

Herbal Medicine for Acne Vulgaris

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Abstract

Natural treatments for acne vulgaris, a common condition in industrialized societies, have much to offer although clinical studies are lacking. Several studies have shown that low stomach acid is a common finding in patients who have acne. This suggests that the traditional use of bitter herbs, which act by stimulating digestive function, including acid secretion, may be useful and important for correcting acne vulgaris. Herbs with antimicrobial, inflammation-modulating, anticomedogenic, and, in certain cases, hormone-balancing actions are also useful for treating acne. (See Table 1.)

Acne vulgaris remains a common condition in industrialized societies, with many mainstream treatment options available. All these treatments carry risks, and none is completely satisfactory. Natural alternatives are gaining greater research support and have much to offer clinically.

Antibiotic resistance in *Propionibacterium acnes* and *Staphylococcus epidermidis* has been rising steadily since the 1980s. In one analysis covering 10 years in the United Kingdom, carrying resistant bacteria were noted in more than 50 percent of patients who had acne and who were treated with antibiotics, with most patients carrying multiple different resistant strains on different parts of their bodies.¹ Similar trends have been reported in many other industrialized nations.²

Despite some efforts by drug manufacturers to inform consumers, the incidence of women exposed to oral tretinoin, a known teratogen, during pregnancy has been increasing, possibly the result of direct-to-consumer drug advertising.³ These and other concerns, including cost, underscore the need for safer, effective, more-inexpensive approaches, including those offered by herbal medicine.

This article focuses primarily on herbal treatments for acne. Few botanical medicines have been evaluated systematically in clinical trials, and there is virtually no research on the common approach of natural-medicine practitioners for acne—recommending multiple lifestyle changes along with multiple natural products. Nonetheless, biologic plausibility has been demonstrated for many therapies in isolation.⁴

Diet, Digestion, Acne, and Herbs

Mainstream dermatology has long maintained that “diet is not related to acne,” based on outdated, low-quality, and rather sparse research. Mounting modern research supports that diet can, in fact, affect acne in multiple ways.⁵ If nothing else, it is quite clear that people living in “Stone Age societies” have no acne, compared with rates as high as 95 percent in adolescents in industrialized societies.⁶ Although diet is not the only difference between these traditional and industrial societies, it is likely to be a major factor.

Changing diet and lifestyle are, therefore, still considered to be critical to any natural approach to acne. Herbal medicine can potentially help make dietary changes more effective. It is a tenet of natural medicine that poor digestion may exacerbate poor dietary intake and contribute to acne.

Several studies have shown that low stomach acid is a common finding in patients who have acne.^{7,8} This suggests that the traditional use of bitter herbs, which act by stimulating digestive function including acid secretion, may be useful and important for correcting acne vulgaris. (See box entitled Case Study: Digestive Herbs for Acne.) Some common bitter herbs used include *Taraxacum officinale* (dandelion) leaf and root, *Achillea millefolium* (yarrow) flowering top, *Artemisia absinthium* (wormwood) leaf, *Gentiana lutea* (gentian) root, and *Mahonia aquifolium* (Oregon grape) root.

The concept in natural medicine that liver function is also critical to avoiding diet-induced acne is more theoretical. The idea is that, if the liver and its detoxification and excretory functions are not functioning optimally, the body will attempt to compensate by eliminating toxic compounds through other routes in the body, including the skin. It is possible that the liver herbs commonly used, such as *Arctium lappa* (burdock) root, actually work because of their bitter digestive stimulant actions. Sufficient clinical research has not been done on this line of reasoning to allow a reasoned analysis of the approach.

Antimicrobial Herbs

Various bacteria play a role in the pathogenesis of acne with *P. acnes* and *S. epidermidis* being studied most often. Both of these microbes, and others potentially related to acne pathogenesis, are present on normal skin, and none has been shown definitively to cause acne.⁹ Once either excess sebum production or inflamma-

tory changes begin, these microbes can and often do overgrow and worsen inflammation.

