

Home Remedies in Dermatology

Introduction

Home remedies, or home-based remedies, are traditional therapies often utilizing natural products, nutritional supplements, or physical measures. These are often colloquially called folk remedies. They have been in use for centuries in various dermatological disorders. In a study from rural North India, 76% of study participants out of 300 had used traditional therapies alternatively or complementarily to Ayurveda and Unani therapies.^[1] Similarly, in a cross-sectional survey of patients in Germany, 80% of respondents reported using home remedies regularly either due to good experiences with them or as a recommendation from someone.^[2] Many household items like honey, aloe vera, vinegar, common salt, turmeric, onion, garlic extract etc., have been used to treat infectious, inflammatory, or autoimmune dermatoses. Owing to their easy availability, relative safety and ease of application, home-based remedies are the preferred initial treatments by many patients, before consulting a dermatologist. These treatments are often a part of some cultural or social practices as well, which leads to widespread acceptability, apart from being cost-effective. Herein, we review some common household items and their therapeutic uses.

Vinegar

Vinegar is a commonly used food condiment and preservative. It is a combination of acetic acid and water made by a two-step fermentation process using yeast and *Acetobacter*. Based on the source as well as the distillation process, there are several types of vinegar, like white distilled vinegar (produced by fermentation of distilled alcohol), balsamic vinegar (made from fermented grapes), black vinegar (grain-based vinegar), rice vinegar,

apple cider vinegar (made from fermented apple juice), etc. Different concentrations are prepared by diluting them with water. The U.S. FDA requires vinegar to contain at least 4% acetic acid, which is responsible for the tart and pungent flavor and odor. In addition, it contains traces of vitamins, mineral salts, amino acids, and polyphenolic compounds. It is known to have antibacterial, antifungal, and antioxidant properties.^[3] The uses of vinegar are summarized in Table 1.^[4-20]

The adverse effects include burns, (especially in children) and contact dermatitis to nickel, as vinegar increases the leaching of nickel storage containers leading to a higher nickel content.^[3]

Aloe vera

The botanical name of aloe vera is *Aloe barbadensis miller* which belongs to the family Xanthorrhoeaceae. The leaves contain a colorless mucilaginous gel which has been used for various dermatological and non-dermatological indications. Aloe vera gel has a pH of 4.5 and contains 99% water and more than 75 bioactive compounds. Bioactive compounds in aloe vera gel include carbohydrates (monosaccharides like mannose-6-phosphate, polysaccharides like glucomannans, and glycoproteins like alprogen), fatty acids (lupeol and campesterol), minerals (zinc, copper, selenium, and calcium), various vitamins (A, C, E, B₁₂), enzymes (amylase, catalase, and peroxidase), plant hormones (auxins and gibberellins), anthraquinones (aloin and emodin), and miscellaneous compounds like salicylic acid, lignin, and saponins.^[21,22]

The dermatological uses of aloe vera gel along with the proposed mechanism are summarized in Table 2.^[22-27]

Honey

Honey is produced by honeybees from the nectar (a sugary juice) of

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Table 1: Dermatological uses of vinegar (acetic acid)

