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Review: Utilization of Polyherbal Extracts in the Development of Microparticulate Systems for Drug Delivery

Rahmat Santoso[1], Kintoko[2]*, Nining Sugihartini[2]

[1]Faculty of Pharmacy, Bhakti Kencana University, Bandung, Indonesia
[2]Ahmad Dahlan University, Yogyakarta, Indonesia

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***Corresponding author:** Kintoko
Ahmad Dahlan University, Yogyakarta, Indonesia

Abstract

Introduction: Polyherbal extracts contain various bioactive compounds that work synergistically to provide stronger therapeutic effects than single extracts. However, their use in the pharmaceutical field still faces challenges, especially related to low solubility, instability, and limited bioavailability. Microparticulate system technology presents an innovative solution that can increase the effectiveness of herbal drug delivery through physical protection of active compounds, controlled release, and increased absorption in the body. ***Objective:*** This review discusses research progress that integrates polyherbal extracts in microparticulate formulations, including polymer selection, manufacturing techniques, characterization, and pharmacological evaluation. ***Methods:*** A systematic literature review was conducted through searches in the last ten years [2015–2025] obtained through databases such as PubMed, ScienceDirect, and Google Scholar using keywords related to *"polyherbal"* and *"microencapsulation"* with a focus on articles on formulation studies and pharmacological evaluations in the last ten years. ***Results:*** The study showed that microparticulates were able to improve the entrapment efficiency, phytochemical stability, and therapeutic activity of polyherbal extracts, especially in oral and transdermal routes of administration. However several limitations such as the variability of natural product composition, potential interactions between compounds, and regulatory challenges still require further attention. The development of more advanced formulation technology as well as standardized toxicological and clinical studies are urgently needed to encourage the implementation of microparticulate herbal products on an industrial scale. ***Conclusion:*** Overall, polyherbal microparticulate systems have promising prospects as a safe, effective, and competitive strategy for modernizing herbal medicines.

Keywords: polyherbal, microparticulate, drug delivery system.

INTRODUCTION

Drug delivery technology continues to experience rapid progress in efforts to increase therapeutic effectiveness, reduce side effects, and extend the duration of drug action in the body [1]. One innovative approach currently receiving considerable attention is the use of microparticulate systems as drug carriers, for both synthetic molecules and natural products [2]. Microparticulate systems offer various advantages, such as the ability to control drug release, increase the stability of active ingredients, and enhance bioavailability [3].

On the other hand, the use of herbal-based treatments has increased significantly due to their perceived safety, low toxicity, and diverse bioactive compounds with high therapeutic potential [4]. Herbal extracts often consist of a combination of phytochemicals that work synergistically [5]. This concept has given rise to the use of *polyherbal*, a combination of several plant extracts believed to provide more optimal therapeutic effects than a single extract [6].

However the use of polyherbs as medicines presents challenges, particularly related to low solubility, instability under certain physiological conditions, and rapid degradation before reaching their target [7]. Therefore innovative formulations are needed to maximize the effectiveness of the active compounds they contain [8]. One promising technology to overcome these challenges is the microparticulate system [9].

Microparticles can be developed using a variety of polymers, both synthetic and natural, with controlled

release mechanisms and the ability to protect active compounds from the external environment [10]. The integration of microparticulate technology and polyherbal extracts can enhance stability and provide a release profile suitable for long-term therapy [11].

In addition to improving stability, microparticulate systems can also enhance the bioavailability of phytochemicals with low water solubility, allowing for better absorption in the gastrointestinal tract [12]. This advantage is particularly relevant for many active herbal compounds, such as flavonoids, alkaloids, and tannins, which commonly present biopharmaceutical challenges [13].

The use of polyherbs in microparticulate formulations also supports a holistic approach to therapy, where multiple mechanisms of action can occur simultaneously, such as anti-inflammatory, antioxidant, and immunomodulatory activities [14]. This combination can provide broader therapeutic potential, particularly for chronic and degenerative diseases [15].

Microparticulate systems can be developed for various drug delivery routes, such as oral, transdermal, and parenteral, expanding their application flexibility in the pharmaceutical and healthcare sectors [16]. This innovation opens up significant opportunities for the development of modern herbal medicines that can compete with conventional pharmaceuticals [17].

Overall the use of polyherbal extracts in microparticulate systems is a promising approach to improving the quality of medicinal plant-based therapies. With the advancement of research in this field, it is hoped that this technology will produce safe, effective, and high-quality formulations to support public health.