Given these facts, antimicrobial herbs are likely to have a role to play in acne treatment. The best supported natural treatment in

this regard is steam-distilled volatile oil of *Melaleuca alternifolia* (tea tree) leaf. A single-blinded trial was conducted comparing a 5 percent gel of tea tree oil with 5 percent benzoyl peroxide lotion in 124 patients with mild-to-moderate acne.¹⁰ The two treatments were

Table 1. Herbs and Formulas Used to Treat Acne Vulgaris

Single herbs

| Latin binomials | Common names |
|---|-----------------------|
| <i>Achillea millefolium</i> flowering top | Yarrow |
| <i>Aloe barbadensis</i> gel | Aloe vera |
| <i>Arctium lappa</i> root | Burdock |
| <i>Artemisia absinthium</i> leaf | Wormwood |
| <i>Azadirachta indica</i> leaf | Neem |
| <i>Berberis vulgaris</i> root | Barberry |
| <i>Chamaelirium luteum</i> root | False unicorn |
| <i>Coptis chinensis</i> root | Goldthread |
| <i>Commiphora mukul</i> resin | Guggul |
| <i>Embelia ribes</i> fruit | Vidanga |
| <i>Curcuma longa</i> rhizome | Turmeric |
| <i>Emblica officinalis</i> fruit | Amalaki |
| <i>Eucalyptus globulus</i> leaf ^a | Eucalyptus |
| <i>Eucalyptus maculata</i> leaf ^a | Eucalyptus |
| <i>Eucalyptus viminalis</i> leaf ^a | Eucalyptus |
| <i>Gentiana lutea</i> root | Gentian |
| <i>Hemidesmus indicus</i> root | Indian sarsaparilla |
| <i>Holarrhena antidysenterica</i> stem bark | Kutaj |
| <i>Hydrastis canadensis</i> root | Goldenseal |
| <i>Mahonia aquifolium</i> root | Oregon grape |
| <i>Medicago sativa</i> flowering top | Alfalfa |
| <i>Melaleuca alternifolia</i> leaf | Tea tree |
| <i>Mitchella repens</i> leaf | Partridge berry |
| <i>Ocimum basilicum</i> leaf | Basil |
| <i>Piper longum</i> fruit | Long pepper |
| <i>Scutellaria baicalensis</i> root | Asian skullcap, scute |
| <i>Serenoa repens</i> fruit | Saw palmetto |
| <i>Taraxacum officinale</i> leaf and root | Dandelion |
| <i>Terminalia chebula</i> fruit | Chebulic myrobalan |
| <i>Terminalia arjuna</i> stem bark | Arjun |
| <i>Verbena</i> spp. flowering top | Vervain |
| <i>Vitex agnus-castus</i> fruit | Chaste tree, vitex |
| <i>Xanthorrhiza simplicissima</i> root | Yellowroot |
| <i>Zingiber officinale</i> rhizome | Ginger |
| <i>Withania somnifera</i> root | Ashwagandha |

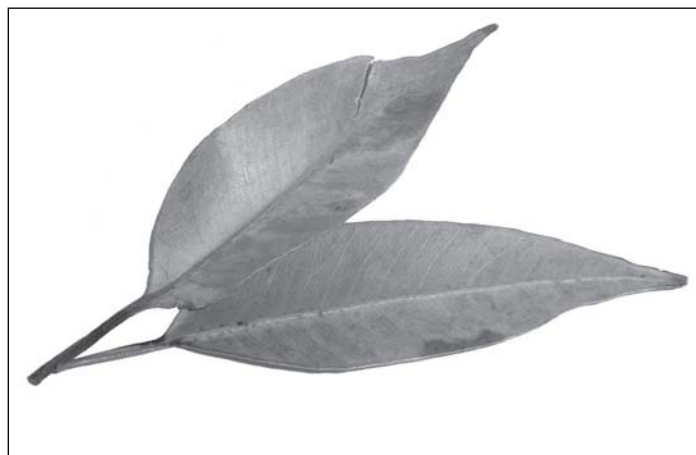
Preparations

| Name | Contents |
|---------------------------------|---|
| Angelica and Sophora Root Pills | b |
| Compound Oldenlandis Mixture | b |
| Sunder Vati | 180 mg of <i>Holarrhena antidysenterica</i> (kutaj) stem bark 30 mg of <i>Emblica officinalis</i> (amalaki) fruit 30 mg of <i>Embelia ribes</i> (vidanga) fruit 10 mg of <i>Zingiber officinale</i> (ginger) rhizome |

^aShowed potential in vitro; ^bFull information not provided in studies of this compound.