| Biological effects | Concentration | Mechanism | Uses |
|---|--|---|---|
| Antibacterial ^[4,5] | Bacteriostatic: 0.1% Bactericidal: 2.5%–10% | 1. Fatty acid accumulation leads to the destruction of the cell membrane 2. Change in pH 3. Inhibition of carbohydrate metabolism 4. Increases solubility of antibiotics, improving drug delivery 5. Prevents biofilm formation | 1. Chronic non-healing ulcers (daily soaks with 1% vinegar for 7 to 21 days) 2. <i>Pseudomonas aeruginosa</i> infected wounds (twice daily soaks with 5% vinegar for 14 days) 3. Prevention of skin infection in epidermolysis bullosa and pemphigus vulgaris (0.25%–1% diluted vinegar in the bath or as a compress for 15–20 min). 4. Otitis externa (three times daily application of 0.1% triamcinolone acetonide and vinegar for 7 days) 5. Green nail syndrome (application of ten parts water and one part 4% white vinegar topically for 5–10 minutes twice daily for 5 days) |
| Antifungal ^[6] | 0.5%–5% | 1. Vinegar (and other weak acids) induces a stress response in yeast cells by lowering their pH 2. Black vinegar is utilized as a nail peeling agent to enhance the penetration of ciclopirox olamine nail lacquer | 1. Pityriasis versicolor: 0.5% apple cider vinegar in combination with 2% ketoconazole shampoo leads to faster resolution compared to ketoconazole alone. 2. Onychomycosis: vinegar soaked for 10–15 min before the application of topical antifungals accelerates the penetration of the drug 3. Tinea pedis: Donning vinegar-soaked cotton socks for 10–15 followed by topical antifungal application overnight hastens resolution |
| Removal of nits ^[7] | 4% | Vinegar dissolves the sheath which firmly attaches the nits to the hair shafts. | Soaking the hair with 4% vinegar/acetic acid for 3 min. Vinegar-dipped combs can also be used. |
| Cervical cancer screening ^[8,9] | 3%–5% | Acetic acid coagulates the abnormal proteins within precancerous cells making it opaque and white. | Application of 3%–5% acetic acid on mucosa leads to aceto-whitening and visualization of HPV-infected areas within 1 minute. |
| Atopic dermatitis ^[10] | 0.5% | Apple cider vinegar may be helpful by restoring skin barrier functions | The use is controversial as recent studies have shown no significant effect but skin irritation in the majority of patients. |
| Stoma wounds ^[11–13] | 0.25%–4% | Counteracts the presence of ammonia in urostomy and urinary incontinence and prevents infection in tracheostomy wound | Prevents formation of pseudoverrucous papules and incontinence-associated dermatitis in urostomy and infection in tracheostomy wounds |
| Uremic pruritus ^[14] | 5% (white vinegar) | Relieves itch by restoring the acidic pH of the skin, counteracting urea crystals, and inhibiting serine proteases on cutaneous nerves | Applied to pruritic areas twice daily |
| Marine injuries (jellyfish stings, sea bathers' eruption) ^[15] | 3%–10% | Blocks release of venom from nematocytes | Vinegar is applied over the sting site for 10 min after the removal of the tentacles |
| Striae gravidarum ^[16] | 2% | Stimulates keratinocytes and fibroblasts. | Vinegar-soaked cotton applied twice daily for a month leads to a reduction in size. |
| Seborrheic keratosis ^[17,18] | 5%–15% | Nitrizinc complex® solution containing nitric–zinc solution 30–50% w/w, organic acids (acetic, lactic, and oxalic acid) 5–15% w/w, copper salt 0.001–1% w/w, water QS to 100% w/w | Used in combination with nitric oxide, zinc, and copper salts every week till clinical/dermoscopic resolution or crust formation (for a maximum of four applications) |

Contd...

Table 1: Contd...

| Biological effects | Concentration | Mechanism | Uses |
|----------------------------|---------------|--|--|
| Acne ^[19] | 8% | Disrupts <i>Cutibacterium acnes</i> biofilm and decreases cytokine production | Acetic acid is a constituent of black peel (in combination with jasmonic acid, salicylic acid, potassium iodide, and biosulfur) used for three treatment sittings 2 weeks apart in nodulocystic acne |
| Photoaging ^[20] | 40% | Acts as an exfoliant and decreases melanin content in the horny layer of the epidermis | Used at 2 weekly intervals for four to six sittings. |

HPV: Human papilloma virus

flowers. It is a supersaturated solution composed of carbohydrates (fructose, glucose), proteins, amino acids, vitamins, enzymes, minerals, and other minor components.^[28] More than 181 ingredients are known. Bioactive compounds in honey include amino acids (proline), essential oils (thymol, bisabolol, farnesol, cineol), organic acids (gluconic acid, citric acid, malic acid, lactic acid, succinic acid, oxalic acid, tartaric acid, formic acid, acetic acid, benzoic acid, pyromucic acid), phenolic acids (hydroxycinnamic acid hydroxybenzoic acid), minerals (phosphorus, potassium, calcium, magnesium, sulfur, iron, copper, manganese, zinc), vitamins (thiamine, riboflavin, pyridoxine, p-aminobenzoic acid, folic acid, pantothenic acid, and vitamins A, C, E), enzymes (glucose oxidase, amylase, catalase, peroxidase, invertase, lysozyme), and flavonoids (naringenin, hesperetin, pinocembrin, chrysin, galangin, quercetin, kaempferol).