METHOD

This review was conducted through a literature search based on scientific data published in national and international journals, a literature study covering scientific publications from 2015 to 2025. Articles were searched using databases such as PubMed, ScienceDirect, Scopus, and Google Scholar. 163 articles were obtained with keywords used included *"polyherbal," "herbal extract," "microparticle drug delivery," "microencapsulation of herbal extracts,"* and "controlled-release herbal formulation." Selected articles were systematically analyzed to identify trends in the development of polyherbal extract-based microparticulate systems, including formulation techniques, characterization, and evaluation of drug efficacy.

This literature review research approach includes identification, selection, and in-depth study of relevant scientific content. The analysis focused on findings related to the advantages and challenges of integrating microparticulate technology with polyherbal utilization. Key data such as polymer type, encapsulation method, particle size, entrapment efficiency, and drug release profile were summarized to provide a comprehensive overview of research progress in this field.

This review also includes a critical evaluation of existing research findings to assess the effectiveness of polyherbal microparticle formulations in improving bioavailability, phytochemical stability, and safety. Therefore, the results of this review are expected to serve as a reference for researchers regarding the direction of future herbal-based formulation development.

Inclusion Criteria

Articles included in this review were English or Indonesian-language scientific publications discussing the use of polyherbal extracts in microparticulate systems, either in the form of formulation studies or pharmacological evaluations. Publications published within the last ten years were prioritized to ensure compliance with the latest technological developments. Articles presenting complete data on formulation methods, physicochemical characterization, or drug release testing were included in the analysis.

Exclusion Criteria

Articles discussing only single herbal extracts without microparticulate formulations were excluded. Studies in the form of editorials, opinion pieces, conference abstracts without complete data, or reports that had not undergone peer review were also excluded. Furthermore, studies that did not provide relevant information regarding formulation parameters or evaluation of pharmacological activity in microparticulate systems were also eliminated from the analysis.