Taraxacum officinale (dandelion).



Extract of the leaves of *Eucalyptus globulus*, *E. maculata*, and *E. viminalis* (various species of eucalyptus) all showed potent anti-*P. acnes* activity.



Arctium lappa (burdock).

ultimately equally effective for clearing comedones, although the tea tree oil took longer to show efficacy. Tea tree oil caused significantly less skin irritation than benzoyl peroxide in this trial.

In vitro, microemulsified and liposomally dispersed formulations of tea tree oil at pH 6.5 have shown optimal follicular penetration and antimicrobial activity, although it is unclear whether these products are clinically more effective than direct application of the oil.^{11,12}

We have found that 25–50 percent tea tree oil diluted in jojoba (*Simmondsia chinensis*) oil applied twice daily is highly tolerable and effective for most patients, though occasionally the strong scent of the tea tree oil is unacceptable for daytime application. In such instances, a 5 percent dilution is usually acceptable scent-wise for application in the morning, and the stronger application can be used in the evening or at bedtime.

Because excessive organic matter can interfere with the activity of tea tree oil (and because mild cleansing seems to be helpful empirically),¹³ it is recommended that patients cleanse their skin gently with soap or other cleansers that do not contain any active pharmaceutical ingredients prior to applying the tea tree oil. Jojoba oil is used because it is noncomedogenic and has demonstrated its own inflammation-modulating effects in animal studies.¹⁴

Another clinical trial apparently showed that steam-distilled volatile oil of *Ocimum basilicum* (basil) leaf was effective for patients with acne, but full details of the study could not be obtained.¹⁵ Basil oil is both antimicrobial and inflammation-modulating.¹⁶

In vitro, a methanol-dichloromethane extract of the leaves of *Eucalyptus globulus*, *E. maculata*, and *E. viminalis* (various species of eucalyptus) all showed potent anti-*P. acnes* activity.¹⁷ This activity was strongly associated with flavonoids and chalcones (flavonoid

precursors) in *E. maculata*, which is surprising as these compounds are not normally antimicrobial. Eucalyptus steam-distilled volatile oils have been used successfully and safely for treating skin infections such as scabies in pilot clinical trials.¹⁸ Thus, the potential for eucalyptus volatile oil to help acne patients is good.

Oregon grape crude root extracts and its alkaloids berberine and jatrorrhizine all showed minimum inhibitory concentrations (MIC) of 5–50 mcg/mL against *P. acnes* in vitro.¹⁹ Oregon grape is often used as an antimicrobial clinically and has at least two other properties that make it particularly compelling for patients with acne—the herb is a bitter digestive stimulant and an inflammation-modulator.

Ultimately, it is clear that an antimicrobial approach does not cure most cases of acne, and that the organisms involved are almost certainly responding to other pathologic processes. This broader approach using herbs is completely logical.

Inflammation-Modulating Herbs

Inflammation plays a major role in the pathogenesis of acne. As microcomedones form, a lymphocytic infiltrate occurs and triggers inflammation.²⁰ This tends to trigger follicular ker-

Case Study

Digestive Herbs for Acne

A 23-year-old male patient with mild-to-moderate papulopustular acne on the face, back, and chest that had not responded to systemic erythromycin treatment sought naturopathic care. He also complained of having claylike stools. He was a vegan (and had been for 7 years) except for occasional dairy-product intake and was in a stressful educational program. He used no medication but was taking a multivitamin and vitamin C. Blood tests revealed that he had low-grade macrocytic anemia. Stool fecal-fat analysis indicated elevated fecal-fat levels. Celiac disease was excluded by a negative serum antiendomysial antibody test.