Apart from honey, other bee products like propolis, bee pollen, bee bread, royal jelly, beeswax, and bee venom are also used in dermatology for their therapeutic or cosmetic potential.^[29] The dermatological uses of honey are summarized in Table 3.^[28-30]

Glycerin

Glycerin or glycerol is a trihydroxy alcohol. It is odorless, viscous, hygroscopic, and sweet to taste. It was discovered by Carl Scheele in 1779. It is produced for commercial use by the saponification of lipids. The hydroxyl groups are responsible for hygroscopicity and water solubility. It is also synthesized endogenously by the pilosebaceous unit and transported to the skin through aquaporin-3. It is also used as a vehicle for many topical preparations.^[31] The dermatologic uses of glycerol are summarized in Table 4.^[31-33]

Turmeric

Turmeric is the dried root (rhizome) of *Curcuma longa* and is a common household condiment used in cooking, cosmetics, and traditional medicine. Curcumin is the active compound found in turmeric. It has many biological properties which makes it useful for both infectious and inflammatory dermatoses. These are summarized in Table 5.^[34-38]

Common salt

Common salt is a safe and cost-effective therapy for lobular capillary hemangioma and umbilical granuloma. Salt baths lessen the sting of bathwater in children with epidermolysis bullosa. It is easily available and free of complications. Its indications include

A. Pyogenic granuloma: Common salt acts by creating hyperosmolarity around the lesion and desiccant action, resulting in the shrinkage of vascular tissue. Thus, it can be used as adjunctive therapy for reducing the size of larger pyogenic granuloma before other procedures. Daruwalla *et al.*^[39] reported 100% resolution with a mean time of 14.77 days and a 94% decrease in bleeding tendency among 50 cases of pyogenic granuloma which healed without any residual scarring. The method of application includes the use of white soft paraffin over perilesional skin followed by daily salt application, preferably at night, and occlusion by surgical adhesive tapes. The dressing should be kept dry until it needs changing the following day. It is a safe and effective treatment option, especially for children, pregnant women, and patients unwilling for invasive procedures.

B. Umbilical granuloma: Umbilical granuloma is seen in the first few weeks of neonatal life after the separation of the umbilical cord. Cooking salt has been used safely as an alternative treatment modality without any complication in different studies. A small amount of common salt is applied to the granuloma after cleaning it and covered with gauze or surgical adhesive tapes for 30 minutes to keep it in place. After that, tapes or gauze has to be removed, and the umbilicus is cleaned with sterile cotton and water to remove the salt. The procedure is repeated for 2 to 3 days. Complete resolution is seen in 2–3 days without any recurrence.^[40] There is also a modified method consisting of a single application of salt under occlusion for 24 hours.^[41]

C. Saltwater bath: Bathing is often painful in patients with inherited epidermolysis bullosa leading to reduced frequency of bathing which increases the chances of infections. Saltwater baths reduce pain, pain medication use, skin odor, and discharge, regardless of EB subtype, age, bath duration, or amount of salt added to bathwater.

Table 2: Dermatological uses of aloe vera gel

| Uses | Components and their mechanism |
|---|--|
| Acute and chronic wounds ^[23] | Bioactive compounds upregulate TGF- β 1, bFGF, and VEGF- α in fibroblasts and cause keratinocyte proliferation and differentiation by lysosomal membrane stability. |
| Photoaging ^[24] | The antioxidant protein, metallothionein, scavenges hydroxyl radicals, making superoxide dismutase and glutathione peroxidase available, reducing the production of keratinocyte-derived anti-inflammatory cytokines and leading to UV-induced suppression of delayed-type hypersensitivity. |
| Antimicrobial (antibacterial, antifungal, and antiviral) effects ^[22,24] | Anthraquinones in it are bacteriostatic against <i>S. aureus</i> and <i>Streptococcus pyogenes</i> . It also inhibits the growth of <i>Candida albicans</i> and is virucidal against the herpes virus. Other antiseptic agents in aloe vera include lupeol, salicylic acid, urea, cinnamomic acid, phenols, and sulfur |
| Acne ^[26] | Bioactive molecules reduce bacterial colonization and inflammation and promote fibroblast proliferation, neocollagenesis, and neovascularization |
| Xerosis ^[27] | Glucomannan, the emollient polysaccharide is responsible for moisturization |
| Post-inflammatory hyperpigmentation ^[22] | Bioactive molecules inhibit tyrosinase and dihydroxyphenylalanine |

TGF- β 1: transforming growth factor- β 1; bFGF: basic fibroblast growth factor; VEGF- α : vascular endothelial growth factor- α