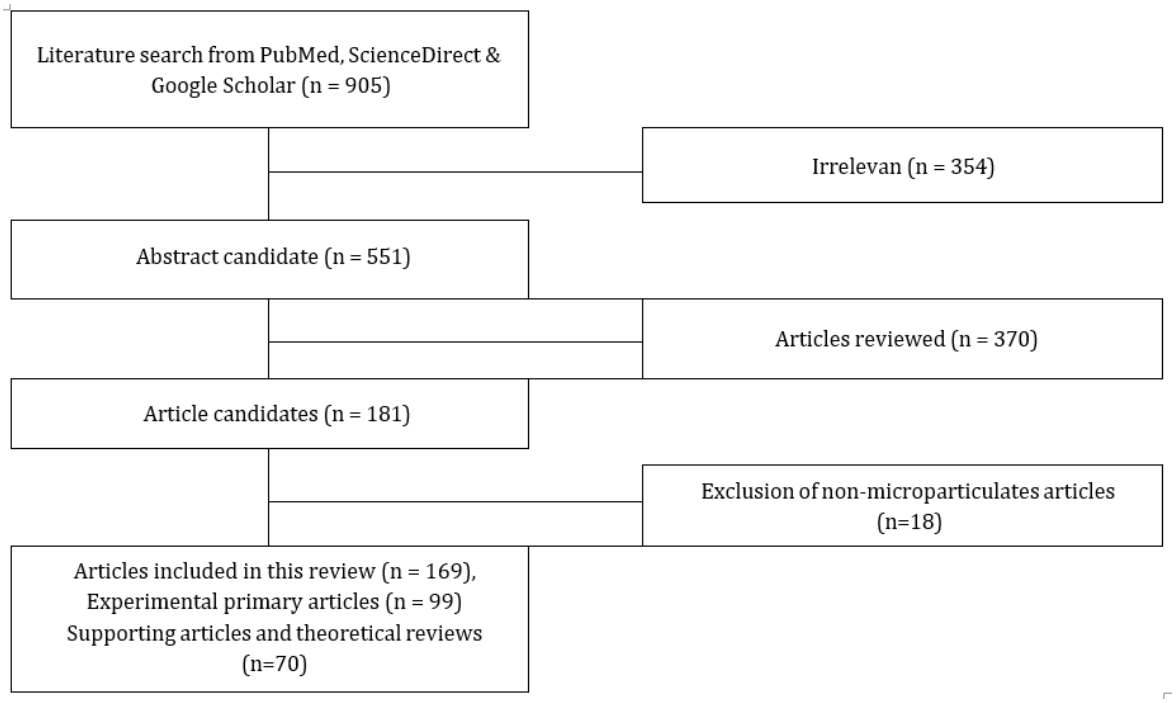

Figure 1: Literature Search Method

RESULTS AND DISCUSSION

1. The Concept of Polyherbalism and the Advantages of Phytochemical Synergism

Polyherbal therapy is a combination of two or more plant extracts used for specific therapeutic purposes [18]. This concept is based on the principle of synergism, where each extract contains active compounds that complement each other, producing a stronger pharmacological effect [19]. Unlike single herbal monotherapy, polyherbal formulations allow for multi-target action, making them effective for complex diseases [20].

These synergistic interactions can enhance therapeutic potency by optimizing pharmacodynamics and pharmacokinetics [21]. For example, one compound can improve the solubility of another compound or slow its degradation [22]. Furthermore, the use of polyherbs can reduce the risk of drug resistance that typically occurs with single-ingredient therapies [23]. However, synergism also needs to be balanced with careful study [24]. Potential antagonism and negative interactions between compounds must be considered in formulations to ensure safe use [25].

2. Biopharmaceutical Problems in Polyherbs

One of the biggest challenges in utilizing polyherbals is the low solubility of phytochemical compounds in body fluids, especially extracts rich in polyphenols and alkaloids [26]. This low solubility results in poor bioavailability, preventing full clinical benefits [27]. Furthermore, some compounds are readily degraded by digestive enzymes or certain pH conditions [28].

Herbs also have poor physicochemical stability during storage [29]. Oxidation, hydrolysis, and photodegradation reactions frequently occur, degrading the quality of the extract [30]. This complicates the development of herbal preparations that meet modern quality standards [31].

Through microparticulate technology, these limitations can be mitigated [32]. Physical protection of the active ingredient and control of the release profile can increase the compound's durability and allow it to reach its biological target [33].

3. Microparticulate Systems [Definition and Advantages in Drug Delivery]

Microparticles are particle units measuring 1-1000 µm that function as drug carriers [34]. This technology can control the release of active compounds according to therapeutic needs, either rapidly or with prolonged action [35]. In the herbal context, microparticles offer increased stability and protection against compounds that are easily degraded [36].

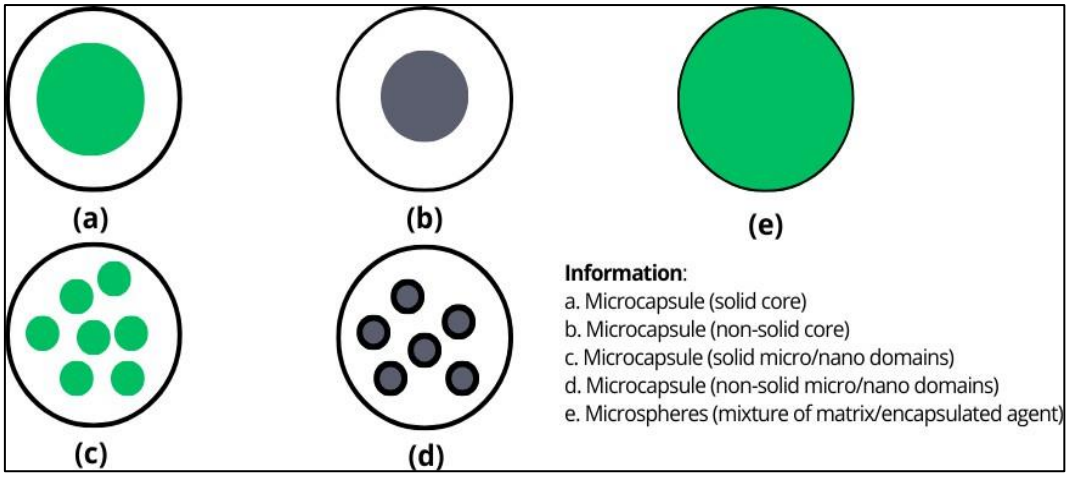

Figure 1: Type of Microparticles

Another advantage is the ability to increase the bioavailability of poorly soluble compounds [37]. This is achieved by increasing the particle surface area and adjusting the polymer matrix structure [38]. Furthermore, microparticles can be targeted to specific organs by adjusting their charge and size characteristics.