The initial treatment for this patient included:

- Increasing omega-3 fatty acid-rich foods in his diet, particularly (*Linum usitatissimum*) flax oil
- An elimination/challenge diet (which revealed that he had various negative reactions to dairy products, avocados, and chocolate)
- One intramuscular (IM) vitamin B₁₂ shot weekly for 6 weeks.^a

After 3 months on this protocol, the patient had a moderate reduction in number of acne lesions and his anemia was resolved, but his stools had not improved much. Therefore, a bitter tincture formula containing 50 percent *Gentiana lutea* (gentian) root, 30 percent *Taraxacum officinale* (dandelion) leaf, and 20 percent *Mahonia aquifolium* (Oregon grape) root was prescribed at a dose of 2 droppers-full before meals. The patient also decided to start eating fish and began taking 6 g of fish oil per day.

Three (3) months of this program led to a near-total resolution of all lesions as well as normalization of his stools. The bitters were discontinued after 1 more month, and the acne remained almost entirely resolved.

After 1 year that was associated with a severe time of stress, some of his acne lesions recurred, but these were reduced when his stress passed. Reinstating bitters, occasional use of topical tea tree (*Melaleuca alternifolia*) oil in jojoba (*Simmondsia chinensis*) oil, and stress reduction were sufficient to control these episodes. After 4 years of this treatment, the patient would often go for months with no lesions, and acute outbreaks would consist of no more than 4–5 lesions on his back and face.

^aVitamin B₁₂ has been reported to exacerbate acne in some cases, but this patient was vitamin B₁₂-deficient and, clearly, the vitamin was indicated (and it did not exacerbate his acne). This is an instance that illustrates the value of individualized medicine.

atinocytes further to produce more keratin, as well as stimulating increased sebum production and reducing linoleic acid content in the sebum generated by the sebaceous glands. Most Westernized people have experienced the inflammatory nature of acne vulgaris, given the various red, swollen, tender lesions associated with it, particularly papules, pustules, nodules, and cysts.

Herbs that relieve inflammation could therefore also be useful for limiting or resolving acne. Berberine-containing herbs, besides their antimicrobial action already discussed, have been shown to be inflammation-modulating.²¹ Besides Oregon grape, *Berberis vulgaris* (barberry), *Coptis chinensis* (goldthread), *Hydrastis canadensis* (goldenseal), and *Xanthorrhiza simplicissima* (yellowroot) all contain berberine and similar alkaloids. Oregon grape has been shown repeatedly to be helpful in clinical trials for patients with psoriasis, another inflammatory skin condition.²² Acne clinical trials are still lacking but sorely needed.

Scutellaria baicalensis (Asian skullcap, scute) root extracts are

well-established inflammation modulators from traditional Asian medicine.²³ Attention has focused on scute's flavonoids, wogonin and baicalein in particular, as potent inflammation-modulators.^{24,25} The potential for internal and topical administration of this herb to help patients with acne is great, although clinical trials are unfortunately lacking.

Magnolia spp. (magnolia) stem bark is used quite frequently in traditional Asian medicine. Its diphenylpropanid constituents honokiol and magnolol have low MICs against *P. acnes* in vitro.²⁶ The compounds also reduced inflammatory reactions to the microbe in this study, and were nonirritating when applied to the skin of healthy human volunteers. The inflammation-modulating effects of magnolol and honokiol have been shown to be related to their ability to suppress the critical inflammatory mediator NF-kappaB.²⁷ Clinical trials are needed on this promising herb and its constituents.

Preliminary evidence looks promising, but much work remains to be done to prove the value of inflammation-modulating herbs for acne. Many inflammation-modulating herbs or herbal compounds have additional actions, including the antimicrobial effects discussed above. These herbs and compounds often also appear to affect comedone formation.

