of analysis: the micro level, which focused on single or a few farms; the meso level, which encompassed research carried out in a nation, a region, or a province; and the macro level, which included studies developed in a general way describing the situation on a global or European level. Table 5 shows that more than half of the papers studied MAPs from an economic point of view with a meso level of analysis (56%), above all, at a national [73,80,81] or regional level [82–84]. By referring to the geographic focus of the study, in almost 90% of cases, the economic papers related to a specific geographical area and were concentrated in India (Figure 12), according to the data of the distribution of total publications shown previously in Figure 3.

Table 5. Structural dimensions and analytical categories.

Structural Dimensions	Analytical Categories	N of Documents
Research methodologies/type of research	Modeling	10
	Case studies	12
	Statistical data analysis	17
	Review	9
	Survey/interviews	25
Level of analysis	Micro	17
	Meso	41
	Macro	15
Geographical focus	Specific geographical area	64
	Not specific	9
Research object	MAPs in general	59
	Specific MAPs	14

**Figure 12.** Distribution of the economic publications ($n = 73$) by countries.

Finally, 80% of the considered economic studies dealt with the MAPs theme by referring to the whole category of medicinal and aromatic plants, while only in 14 cases were specific species studied (Table 5). The medicinal and aromatic species studied over time from an economic point of view are reported in Table 6.

Table 6. MAPs' species studied from an economic point of view.

Common Name	Scientific Name	References
Black rice	<i>Oryza sativa</i> L. indica	[83]
Wild apricot, soapnut,	<i>Prunus davidiana</i> , <i>Sapindus mukorossi</i> ,	[84]
Nepalese pepper	<i>Zanthoxylum armatum</i>	
Chamomile	<i>Matricaria chamomilla</i>	[85,86]
Catnip, stinging nettle, calendula,	<i>Nepeta cataria</i> L., <i>Urtica dioica</i> L., <i>Calendula</i>	[87]
melissa, gray globemallow	<i>officinalis</i> L., <i>Melissa officinalis</i> L., and <i>Sphaeralcea incana</i> Tort.	
Artemisia, Asbos, lavender,	<i>Artemisia afra</i> , <i>Pteronia incana</i> , <i>Lavandula</i>	[88]
rosemary	<i>officinalis</i> , <i>Rosmarinus officinalis</i>	
Coriander	<i>Coriandrum sativum</i>	[89]
Tejpat	<i>Cinnamomum tamala</i> Nees & Eberm	[90]
Callistemon	<i>Callistemon viminalis</i>	[91]
Indian mint	<i>Plectranthus forskohlii</i> Willd	[92]
Oregano	<i>Origanum vulgare</i>	[93]

Table 6. Cont.

Common Name	Scientific Name	References
Menthol mint	<i>Mentha arvensis</i> L.	[94]
Ginger	<i>Zingiber officinale</i> Rose	[95]
Aloe vera	<i>Aloe barbadensis</i> Miller	[96]
Thyme	<i>Origanum Syriacum</i>	[97]

4. Discussions

The study highlights that researchers started explicitly talking about MAPs in the 1950s and the geographical focus of the literature on this theme is in India, followed by China. It can be said that the research interest reflected the worldwide distribution of MAPs. Indeed, according to what was said by Pandey et al. [98], in India, more than 7500 species are used in ethnomedicines, which is half of the country's Indian native plant species, while China has around 6000 species in use that have medicinal properties.

At the same time, although the academic world began talking about MAPs in 1950, it was only in the 1990s that the interest in this topic began to be recognized, which has increased from the 2000s to today. Indeed, since the 2000s, there has been an increase in academic publications about MAPs, and the year with the highest number of results was 2021. As stated by Muley and Medithi [52], this could have been due to the COVID-19 pandemic, when the interest of researchers focused on improving immunity using medicinal and aromatic plants, an interest which was then maintained—at least in Europe—thanks to the Green Deal and the role that MAPs can now have in the search for new natural products that can be used in all sectors to make the European Union more ecological, sustainable, and competitive.

Acta Horticulturae was the source with the highest number of publications in absolute and maintained this leadership until 2012, the year in which Industrial Crops and Products incremented its contribution. Consequently, 2012/2013 can be designated as the year that marks the transition from an entirely agronomic view of MAPs to a more pharmaceutical, chemical, and cosmetic one, even if ethnobotanical aspects always maintain a certain importance over time.

Regarding the socio-economic aspects of the research conducted on MAPs, these represented only 1% of the total academic publications. According to the general trends, they have increased since 2000, 2021 was the year with the highest number of results, and they were concentrated in India. These documents were surveys at a meso level (conducted in a region or country), and were, therefore, carried out in a specific geographical area, which, in most cases, concerned the expression MAPs in general.