This technology is also flexible for various routes of administration, especially oral and transdermal, which are most suitable for herbal-based therapies [39].

4. Polymers in Polyherbal Microparticulate Formulations

Polymer selection is a key factor in microparticle formulation [40]. Polymers can be derived from natural materials such as chitosan, alginate, and gelatin, or synthetic materials such as PLGA *[Poly[lactic-co-glycolic acid]* [41]. Natural polymers are widely used because of their good biocompatibility and biodegradability, making them particularly suitable for herbal extracts [42].

Table 1: Comparison of Main Polymers in Polyherbal Microparticulate Formulations

Polymer Categories	Examples of Commonly Used Polymers	Key Benefits [Relevant to olyherbal]	Weaknesses/Challenges	Reference
Natural/ Biopolymer	Chitosan	Good biocompatibility and biodegradability. Polycationic, suitable for ionic gelation. May enhance absorption.	Solubility is limited to neutral/alkaline pH.	[43–45]
	Alginate	Capable of forming gels through ionic interactions. Commonly used in *ionic gelation methods.*	Stability in an acidic environment [stomach] can be an issue.	[46–48]
	Gelatin	Natural polymer, fibrous protein, Biocompatible and digestible in the GIT.	Requires *cross- linking* for stability; susceptible to hydrolysis.	[49–51]
Synthetic	PLGA [*Polylactic-co-glycolic acid]*]	Biodegradable, provides controlled and slow drug release [over months]. Ideal for long-term therapeutic targets.	Relatively higher costs. May produce acid degradation products.	[52–54]

Polymers determine the drug release profile, entrapment efficiency, and final product stability [55]. Matrix or core *shell systems* are used depending on the characteristics of the extract to be encapsulated [56]. The polymer-to-extract ratio must be optimized to avoid chemical incompatibilities [57]. Characterization studies such as particle size, zeta potential, and morphology determine formulation quality and therapeutic efficacy [58].

5. Method of Microparticulate Formation Using Polyherbal Extracts

Some commonly used methods include spray drying, emulsion crosslinking, solvent evaporation, and ionic gelation [59]. The choice of method depends on the extract's sensitivity to heat, solubility, and the drug release objectives [60]. For example, ionic gelation is suitable for natural polymers that cannot withstand high temperatures [61].

The correct method allows for optimal encapsulation and increased stability of polyherbal extracts [62]. Therefore, process parameters such as

stirring speed, nozzle size, and pH must be strictly controlled [63]. This process determines the trapping efficiency which will have a direct impact on dosage, effectiveness and production costs [64].

6. Entrapment Efficiency and Characterization of Polyherbal Microparticles

Entrapment efficiency is an important indicator in formulation [65]. A high value indicates the polymer's ability to retain the active ingredient within the matrix, resulting in more controlled release [66]. Influencing factors include the polymer-to-extract ratio, formulation technique, and the chemical properties of the active compound [67].

Table 2: Advantages and Selection of Polyherbal Microparticle Formulation Methods

Formation Method	Basic Principles	Specific Advantages for Polyherbals	Limitations	Key Characterization Indicators	Reference
Ionic Gelation	Ionic interactions between polymers [polyanions/ polycations] and *cross- linkers*.	Does not involve high heat, ideal for protecting temperature-sensitive herbal compounds.	Only suitable for ionically interacting polymers [e.g. chitosan-TPP].	Particle Size [DLS], Entrapment Efficiency [EE], Zeta Potential	[68,69]
Spray Drying	Rapid solvent evaporation under controlled temperature conditions [usually hot air].	Easy industrial scale, producing spherical and uniform particles.	Vulnerable to heat, can deactivate thermolabile active compounds.	Morphology [SEM], EE, Moisture Content	[70,71]
Solvent Evaporation	Evaporation of organic solvents from emulsions.	Can be used to encapsulate lipophilic compounds which are commonly found in herbal extracts.	Requires organic solvents that must be completely removed.	Drug Release Profile, EE, FTIR [chemical interaction]	[72,73]
Extrusion	Forces a wet mass [mixture of herbal extracts, fillers, and binders] through a perforated die or screen using mechanical pressure to produce dense, Cylindrical extrudates.	Enables high drug loading of multiple herbal extracts with diverse physical properties into a single, homogeneous matrix, ensuring dose uniformity.	Highly sensitive to moisture content; the high resinous or hygroscopic nature of herbal extracts can cause stickiness, leading to die clogging.	Extrudate diameter, texture consistency [tackiness], bulk density, and mass flow rate through the die.	[74–76]
Spheronization	A process where cylindrical extrudates are cut and rounded on a rotating friction plate	Produces pellets with smooth surfaces ideal for functional coating to mask the bitter taste or pungent odors Typical of	Requires extensive optimization of rotation speed and time due to the chemical variability	Degree of sphericity [aspect ratio], particle size distribution, friability, and surface morphology [SEM].	[77–79]