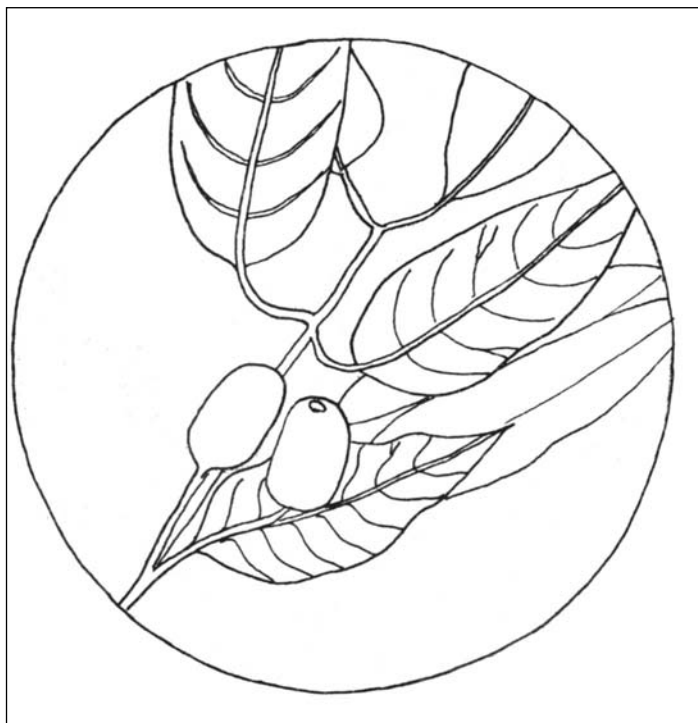
Anticomedogenic Herbs

A comedone arises when a hair follicle is blocked by excess keratin and sebum. If the lipids and/or sebum involved are exposed to air, they oxidize, turning black (forming the infamous "black-head"). If the follicle is completely closed and an anaerobic environment forms, the material is cream-colored (thus forming a "whitehead"). Several natural keratolytics, such as glycolic acid or salicylic acid, are well-established as treatments for comedones. However, these keratolytics tend to be painful when applied and can cause bizarre whitening patterns on the skin. These substances also do not resolve the underlying causes of the comedones.

In contrast, several natural products have been shown to inhibit abnormal lipogenesis—directly and significantly—in hamster sebaceous glands.²⁸ Berberine and wogonin were the most active in this study. In a separate study, a crude extract of goldthread root (which contains berberine alkaloids) at a concentration of just 0.01 percent also had a strongly antilipogenic effect in sebaceous glands.²⁹

While no further work has been done to clarify the clinical relevance of these findings, they indicate yet another way in which the herbs containing these compounds may operate in acne. Thus, one cannot focus too closely on any single action for most herbs that could be beneficial for acne, as research continually shows they have multiple ways of affecting the disease.

In a double-blinded clinical trial, tetracycline 500 mg twice daily or an extract of *Commiphora mukul* (guggul) providing 25 mg guggulsterone twice daily were compared in 20 patients with nodulocystic acne.³⁰ After 3 months, all subjects had similar reductions in the number of inflammatory lesions (approximately 65 percent). Three (3) months after discontinuation of therapy, 4 patients who were previously on tetracycline and 2 who were on guggul relapsed. The researchers suggested that patients with



Terminalia chebula (chebulic myrobalan). Drawing © 2006 by Kathy Abascal, B.S., J.D., R.H. (AHG).

more oily skin reacted best to the guggul, raising the possibility that this agent works by addressing comedogenesis. Guggul also may have antimicrobial and inflammation-modulating activities.

Multiherbal Approaches from Traditional Asian Medicine

In traditional Asian herbal medicines, the standard approach is to combine multiple herbs into a formula suited to an individual patient. While this approach is also used by many herbal practitioners in the western world, it is difficult for mainstream health care providers to understand. When one is schooled in a system of medicine that focuses on single molecular entities to treat disease in broad groups of people, and also having been taught that combining multiple agents is potentially dangerous, polypharmacy makes the use of polyherbal formulas seem quite foreign. Nevertheless, ample experience and published clinical trial data support that this approach can be quite effective.