The co-occurrences analysis of the keywords performed with VOSviewer software showed the “complexity” of the MAPs concept and indeterminate results, which made it necessary to carry out a deeper, qualitative analysis of the socio-economic literature on MAPs. The latter (reported in Table 4) showed that the highest percentages were recorded for ethnobotany, essential oils, and agricultural aspects (which, together, represented around 35% of socio-economic papers). At the same time, if we observe the most recent data among the various research areas identified, the categories “Sustainable use, conservation, and valorization”, and “Rural economy” seem to be of particular interest, since the papers falling into these areas identified guidelines for the protection and valorization of local resources and rural territories and for the diversification of agriculture. Thus, the most recent issue was the prevention of the extinction of MAPs and their sustainable utilization. To this end, Raina and Gautam [99] claimed the need for collaborative efforts by both government and researchers to restrict their harvest, reintroduce species into their natural habitat, develop in situ and ex situ conservation strategies, and formulate techniques for the scientific harvesting of these species. Karki [100] proposed a series of actions, including raising awareness through formal and informal education means; the development of skill in sustainable harvesting; the integration of agricultural and pastoral livelihoods

with off-farm activities through the value chain development of major niche products that have high-value capturing potential; improvements in degraded pasture and farmlands; conservation through sustainable-use-oriented policy and legal reforms to implement integrated strategies linking the conservation of wild fauna and flora with sustainable pastoral production systems; and the expansion of ecologically sensitive low-input high-return tourism, using pastoralists to provide services, particularly through their indigenous knowledge and improved local production practices.

Some authors [101] have pointed out a new path through certifications, such as Non-Wood Forest Products (NWFP), as a tool to support sustainable value chains and influence customer behavior towards MAPs' consumption and sustainable harvesting, in addition to harvesting limits, legal constraints, and other command-and-control systems usually implemented by governments in different countries to preserve species against overharvesting. In particular, NWFPs have a strong link with sustainable tourism through so-called "territorial marketing", a distinctive feature of a territory used as a brand to create an image to attract tourists to the region [102].

According to the most recent research, the interest in territorial marketing in rural areas is growing, also in reference to MAPs, and involving the local population in the implementation process seems to be essential, as well as stakeholders' participation, in creating an identity and linking the products to the image of the place. Sher and Barkworth [103], in addition to demonstrating the feasibility and financial benefits of cultivating MAPs as a cash crop, identified certain steps that would increase the benefits of MAPs' cultivation in rural areas: specialized education, market infrastructure development, and a small loans program.

With specific reference to the aim of this paper and so to realize how the expression MAPs has been understood by scholars over time, nobody has ever wondered what MAPs are, and the 1977 WHO definition has been taken for granted, with any species with medicinal or aromatic functions being considered to be an MAP. Only recently, Brinckmann et al. [104] developed and applied a method to create a list of MAP species. With all the limitations of the study, the authors [104] found evidence of the commercial cultivation of 3227 taxa, belonging to 235 different plant families. Thus, to date, no researcher has ever made a complete list of species to consider as MAPs, distinguishing them from non-MAPs, but this is, perhaps, almost impossible given the great variety of existing plant species with medicinal and aromatic properties. Over time, the properties of MAPs, their uses, cultivation techniques, geographical distribution, and economic value in the various national and international markets have been extensively studied, but nobody has ever wondered what a MAP is and if a species should be considered as such.

The interest of researchers has always been high, especially in recent years, and touches on different areas, ranging from more traditional to more modern uses, to the beneficial properties of essential oils, to cultivation techniques to improve productivity, and to strategies to diversify production and ensure a fair standard of living for local communities, especially in rural areas. In many countries, MAPs can represent important sources of income, and their economic value is widely recognized worldwide, but the present literature analysis shows that few researchers have approached this topic from an exclusively economic point of view. Thus, in light of the growing interest in MAPs, their nutraceutical value, and their different uses, also taking into account the ecological transition, it is necessary to strengthen the role of socio-economic research in this sector, also looking at sustainability through environmental impact assessment studies.

5. Conclusions

The results of the present systematic and bibliometric literature review highlight the importance of medicinal and aromatic plants over time, although socio-economic studies regarding MAPs were few compared to the total academic publications.

The properties of MAPs, their uses, cultivation techniques, geographical distribution, and economic value in the various national and international markets have been extensively

studied over time, but, at the same time, there is a lack of estimation of the ecosystem services that MAPs offer, analyses of consumer preferences in the search for new business opportunities, and environmental impact assessments of the entire supply chain. This is especially true in the Western academic world, where, among other things, researchers should analyze the regenerative potential of MAPs within mountain and rural areas to diversify agriculture, protect these often marginal and fragile territories, and create new job opportunities to allow farmers in these areas to continue their important function of protecting the territory.

Limitations of the Study

The results of the research are influenced by the use of Scopus as the extraction database, which includes only documents with CiteScore and not the many other forms of reports (such as national and international projects) in which the socio-economic aspects of MAPs may have been discussed. Furthermore, the absence of an in-depth analysis typical of reviews, which, in the future, we intend to fill with empirical analyses on case studies, represents another limitation of the study.

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