



Novel Herbal Approaches: The Emerging Paradigm for Effective Treatment

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Received: March 02, 2023

Published: April 27, 2023

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Abstract

New and better medications are needed since drug resistance is becoming a bigger issue. Natural products and biotherapeutics provide an enormous source of potential new drugs; however, there are difficulties associated with these fields, including the expense and length of time required for conventional drug discovery processes and the subsequent lack of investment from the pharmaceutical industry. Faster production of molecules with the right activity is made possible by new approaches. A viable strategy for increasing the number of drug advances available to modern medicine is the formulation of these in combination with drug-delivery systems. The benefits that several classes of drug-delivery systems bring to small molecule and biotherapeutic targeting are addressed in this article. This is an appealing strategy for the pharmaceutical sector, and a quick analysis of the expanding trend in this field of study is provided.

Keywords: Biotherapeutics; Drug-Delivery Systems; Drug Discovery; Natural Products

Introduction

Medicinal herbs have been used for healing since the dawn of time. The relationship between man and his pursuit of pharmaceuticals in nature tells story of thousands years, as can be seen from written documents, preserved monuments, and even original plant remedies. Herbal Medicine, often known as Herbalism or Botanical Medicine, is the practise of using herbs or their extracts for therapeutic or medicinal purposes. According to the World Health Organization (WHO), 4 billion people utilize herbal medicine in some form for basic health care. The WHO promotes and motivates Ayurvedic treatments in 1992; the WHO Regional workplace for the Western Pacific invited a gaggle of consultants to guide research work on evaluating herbal medicines [39].

Due to the increasing problem of drug resistance, new and improved medicines are required. Natural and biotherapeutic products are source of new medicines; however, cost and time taken

for traditional drug discovery processes are some challenges and the lack of investment from the pharmaceutical industry. There are various new techniques that are using advanced activities for producing compounds at a faster rate. While the formulation of these combined with drug-delivery systems offers a promising approach for expanding the drug developments available to modern medicine. Here, various classes of drug-delivery systems are described and the advantages they bring to small molecule and biotherapeutic targeting are highlighted. This is an attractive approach to the pharmaceutical industry and the rising trend in research in this area is examined in brief [40]. Modern medicines are mainly derived from herbs on the basis of traditional knowledge and practices. Now a days, approximately 25% of the pharmaceutical compounds and their derivatives are obtained from natural resources available on earth [42]. Figure 1 illustrate different NDDS for herbal formulations.

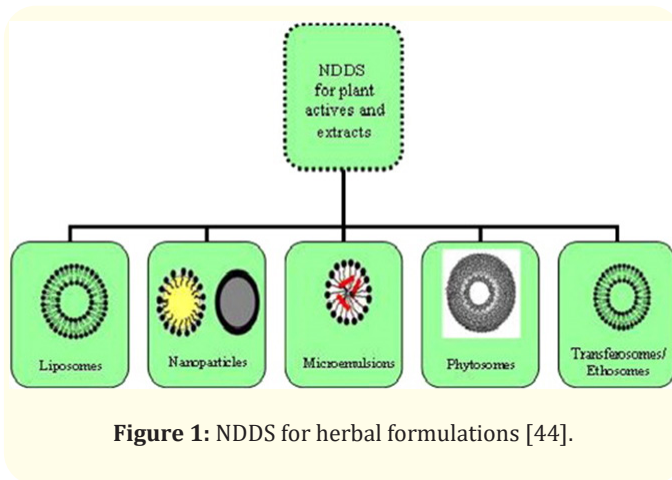


Figure 1: NDDS for herbal formulations [44].

Till today, the use of phytomedicines is widespread in most of the world’s population. In the modern world, herbal drugs are popular due to their ability to cure a variety of diseases with less toxic and better therapeutic effects [41]. From ancient times to the present, various diseases, including cancer, have been treated with natural products derived from herbal remedies, medicinal plants, functional foods, and their constituents; more and more attention is being paid to research on traditional medicine, which includes many herbs and medicinal plants. Natural products may be effective sources for the prevention and treatment of diseases that are mediated by inflammation as a result of the need for novel techniques to combat these conditions.

Despite several advantages, pharmaceutical companies are hesitant to invest more in natural product-based drug discovery and drug delivery systems and instead explore the available chemical compounds libraries to discover novel drugs. However, natural compounds are now being screened for treating several major diseases, including cancer, diabetes, cardiovascular, inflammatory, and microbial diseases. This is mostly due to the special benefits that natural medicines provide, such as reduced toxicity and side effects, low cost, and strong therapeutic potential. Yet, employing natural chemicals as medication is more difficult due to worries about their biocompatibility and toxicity. Consequently, many natural compounds are not clearing the clinical trial phases because of these problems. Major difficulties arise when using large-scale materials for drug administration, including *in vivo* instability, low bioavailability and solubility, poor body absorption, problems with target-specific distribution, problems with tonic effectiveness, and possibly harmful pharmacological effects. Hence, adopting inno-

vative drug delivery systems to direct medications into particular body areas may be an alternative to address these problems [42].