In a double-blinded trial, four different herbal and mineral combinations were compared with a charcoal placebo in Indian patients with acne vulgaris. Only one of the formulas, Sunder Vati, showed a significant improvement in inflammatory and noninflammatory lesions compared with baseline or placebo.³¹ Sunder Vati contains *Holarrhena antidysenterica* (kutaj) stem bark 180 mg, *Embllica officinalis* (amalaki) fruit 30 mg, *Embelia ribes* (vidanga) fruit 30 mg, and *Zingiber officinale* (ginger) rhizome 10 mg for a total of 250 mg, administered at a dose of 500 mg, three times per day.

Tell Your Patients

Proposed Acne Vulgaris Protocol

Increase omega-3 fatty acid, fruit, and vegetable intakes. Eliminate or greatly reduce *trans*-fatty acid and simple carbohydrate intake. Reduce or eliminate animal product ingestion, and use only organic animal products if any are taken to avoid exogenous hormones. Avoid iodized salt and swimming in chlorinated water.

Use bitter herbs before meals for any suspected or documented problems with malabsorption, hypochlorhydria, or other digestive atony.

Cleanse the skin with non-medicated soap gently on a daily basis.

Apply 5–50 percent tea tree (*Melaleuca alternifolia*) oil diluted in jojoba (*Simmondsia chinensis*) oil topically one to two times per day as needed. Apply after skin cleansing.

Use natural skin moisturizers as needed for dry skin.

As needed, use inflammation-modulating (IM), antimicrobial (AM), and anticomedogenic (AC) herbs internally and topically. A typical formula would be:

- *Mahonia aquifolium* (Oregon grape) fresh root tincture, 20–30 percent (IM, AM, AC, bitter)
- *Scutellaria baicalensis* (scute) decocted dried root tincture, 20–30 percent (IM, AC)
- *Achillea millefolium* (yarrow) fresh flowering top tincture, 10–20 percent (IM, AM, bitter)
- *Curcuma longa* (turmeric) fresh root tincture, 10–20 percent (IM)
- *Commiphora mukul* (guggul) resin tincture, 5–10 percent (AC, IM)
- *Glycyrrhiza glabra* (licorice) dried root fluid extract, 5–10 percent (IM, AM, flavor enhancer)
- *Oplopanax horridum* (devil's club) fresh root bark glycerite, 5–10 percent (if stress is a problem)
- *Vitex agnus-castus* (chaste tree) mature fruit tincture, 10–20 percent (for hormone balancing)
- *Serenoa repens* (saw palmetto) mature fruit tincture, 10–20 percent (if androgens are a factor).

The dose is 1 tsp, three times per day, in water, sipped before meals.

A similar double-blinded trial compared various combinations of internal and external herbal formulas. A combination of *Aloe barbadensis* (aloe vera), *Azardirachta indica* (neem), *Curcuma longa* (turmeric), *Hemidesmus indicus* (Indian sarsaparilla), *Terminalia chebula* (chebulic myrobalan), *Terminalia arjuna* (arjun), *Withania somnifera* (ashwagandha) and *Piper longum* (long pepper) was given orally combined with either a gel or cream of the same formula but without long pepper (which is used orally to increase absorption of other herbs).³²

One group took herbs orally and applied a placebo topically and one group took an oral placebo and an active topical treatment. All groups who used the herbal preparation had improvement compared with no improvement in the placebo group. The active cream preparation combined with oral herbs was judged to be the most effective.³² These inflammation- and immune-modulating herbs definitely should be investigated further for helping patients who have acne.

One preparation, known as Compound Oldenlandis Mixture (COM) in Chinese medicine was compared with Angelica and Sophora Root Pills (ASRP) in 120 patients with acne.³³ COM led

Clinical Trial of Combination Therapies for Acne

In an open clinical trial, 90 of 98 patients had significant improvement on the following protocol over 6 or more months' time, and 42 had 90–100 percent lesion clearance within 2 months. While this trial did not incorporate herbal medicine, it is still important to recognize that dietary approaches to acne are reasonable, safe, effective, and complement an herbal approach.

Supplements

- Vitamin A, water soluble form, 50,000 international units (IU), bid, tapered gradually over the course of the trial
- Vitamin E 400 IU, bid
- Pyridoxine 50 mg qd–bid (in women with perimenstrual acne flares only)
- Benzoyl peroxide, 5 percent gel, topical at night after gently washing with nonmedicated soap.

