
FREQUENTLY ASKED QUESTIONS (FAQ)

K. P. Khalsa, Column Editor

Dosing Botanical Medicines

Eric Yarnell, ND, RH (AHG)

Therapeutic effects in herbal medicine depend on proper dosing. With few exceptions, traditional medical systems tend to recommend what are considered large or physiologic doses (several grams daily of safe herbs). Many modern botanical systems, particularly those that arose in Europe, tend to use similarly large doses. This article will focus on crude herbs and extracts in wide use, but will not address specific standardized extracts or other dose forms that have not been used in traditional medicine and require clinical trials to determine specific optimal doses.

However, there has been a tendency, particularly in North America, toward lower doses. For example, health food stores generally sell only 1 oz bottles of herbal tinctures, enough for only 1-2 days use at physiologic doses. The economic basis of this situation is apparent but still unacceptable. Clinicians looking to prescribe herbs effectively must not get caught in the 1 oz bottle trap. This article deals only with the dosing of generally safe herbs. Herbs with known toxic effects must be dosed on an individual basis and are not discussed here.

Eric Yarnell is affiliated with the Bastyr University, Department of Botanical Medicine, 6300 Ninth Avenue, NE, Suite 362, Seattle, WA 98115 (E-mail: dryarnell@earthlink.net).

Journal of Herbal Pharmacotherapy, Vol. 5(1) 2005
Available online at <http://www.haworthpress.com/web/JHP>
© 2005 by The Haworth Press, Inc. All rights reserved.
Digital Object Identifier:10.1300/J157v05n01_08

TABLE 1. Traditional Chinese Medicine Doses for Tonic Herbs

Latin name (common name) part	Typical recommended daily dose	Equivalent tincture daily dose (1:2)*	Equivalent tincture daily dose (1:5)
<i>Angelica sinensis</i> (dang gui) root	3-15 g	6-30 ml	15-75 ml
<i>Astragalus membranaceus</i> (huang qi) root	9-30 g (up to 60 g occasionally)	18-60 ml	45-150 ml (up to 300 ml)
<i>Codonopsis pilulosa</i> (dang shen) root	6-30 g	12-60 ml	30-150 ml
<i>Glycyrrhiza uralensis</i> (gan cao, licorice) root	2-12 g (use of this dose continuously for several weeks can cause pseudohyperaldosteronism)	4-24 ml	10-60 ml
<i>Panax ginseng</i> (Asian ginseng) root	1-10 g chronic (up to 30 g acutely)	2-20 ml (up to 60 ml)	5-50 ml (up to 150 ml)
<i>Paeonia lactiflora</i> (white peony, bai shao) root	6-15 g (up to 30 g occasionally)	12-30 ml (up to 60 ml)	30-75 ml (up to 150 ml)
<i>Polygonum multiflorum</i> (fo-ti, he shou wu) root	9-30 g	18-60 ml	45-150 ml
<i>Rehmannia glutinosa</i> (shu di huang) root	9-30 g	18-60 ml	45-150 ml
<i>Zizyphus jujuba</i> (jujube) fruit	10-30 g	20-60 ml	50-150 ml

* Ratios refer to the weight of raw material to volume of solvent used to make the tincture. Thus a 1:2 tincture contains the extract of 500 mg herb per 1 ml.

Traditional Chinese medicine is arguably one of the oldest systems that employ herbs heavily and that has a written history extending back many millennia. Thus one can look to this system for some sense of what typical doses for safe botanicals should be. Daily doses of some common tonic herbs according to two respected sources on traditional Chinese herbal medicine are given in Table 1, along with equivalent tincture doses.^{1,2}

The transmission of doses from ancient times to today in western herbal medicine has been fragmented at best, and thus one cannot refer to a 5,000-year-old history of dosing as easily. Nevertheless, there is no reason to assume that doses of western tonic herbs should be any different than that of Chinese tonic herbs.