Recent market of herbal medicine

Rising public knowledge of the advantages of herbal medicines should be a significant development driver in the global market. Since these products are chemical-free and natural, they are gaining the interest of a growing number of consumers. The fact that these are lower priced and can be easily attained also elevate their demand in the market. The herbal medicine market is anticipated to grow at a rate of 5.88% between 2020 and 2027, according to Market Research Future (MRFR). By the end of 2027, the market may be valued USD 1,29,689.3 Million, according to MRFR.

Because of the rising demand for herbal medicines to strengthen immunity, the COVID-19 outbreak has had a favorable effect on the global market for herbal medicines. Due to their lack of chemicals, herbal medications experienced tremendous growth throughout the COVID-19 era. The most popular kind of treatment for a number of ailments is herbal medicine. The main markets for herbal medicines are Asia Pacific/APAC, North America, Europe, and rest of the world.

Due to the growing awareness of the advantages of such products, the European market is the largest gainer and the top consumer of herbal medications. Government gives strong support for introduction of new products, encouraging manufacturers to focus on research and development activities. Key markets like energy, menopause, sexual performance, sports nutrition, and arthritis are also major drivers of sales in the area. The huge demand for traditional remedies and natural alternatives in the area has led to a huge market for herbs like valerian, echinacea, and ginkgo. These elements clearly demonstrate the European market’s capacity for expansion.

The APAC market stands to profit from mounting consumer awareness as well as the heightened demand for skin care products and dietary supplements that are natural and organic. Given the robust government support for extensive research initiatives, nations like India and China produce enormous demand for herbal medicine. For instance, the Indian government set up a board called the Indian System of Medicine and Homeopathy to push the manufacturing rate of herbal products. The sales in the region are

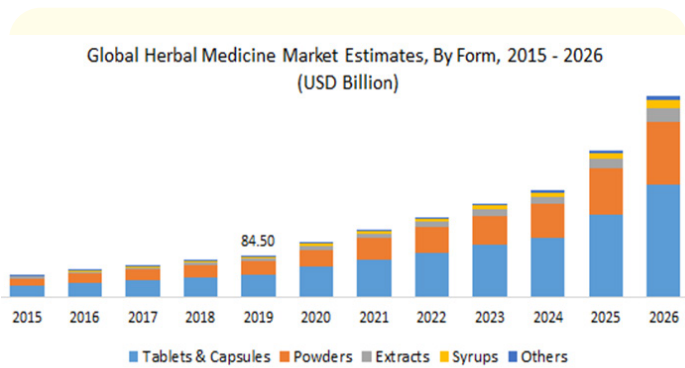


Figure 2: Herbal Medicine Market Size [43].

also rising in view of the growing number of critical disorders. Figure 2 indicates the global herbal medicine market estimates till the year 2026.

Market Research Future (MRFR) is a reputable international market research firm that takes pride in providing thorough and accurate analyses of various markets and customers throughout the world. The distinctive goal of Market Research Future is to give customers the highest quality, most detailed research possible. Our market research studies for global, regional, and country level market segments, broken down by goods, services, technologies, applications, end users, and market participants, allow our clients to see more, know more, and take action, which helps them find the answers to their most pressing questions [1].

Therapeutic activity of herbal drugs

Now- a-days herbal medicines are used in various health problems. Some of them are given below

S. No.	Plant used	Drug delivery System	Efficacy of DDS	Reference
1	Curcumin	Liposomes	Long systemic residence time and high entrapment efficiency	2
2	Curcumin	Phytosomes	For enhanced antioxidant action and bioavailability	3
3	Curcumin	Emulsion	To improve absorption	4
4	Curcumin	Transferosomes	To enhance permeation	5
5	Wogonin	Liposomes	To increase duration of action	6
6	Quercetin	Liposomes	Increase in bioavailability and reduction in side effects	7
7	Thea sinensis	Phytosome	Increase in bioavailability and absorption	8
8	Camptothecin	Microspheres	Dose reduction, enhancement of cytotoxicity	9
9	Turmeric Oil	Microspheres	Sustained release, increase in bioavailability	10
10	Curcumin	Nanoparticles	Solubility and bioavailability enhancement	11
11	Zedoary Turmeric oil	Nanoparticles	Enhancement of stability, hepatoprotective activity and anticancer effects	12
12	Quercetin	Nanoparticles	Enhancement of antioxidant activity	13
13	Paclitaxal	Nanoparticles	Reduction of side effects	14
14	Paclitaxel and Doxorubicin	Nanoparticles	Reduction of side effects/Avoidance of resistance	15

Table 1: Anticancer activity.

Conclusion

Herbal remedies, both in their raw form and as a pure chemical upon which contemporary drugs are based, have contributed many of the most potent medications to the large arsenal of drugs available to modern medical science in the last ten years. Herbal medicines have many benefits, but they can have drawbacks. Therefore, it is essential for new treatments to be both highly effective and low in side effects. Combinations of herbal and allopathic medicines have given medical treatment a new lease on life. The idea behind natural treatments is that the sickness can be treated using all the components found in nature.

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