Vitamin B₁₂ was avoided as it can occasionally exacerbate acne.

Diet

A "well-balanced diet," low in fat and simple sugars was recommended. Processed grain flours with added inorganic iron, which are thought to bind and inactivate vitamin E, were prohibited. Iodized salt, kelp, soft drinks, and milk were prohibited because of their associations with acne.

Exogenous estrogens were also avoided.

Sources: Ayres S, Mihan R. Acne vulgaris: Therapy directed at pathophysiologic defects. *Cutis* 1981;28:41–42; and Adebamowo CA, Spiegelman D, Danby FW, et al. High school dietary dairy intake and teenage acne. *J Am Acad Dermatol* 2005;52:207–214.

to a cure rate of 73 percent compared with 47 percent for the ASRP. While the full details of what was in these formulas are not available, and although arguably a known active treatment was not used as a control, this study still provides some evidence that multiple herbs working in synergy can be quite effective for patients who have acne.

In a similar trial, a topical formula known as *xiao cuo fang* (full details of the contents of this formula were not available) was combined with 0.1 percent adapalene (a synthetic retinoid) gel and compared with topical 0.03 percent retinoic acid cream in 133 patients with acne.³⁴ The adapalene and herbal combination was significantly more effective at reducing the number of acne lesions compared with retinoic acid. Adverse effects caused by the herbal formula were minimal. More-rigorous follow-up research is necessary, but this trial again shows the potential benefit of poly-herbal formulas applied topically in patients with acne vulgaris.

Hormonal Acne

Very often, acne flareups are related to the impending onset of menses. This particular type of acne highlights the fact that acne is often affected by hormone balance in the body. Much work has focused on the potential negative impact of androgens on acne; estrogen and progesterone can definitely also be involved.³⁵

Two herbs are commonly used for addressing hormonal issues that arise in acne. The first is *Vitex agnus-castus* (chaste tree, vitex) fruit. This plant acts in the pituitary gland to balance secretion of

lutetizing and follicle-stimulating hormones, thus regulating estrogen and progesterone levels.³⁶

Preliminary German research confirms that chaste tree can help moderate hormonal acne.³⁷ Chaste tree should be taken throughout the menstrual cycle for optimal effects. Vitex is often used together with vitamin B₆, which has also proven to be quite helpful for resolving hormonal acne, although one comparative trial found that vitex was superior to vitamin B₆ for helping patients with symptoms of premenstrual syndrome.³⁸

When androgens are a problem in acne vulgaris, *Serenoa repens* (saw palmetto) fruit is the first herb most clinicians use. If polycystic ovarian syndrome or documented high serum androgens are present, saw palmetto should be considered to help offset the negative effects of excessive androgens. Saw palmetto does this by moderately inhibiting 5- α reductase (which activates testosterone to the much more potent dihydrotestosterone form) and by antagonizing the androgen receptor.³⁹ No clinical trials were located on the efficacy of saw palmetto in acne. The only other well-documented antiandrogenic herb is *Glycyrrhiza glabra* (licorice), although it also has not been studied for acne in clinical trials.^{40,41}

Other hormone-balancing herbs may have a role in acne vulgaris, including but not limited to, *Medicago sativa* (alfalfa), *Chamaelirium luteum* (false unicorn root), *Verbena* spp. (vervain), and *Mitchella repens* (partridge berry). This is yet another fruitful area for more study.

Conclusions

Much disparate and introductory research exists on the effects of herbs on multiple aspects of acne. A comprehensive approach combining multiple herbs as well as lifestyle and dietary changes has helped people with acne in preliminary clinical trials.

The continued resistance of mainstream dermatology to the possibility of this approach does not optimally serve patients who might be significantly helped by natural therapies. There are sufficient pilot data to warrant larger trials on various herbal medicines in isolation and combined with each other and other natural therapies. The data are also sufficient to support a recommendation for use of these herbs in clinical practice. This is particularly true, given how safe they are. Overall, herbal medicine has much to offer to improve our ability to deal with the complex issues acne presents. □

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