

Medicinal plants and healthy aging: an urgent call for robust clinical evidence

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Abstract

Medicinal plants are widely used across cultures for centuries offer promising adjuncts for promoting healthy aging. This commentary highlights current evidence from human clinical trials (2015–2025) that investigated the effects of widely used botanicals such as *Ginkgo biloba*, *Panax ginseng*, *Curcuma longa* (curcumin), *Allium sativum* (garlic), *Crataegus* spp. (hawthorn), *Withania somnifera* (ashwagandha), *Bacopa monnieri*, *Crocus sativus* (saffron), *Mentha piperita* (peppermint), and *Echinacea purpurea*. These plants have demonstrated benefits across key domains of geriatric health-cognition, cardiovascular function, joint mobility, immune resilience, and gastrointestinal comfort often with fewer side effects than conventional drugs for elderly people. Although current findings are promising, the evidence remains limited, fragmented, and heterogeneous, with few *in vivo* human studies specifically involving older adults highlighting a clear research gap. Greater methodological rigor and inclusion of elderly participants are needed to confirm efficacy, clarify mechanisms, and assess herb-drug interactions. Bridging traditional knowledge with modern clinical science could transform several botanicals from complementary remedies into evidence-based tools for preventive geriatric medicine, enhancing quality of life and extending health span in aging populations.

Keywords: Aging, medicinal plants, older patients, botanical therapeutics, integrative care

The global shift toward aging societies has brought new urgency to sustaining health rather than merely extending life. Traditional pharmacological regimens—though effective—often prove cumbersome for older adults, who are vulnerable to drug interactions and adverse effects. In this context, medicinal plants offer an appealing complement: biologically active, widely available, and generally safe. Yet while their ethnobotanical heritage is vast, the modern clinical evidence base remains thin when restricted to geriatric populations.

Cognitive decline has been a key target of research. *Ginkgo biloba* L. is among the best-studied botanicals. Systematic reviews found that standardized *Ginkgo* extract at 240 mg/day modestly improved cognitive performance and enhanced daily functional abilities [1]. However, few large trials have focused exclusively on older adults or followed

participants beyond one year. *Panax ginseng* C.A.Mey. shows similar promising effects but shares similar gaps. Meta-analyses reveal small yet significant improvements in cognitive performance and immune resilience with daily doses of 200–450 mg [2, 3]. Nevertheless, trials enrolling participants over 65 are scarce, and the mechanisms by which ginseng influences neuroendocrine function in aging remain poorly characterized.

Wang *et al.* [4] reported that supplementation of 800 mg/day curcumin from *Curcuma longa* L. for ≥ 24 weeks produced significant improvements in global cognitive function, especially in individuals aged ≥ 60 years. Hsiao *et al.* [5] confirmed that curcumin (500–1500 mg/day) significantly reduces osteoarthritis knee pain and improves function. Because absorption of curcuminoids declines with age and comorbid gastrointestinal disease is common, dedicated pharmacokinetic and tolerability studies in geriatric cohorts are urgently warranted.

Cardiovascular botanicals such as *Allium sativum* L. and *Crataegus* spp. have produced encouraging findings. Bashiri *et al.* [6] and Vila-Nova *et al.* [7] reported that aged garlic extract at ≥ 1200 mg/day reduced systolic blood pressure, improved lipid profiles and stool consistency. Yet again, these data derive mainly from mixed-age adults, not those over seventy, whose vascular physiology

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and polypharmacy status may alter efficacy and safety. Similarly, *Crataegus* extracts (Hawthorn) improved exercise tolerance, reduced systolic blood pressure and non-significantly decreased diastolic blood pressure following 2–6 months of intervention [8]. However, virtually all studies excluded participants with multimorbidity—the norm in geriatric practice.

Adaptogenic plants such as *Withania somnifera* (L.) Dunal may address psychosomatic aspects of aging. A 12-week randomized trial in adults aged 65–80 years using 600 mg/day of ashwagandha root extract showed significant improvements in sleep quality and mental alertness [9]. Despite these promising results, the small sample size (< 100 participants) and short duration preclude conclusions about long-term resilience or cognitive benefit.

Neuroprotective herbs such as *Bacopa monnieri* (L.) Pennell and *Crocus sativus* L. illustrate the same imbalance between mechanistic promise and geriatric evidence. *Bacopa*, standardized to $\geq 50\%$ bacosides at 300 mg/day produced modest improvements in cognitive performance in older adults after 12 weeks [10, 11]. Yet most studies excluded individuals with multimorbidity or concomitant medication use. *C. sativus* (saffron) performed comparably to donepezil (10 mg/day) in mild-to-moderate Alzheimer's disease over 22 weeks while producing fewer gastrointestinal effects [12]. However, these findings stem from small single-center studies in specific ethnic groups. Broader, multiethnic replication is needed to confirm both efficacy and safety.

Gastrointestinal and immune functions in elderly people also warrant attention. Enteric-coated *Mentha piperita* L. oil capsules (0.2–0.4 mL, 1–3 times/day) improved irritable bowel syndrome symptoms [13]. However, the effects of peppermint oil on aging gastrointestinal motility and drug absorption remain unknown. *Echinacea purpurea* (L.) Moench has demonstrated modest reductions in cold incidence and duration [14]. Yet evidence among older adults with immunosenescence is weak. Focused studies in nursing-home or community-dwelling seniors are needed.

In conclusion, current clinical literature confirms modest efficacy but exposes a substantial research gap: most botanical trials are neither designed nor powered for older populations. Aging alters absorption, distribution, metabolism, and excretion of phytochemicals; it also increases vulnerability to interactions and side effects. Nevertheless, the integration of medicinal plants in geriatric health care aligns with the World Health Organization's call for evidence-based traditional and integrative health approaches. To realize their potential, well-designed, geriatric-specific clinical trials using validated biomarkers and meaningful functional outcomes are urgently needed.

Declarations

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