Table 3: Dermatological uses of honey

| Uses | Mechanism of action |
|-------------------|---|
| Wound dressing | Moisturizes injured tissues, prevents microbial infections, decreases inflammation, promotes angiogenesis, granulation, and epithelialization, stimulates lymphocytes and phagocytes, and triggers epithelial-mesenchymal transition in keratinocytes |
| Antibiotic effect | Release of hydrogen peroxide by the action of glucose oxidase, low pH, and low water activity |
| Antifungal effect | The enzyme glucose oxidase in honey is activated upon dilution, converting glucose to gluconic acid and hydrogen peroxide. In addition, the phenolic compounds in honey denature fungal proteins. |
| Antiviral effect | Hydrogen peroxide, vitamin C, phenolic compounds (p-coumaric acid, benzoic acid, pinocembrin), flavonoids (isoquercetin, rutin, and quercetin), and fatty acids (10-hydroxy-2-decenoic acid) have antiviral effects. |

Table 4: Dermatological uses of glycerin

| Uses | Mechanism |
|-----------------------|--|
| Xerosis | Glycerol diffuses into the stratum corneum and retains water due to hygroscopicity. It also alters the hydrophilicity of stratum corneum lipids and proteins. The “bulking” effect (intra- and intercellular expansion of corneocytes) of glycerol, in addition, increases the water-holding capacity of the stratum corneum, improving skin barrier function. |
| Wound healing | It promotes wound healing by restoring epidermal barrier function and improving hydration. |
| Antimicrobial effects | It influences the enzymatic nucleic acid breakdown and thus has both antibacterial, (against <i>S. aureus</i> , <i>P. aeruginosa</i> , and <i>Bacillus subtilis</i>) and antiviral (against herpes simplex virus) effects |

The addition of salt makes bathwater pH neutral or isotonic, and hence decreases pain. Approximately 900 grams (g) of salt is added to 150 litres (L) of

tub water, that is, 6 g/L of water. Since the common household bucket size is 10–20 L, 60–120 g of salt is to be used.^[42,43]

D. Saline soaks: Saline-soaked swab is kept on the lesion for 10–15 minutes to remove crusts from sensitive areas like the periorbital, perioral, face, and genital region. It can also be used to decrease pain and inflammation in lesions of hidradenitis suppurativa or pyoderma gangrenosum.^[44]

Onion extract

Onion juice is effective in the treatment of patchy alopecia areata. Its therapeutic effect is comparable to other available topical immunotherapeutic agents. Sharquie *et al.*^[45] reported significant regrowth of hair in 86.9% of patients (20/23) after twice daily application of onion juice for 2 months. The suggested mechanism of action includes induction of an immunological reaction and antigenic competition which stimulates the regrowth of hair and causes irritant contact dermatitis due to its constituents, phenolic compound, and sulfur.

Duct tape

Occlusive duct tape treatment is a safe and effective method for warts, which was popularized after a study by Focht *et al.*,^[46] comparing duct tape treatment with cryotherapy. This method involves applying a piece of duct tape the size of the wart directly to the wart and removing it 6 days later followed by soaking it in water and scrubbing with an emery board or pumice stone. The wart is kept open to the air overnight followed by repeating the same 6 days cycle the next morning. This process is repeated for up to 2 months. This is a painless and cost-effective procedure. However, more studies are required to cement its evidence.

Garlic extract

Components of garlic (*Allium sativum*) are known to possess antiviral activity and inhibit cellular proliferation of virally infected cells. Dehghani *et al.*,^[47] reported

Table 5: Dermatological uses of turmeric (curcumin)

| Uses | Mechanism | Formulation |
|---|--|--|
| Psoriasis | Inhibits the production of TNF- α and TNF-dependent activation of NF- κ B | Oral curcumin nanoparticles potentiate the effect of acitretin and improve dyslipidemia in patients with psoriasis |
| Atopic dermatitis | p-hydroxycinnamic acid in turmeric inhibits T-cell activation by modulating the protein kinase C pathway | Combination cream improves erythema, scaling, thickening, and itching in patients with eczema |
| Radiation-induced dermatitis | Reduction of inflammation | Oral curcumin (6 g/day) reduces the severity |
| Capecitabine-induced hand-foot syndrome | Antioxidant and anti-inflammatory properties | Prevention by 4 g/day dose |
| Wound care | Curcumin decreases the expression of MMPs, increases hydroxyproline and collagen synthesis, accelerates collagen maturation, and promotes fibroblast differentiation to myofibroblasts | The topical application of curcumin promotes wound healing |
| Photoaging | It inhibits UV-B-induced TNF- α and IL-1 β production and increases the production of hyaluronan | Combination gel (containing turmeric, rosemary, and gotu kola) and oral hot water extract |
| Antibacterial effect | Blue light-activated curcumin disrupts the bacterial cell membrane and is microbicidal against <i>S. aureus</i> (including MRSA) and <i>C. acnes</i> | Topical application |
| Antifungal effect | Induces apoptosis in fungal cells by releasing reactive oxygen and reactive nitrogen species | Topical application |