After the formulation is developed, further characterization, such as FTIR, SEM, and DLS tests, is performed to assess stability, morphology, and particle size distribution [80]. The drug release profile is also tested in a simulated gastrointestinal environment [81]. Characterization data determines the potential clinical efficacy and safety of the product in future applications [82].

Table 3: Comparing Polyherbal Microparticle Fabrication Techniques

Technique	Main Advantages	Application Notes	Reference
Microfluidics	High precision control over particle size, high and accurate encapsulation efficiency.	Lab scale; can be *parallelized* for potential large-scale production, ideal for formula *screening*.	[83-85]
Spray Drying	Very fast production process, suitable for heat-sensitive materials due to short exposure to high temperatures.	Industrial scale [mass production]; yields particles with good uniformity.	[80,86,87]
Emulsion [Single/Double]	Highly versatile, suitable for encapsulating both hydrophilic and lipophilic active ingredients; easily adaptable.	Formulation parameters [e.g., surfactant type] greatly influence encapsulation efficiency and stability.	[88][89][90]
Electrospraying	Produces very small particle sizes [nanoparticles], narrow size distribution, and capability to create *multi-layer* structures.	Highly suitable for polyherbal preparations; allows excellent control over particle morphology and internal structure.	[83][91][92]
Coacervation	Highly effective and suitable for use with natural polymers, such as biocompatible alginate and gelatin.	Particle size is primarily controlled by adjusting the stirring speed and polymer concentration.	[93][94][95]

The optimal ratio of polyherbal components must be carefully determined through a mixture design process and statistical analysis based on the targeted therapeutic activity. Modern microparticle fabrication can utilize various techniques, including Microfluidics, Spray Drying, Emulsion, Electrospraying, or Coacervation [80]. The choice of technique must be tailored to the physicochemical characteristics of the raw materials [polyherbs] and the final goal of the pharmaceutical preparation. These techniques collectively result in microparticles with uniform size, ensuring high encapsulation efficiency, and providing the controlled release profile that is crucial for product efficacy [82].

7. Controlled Release and Bioavailability in Microparticulate Systems

Microparticles serve as highly effective drug delivery systems due to their inherent ability to achieve controlled and sustained release of the active ingredients [96]. The mechanism of this release typically occurs through the diffusion of the active agent out of the polymeric matrix, the gradual erosion of the matrix itself, or a synergistic combination of both processes [97]. The capacity to precisely control this release profile is tremendously beneficial, especially for managing chronic diseases or conditions that demand consistent, long-term therapeutic intervention [98]. In the context of polyherbal formulations, controlled release plays a vital role in ensuring that the concentrations of the various active compounds are maintained stably within the therapeutic window [99]. This stable concentration minimizes the risk of toxicity while simultaneously maximizing the overall efficacy of the treatment over the desired duration of therapy [100].

In addition to managing the timing and rate of release, an optimal release profile from microparticles significantly contributes to the enhancement of the bioavailability of the herbal compounds [101]. This improvement in bioavailability is achieved through several protective and residence-time-extending mechanisms [102]. One key function of microparticles is their capacity to extend the residence time of the drug within the digestive tract [103]. This prolonged time provides an extended window for the active compounds to be effectively absorbed across the intestinal wall [104].

Furthermore the microparticle matrix acts as a robust protective fortress, shielding the active components from rapid degradation caused by the highly acidic gastric environment or the destructive activity of digestive enzymes [105]. This protection ensures that the majority of the active ingredients can reach their primary site of absorption, the small intestine, intact and ready to be taken up [106]. The net result is a much more efficient and optimal absorption of the active ingredients compared to free herbal extracts that are susceptible to degradation [107]. Therefore this enhanced bioavailability directly correlates with a greater therapeutic potential of the formulated herbal preparation [108].