BASIC CHRONIC DOSING RECOMMENDATIONS

At a minimum, this author recommends administering 5-10 g daily in divided doses of any nontoxic herb used as a “simple,” meaning it is given by itself. Translated to tincture doses, this means 10-20 ml daily of a 1:2 tincture and 25-50 ml daily of a 1:5 tincture. Very often, 5 ml (one measuring teaspoon) is recommended three times daily, which will underdose herbs in dilute tinctures (1:5) but provide a good dose of those in concentrated tinctures (1:2) or fluid extracts (1:1). For this reason, the author avoids 1:5 tinctures as much as possible, as it is difficult to provide sufficient dose economically.

The dose form in which herbs are delivered must always be considered, as quantity and quality both matter. Powdered herbs are generally cheaper than tinctures. However, they have a much shorter shelf life (6-12 months maximum, compared to at least 10 years for tinctures) given their enormous surface area and lack of preservatives. Though easy to take if simply mixed into water or other liquids, they can become problematic to swallow if used as capsules, which can hold 500-750 mg in the largest sizes. Tinctures and powders can both be objectionable taste-wise, whereas capsules tend to mask flavor. Crude herbs can also be made into infusions and decoctions. The dose recommendations are the same as powders. Crude herbs have longer shelf-lives than powders as they have not been ground. Flavor is often a serious issue, as well as preparation time. The addition of water delivered by teas can be therapeutically valuable in some situations.

Ultimately the quality of the raw material is crucial in efficacy of the final extract or dose form. A huge amount of very low quality herb will have no effect compared to small amounts of very high quality herb. Much effort is going into attempting to quantify quality of herbs, a debate that is beyond the scope of this article.

The use of multiple daily doses cannot be overly emphasized. Though patients often find it difficult to take a dose in the middle of their work or school day, it is imperative that they do so. Part of what makes herbs so safe is that the body is efficient at clearing most botanical constituents. It is presumed that the half-lives of most herbal constituents are 3-4 hours, though there is little research in this area and some studies have shown they can be substantially longer.^{3,4} If a patient takes only one or two doses daily of most herbs, they may have negligible blood levels in the middle of the day and lose many of the benefits of the herbs. It must always be remembered that individuals may have different metabolic capacities and thus doses must be tailored to the individual.⁵

Intrarectal administration of botanicals by enema or suppository should also be considered. It is estimated that approximately 30% of constituents delivered per rectum bypass first pass hepatic metabolism, thus increasing half-life and overall potency. This benefit may be overcome by relatively poor absorption from the rectum. It is recommended that usual oral doses be used as a starting point for intrarectal dosing, though probably 10-20% lower doses will still be effective. This route of administration is particularly indicated when patients are nauseated or unable to swallow medicines. Much work remains to determine optimal intrarectal doses of herbs.

BASIC ACUTE DOSING RECOMMENDATIONS

When a patient has an acute condition, dose requirements of herbs go up to around 10-30 g daily (Table 2). Instead of taking larger doses, more frequent dosing is preferable to insure continuous blood levels of therapeutic constituents are maintained. Of a 1:2 tincture, the typical recommendation is to take 5 ml six to eight times daily. It must also be remembered that with oral dosing, it can take an hour or more after intake before blood levels begin to rise and physiological effects are noticed.

THE SYNERGY CONUNDRUM

Many sophisticated botanical practitioners do not use simples, but instead formulate many herbs together. This is certainly true of the most advanced and well-documented traditional herbal systems from Asia (China, Southeast Asia, India). It quickly becomes impractical to administer the full dose of each herb in a formula. If one gives just five herbs, the patient is looking at consuming 50-100 g of herbs a day, which is too expensive and unpalatable for almost all.

Instead, the total dose of the formula is generally about the same as the dose for any single herb. It is believed that although the absolute doses of each herb in the formula are below normal therapeutic levels, the synergistic and/or additive effects among the herbs still makes the formula effective. It is difficult to understand otherwise how formulas with 10+ herbs can be found to be effective in double-blind, placebo-controlled trials, given that the dose of any one herb in the formula is < 1 g daily unless synergy occurs.⁶

The usual chronic adult dose of most crude herbal formulae is 5-10 g daily. For acute situations this rises to 10-30 g.