In the endeavor to predict the actual clinical performance of microparticle-based herbal preparations, *in vitro* release testing holds a very critical and indispensable role [109]. This testing is conducted under laboratory conditions that closely replicate the *in vivo* environment, such as pH and enzyme presence, to generate an accurate release profile [110]. The data obtained from these *in vitro* tests serves as a powerful indicator for predicting how the formulation is likely to behave after administration to a patient [111]. The concordance between the *in vitro* results and the *in vivo* performance is essential for the ultimate success and reliability of the developed phytopharmaceutical product [112].

Thus careful release testing and well-engineered microparticle formulation are crucial steps in creating effective and safe polyherbal products [113]. Researchers utilize the release data to refine the polymer composition and particle size, ensuring that the release profile meets the specific therapeutic needs [98]. This continuous optimization guarantees that the microparticulate system can consistently deliver the full benefits of the herbal contents to their biological targets [114]. Consequently microparticle technology represents a significant advancement in enhancing the efficacy and reliability of modern herbal medicines [115].

8. Pharmacological Activity of Polyherbs in Microparticles

The incorporation of polyherbal extracts into microparticulate systems has been consistently reported to result in a significant enhancement of their pharmacological activity compared to the use of free extracts [116]. This boost in effectiveness is a direct result of the bioactive protection and improved targeting offered by the microparticle formulation [117]. The bioactivity of the compounds, such as polyphenols and alkaloids, is maintained at a maximum due to protection against the harsh environmental conditions within the body [118]. Consequently, the bioactive compounds are able to act with much greater efficiency on their biological targets upon controlled release [33].

This increased efficiency is evident across a wide spectrum of therapeutic activities that have been extensively studied and documented [119]. Among the most frequently studied activities are the potent anti-inflammatory properties, where the active compounds can modulate inflammatory pathways more effectively [120]. Furthermore, the antioxidant properties of the polyherbs are potentiated, allowing for better free radical scavenging and a reduction in overall cellular oxidative stress [121]. Studies have also highlighted enhanced antimicrobial activities, offering great potential for tackling antibiotic resistance through diverse mechanisms of action [122].

The anticancer activity of polyherbs within a microparticle matrix has shown promising results in preclinical research [123]. The targeted drug delivery afforded by microparticles can improve compound accumulation at the tumor site [124]. This enhanced targeting allows for higher local cytotoxic concentrations to be achieved at the cancer cells [125]. This amplified activity, spanning anti- inflammatory, antioxidant, and cytotoxic effects, underscores the immense potential of microparticulate systems as comprehensive therapeutic agents [126].

These advantages serve as a compelling rationale for driving forward the development of microparticulate formulations within the context of modern herbal-based therapies [127]. This approach inherently supports the concept of holistic healing espoused by traditional medicine philosophy [128]. This holistic healing concept is achieved through the multi-target action inherent in polyherbs, where various compounds work synergistically on multiple disease pathways [129]. The enhanced system offers a more comprehensive and balanced solution to complex health issues than single-compound drugs [130].

While the therapeutic potential offered is vast, it is absolutely essential to stress that thorough and rigorous toxicology testing must be a prerequisite before long-term use can be recommended [131]. Long-term safety is a paramount concern, particularly given the chronic nature of many diseases targeted by these herbal therapies [132]. This testing must carefully evaluate the potential side effects of both the herbal ingredients and the polymeric materials themselves upon repeated administration [133].

9. Route of Drug Administration in Polyherbal Microparticles

The oral route remains the most common and preferred pathway for microparticle-based polyherbal formulations due to its unmatched convenience and wide acceptance by patients [134]. The compatibility of this route with the tradition of herbal medicine usage is also a significant factor in its popularity [135]. Microparticles are meticulously engineered to survive the harsh gastric environment, which would otherwise rapidly deactivate sensitive herbal compounds [136]. This protection ensures that the targeted release of the active compounds can occur in the small intestine [137].

The small intestine is the ideal location for release as it offers an exceptionally large surface area and more neutral pH conditions [138]. These conditions are significantly more conducive for the effective absorption of most herbal compounds into the bloodstream [139]. By utilizing the microparticle shield, the systemic bioavailability of the polyherbs can be maximized, which is a key objective of oral drug delivery systems [140]. Success in oral delivery is crucial for systemic therapies of internal diseases [141].

Aside from the oral route, topical or transdermal application represents a valuable and relevant pathway for microparticles carrying polyherbs [142]. In the context of skin application, microparticles excel at enhancing the penetration of active compounds across the dermal layers [143]. This improved penetration allows for more effective treatment of dermatological conditions or localized pain [144]. Furthermore, topical formulations can be designed to prolong the local effects of the herbal extract, minimizing the need for repeated applications [145].

The parenteral route, while less common and more technically challenging, is also a feasible option for microparticulate polyherbal preparations under specific circumstances [146]. However, this route demands

substantially higher and stricter requirements regarding absolute sterility standards [147]. Additionally, the characterization of particle size and homogeneity becomes exceptionally critical to avoid the risk of vascular occlusion [148]. Therefore, the parenteral system is only chosen when other routes are inadequate or when rapid action is required in acute situations [149].

The decision on the most appropriate route of drug administration must always be the outcome of careful consideration of multiple determining factors [150]. These factors include the specific therapeutic target [local vs. systemic], the unique characteristics of the disease being treated, and most importantly, the effectiveness and reliability of drug absorption via the chosen path [151]. This diversity in administration route options allows for a significant expansion of the opportunities for herbal polysystem-based therapy to address a much wider spectrum of medical conditions [152].

10. Challenges and Limitations in the Development of Polyherbal Microparticles

Despite its many advantages, the development of polyherbal microparticles still faces challenges [153]. Variability in active ingredient composition between batches can complicate standardization [154]. Interactions between compounds can also lead to chemical instability or reduced entrapment efficiency [155].

Table 4: Main Challenges and Future Prospects for the Development of Polyherbal Microparticles

Area / Issue	Current Challenges and Limitations	Prospects and Directions for Future Research	Reference
Standardization & Quality	Variability in the composition of active ingredients between *batches* of polyherbal extracts. Inter-compound interactions that may cause antagonism or decreased stability.	Application of Omics and In Silico technologies for accurate identification and quantification of phytochemicals.	[156,157]
Biopharmaceuticals	Bioavailability is low in many phytochemicals due to low solubility and rapid degradation.	Development of *targeted drug delivery* to specific organs [e.g., the brain for Alzheimer's]. Utilization of predictive drug release models.	[158,159]
Commercialization & Regulation	The production costs of microparticle technology are relatively high [especially *spray drying]*. Strict regulations are needed to ensure the safety and quality of modern herbal products.	Collaboration between academia, industry, and regulators to standardize and accelerate implementation. Standardized toxicology and clinical research.	[160,161]

Production costs and the required technological equipment are still relatively high for small- and medium-scale herbal industries [162]. Furthermore, the need for strict regulations regarding safety and quality poses a challenge to commercialization [163]. Therefore, standardized preclinical and clinical studies are essential to support broader applications [164].

11. Prospects and Directions for Future Research

The development of polyherbal microparticulates holds great promise for developing modern herbal medicines with therapeutic qualities comparable to synthetic pharmaceuticals [165]. Combining traditional approaches with advanced materials technology can accelerate innovation in the phytopharmaceutical sector [166]. Future research is directed at the use of safer, more environmentally friendly polymers that are responsive to biological stimuli [167].

Furthermore, the application of in silico, omics, and predictive drug release models can improve research efficiency [168]. The development of targeted drug delivery also opens up opportunities for herbal- based therapies for degenerative diseases and cancer [169]. Collaboration between academia, industry, and regulators is essential to achieve broader and standardized use of polyherbs.

CONCLUSION

The use of polyherbal extracts in the development of microparticulate systems offers an innovative solution to overcome various limitations of natural biopharmaceuticals, including low solubility, poor stability, and low bioavailability of active compounds. Microparticulate technology can provide protection against degradation, regulate drug release profiles, and enhance absorption, thus achieving optimal therapeutic efficacy. Phytochemical synergism in polyherbs also provides the advantage of multi-target pharmacological activity suitable for complex disease therapy needs.

However, challenges related to extract standardization, production costs, and strict regulatory requirements remain obstacles to the development of microparticulate herbal products for industrial scale. Therefore, more comprehensive further research is needed, including toxicity testing, clinical validation, and the use of the latest formulation technologies to ensure their safety and effectiveness. With the support of

ongoing research and cross-sector collaboration, polyherbal microparticulate systems have great potential for implementation as a modern form of herbal medicine that offers high quality and high competitiveness.

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