CONFLICTS BETWEEN DOSE RECOMMENDATIONS

The doses recommended by various authoritative texts on herbal medicine vary widely, leading to confusion in practice and concern among medical practitioners familiar with the apparent uniformity of drug dosing. The example of *Echinacea* spp. will highlight the wide range of recommendations.

Thus in Melchart et al.'s¹⁰ clinical trial, they were using 3-10% the dose recommended by Mills and Bone⁸ or Yarnell et al.⁷ Not surprisingly, the Melchart et al.'s,¹⁰ clinical trial reported a lack of efficacy, though the possibility that the extremely low dose caused the failure was barely even considered. Low doses are seen in almost every clinical trial of echinacea.

This author suggests that dose recommendations be considered in light of traditional dose ranges discussed above and clinical trial data. It is very difficult to evaluate the relevance of recommendations outside these ranges from single practitioners claiming efficacy, because regression to the mean and other factors could just as easily explain the perceived benefit of very low doses of herbs. The statistical controls in clinical trials and the sheer accumulated mass of thousands of years of traditional practice are much better at counteracting subjectivity. Nevertheless, it is clear that a research agenda is needed to determine what are truly effective doses for crude herb products given their widespread use.

CONCLUSION

Dosing traditional herbal medicines has been largely neglected, though it is of pivotal importance. Scientific research on crude herbs should al-

TABLE 2. Differing Acute *Echinacea* spp. Dosing Recommendations

Reference	Recommended adult daily dose*	Recommended preparation	Equivalent daily raw material
7	30-60 ml	1:3 tincture	9-18 g
8	10-30 ml	1:2 tincture	5-15 g
9	4.5-9 ml (90-180 drops)	1:5 tincture	0.9-1.8 g
10	5 ml (100 drops)	1:11 tincture	0.45 g

ways include a component to determine optimal dosing. The author's experience is that insufficient dosing is a common cause of apparent therapeutic failure of herbal medicines, and that those trends that recommend low doses are doing a disservice to their patients. Based on the accumulated experience over thousands of years of use of herbs in China and India, higher doses are most often associated with efficacy of herbal medicines.

REFERENCES

1. Bensky D, Gamble A, Kaptchuk T. Chinese herbal medicine materia medica (revised edition). Seattle: Eastland Press, 1993.
2. Chen JK, Chen TT. Chinese medical herbology and pharmacology. City of Industry, CA: Art of Medicine Press, 2004.
3. De Smet PAGM, Brouwers JRBJ. Pharmacokinetic evaluation of herbal remedies: basic introduction, applicability, current status and regulatory needs. *Clin. Pharmacokinet.* 1997;32:427-36.
4. Brockmöller J, Reum T, Bauer S, et al. Hypericin and pseudohypericin: pharmacokinetics and effects on photosensitivity in humans. *Pharmacopsychiatr.* 1997;30 (suppl 2):94-101.
5. Li C, Homma M, Oka K. Characteristics of delayed excretion of flavonoids in human urine after administration of shosaiko-to, a herbal medicine. *Biol. Pharm. Bull.* 1998;21:1251-7.
6. Hirayama C, Okumura M, Tanikawa K, et al. A multicenter randomized controlled clinical trial of shosaiko-to in chronic active hepatitis. *Gastroenterol. Jpn.* 1989;24:715-
7. Yarnell E, Abascal K, Hooper K. *Clinical botanical medicine*. New York: Mary Ann Liebert Inc., 2003.
8. Mills S, Bone K. *Principles and practice of phytotherapy: Modern herbal medicine*. Edinburgh: Churchill Livingstone, 2000.
9. Blumenthal M, Busse WR, Goldberg A, et al. (eds). *The Complete German commission E monographs: Therapeutic guide to herbal medicines*, Austin: American Botanical Council and Boston: Integrative Medicine Communications, 1998.
10. Melchart D, Walther E, Linde K, et al. Echinacea root extracts for the prevention of upper respiratory tract infections: A double-blind, placebo-controlled randomized trial. *Arch. Fam. Med.* 1998;7:541-5.