TNF- α , tumor necrosis factor- α ; NF- κ B, nuclear factor kappa B; MMPs, matrix metalloproteinases; IL-1 β , interleukin-1 β ; MRSA, methicillin-resistant *Staphylococcus aureus*

Table 6: Sources, bioactive compounds, and biological effects of various plant oils

| Oil | Source | Main active compound | Biologic effects |
|---------------|--|--|---|
| Olive oil | Fruits of <i>Olea europaea</i> | Oleic acid, hydrophilic phenols | Anti-inflammatory and antioxidant |
| Sunflower oil | Seeds of <i>Helianthus annuus</i> | Oleic and linoleic acid | Linoleic acid activates PPAR- α stimulating keratinocyte proliferation and lipid synthesis |
| Coconut oil | Kernel of mature coconuts from <i>Cocos nucifera</i> | Free fatty acids (lauric, myristic, palmitic, caprylic, capric, oleic, linoleic, and stearic acid), and monolaurin (monoglyceride) | Moisturizing, antimicrobial, and photoprotective effect |
| Almond oil | Seeds of <i>Oleum amygdalae</i> | Oleic, linoleic, and palmitic acid | Emollient and sclerosant properties |
| Sesame oil | Seeds of <i>Sesamum indicum</i> | Lignans (sesamin, sesamol, sesaminol) | Antioxidant and photoprotective effect |
| Peanut oil | Seed kernels of <i>Arachis hypogaea</i> | Oleic, linoleic, and palmitic acid | Emollient |
| Soybean oil | Seeds of <i>Glycine max</i> | Soy phytosterols and anthocyanin | Emollient, antioxidant, anti-inflammatory, anti-tyrosinase, photoprotective effect |

PPAR- α , peroxisome proliferator-activated receptor- α

complete resolution of cutaneous warts without recurrence at 3–4 months after twice daily application of chloroform extracts of garlic in a placebo-controlled trial. Mousavi et al.^[48] had shown complete resolution of male genital warts after twice daily application of garlic extract with cotton swabs for 8 weeks, which was comparable to cryotherapy.

Bleach

Sodium hypochlorite (or bleach) is commonly used in many households for bleaching clothes. Diluted bleach solution is useful in reducing *Staphylococcus aureus* colonization in patients with atopic dermatitis. A concentration of 2.5 microlitres(μ L)/millilitres (mL) (0.005% NaOCl) is optimal, which is achieved by diluting half a standard cup (i.e., 4 ounces or 118 ml) of 6% common household

bleach in a standard 150 L bathtub full of water or 12 mL of household bleach in 10 L water. A common household bucket size is 2.5–5 gallons (roughly 10–20 L), so 12–24 mL bleach depending on the size of the bucket may be used. Younger children can immerse a significant part of their body in a bucket, and older children can immerse their extremities one by one for 10 minutes, 2 to 3 times every week.^[49]

Plant oils

Plant oils possess many cosmetic and medicinal properties. They form an integral part of routine skin care practices in many cultures and communities. Cold-pressed plant oils are better than refined oils as many properties of these oils are lost during the refining process. Bioactive compounds in various plant

oils have antibacterial (resveratrol and monolaurin), anti-inflammatory (polyphenolic compounds, triterpenes, linoleic and linolenic acid, phospholipids), antioxidant (tocopherols, polyphenolic compounds, triterpenes, resveratrol, sesamin, anthocyanin), skin barrier repair (free fatty acids including linoleic, linolenic, and lauric acid; phospholipids, phytosterols, polyphenolic compounds, triglycerides), wound healing (polyphenolic compounds, triterpenes, oleic acid, lauric acid), permeability-enhancing (oleic and free fatty acids, phospholipids), and anti-photoaging (polyphenolic compounds and sesamol) effects. The details of individual oils are summarized in Table 6.^[50]

Conclusion

Home-based therapies are widely available, inexpensive, and have shown promising results. However, there is still a lack of evidence and well-controlled studies with large sample sizes. Nevertheless, the trust of the general populace in them remains strong. The dermatologist should be familiar with the uses and therapeutic efficacy of home-based therapies which may be advised to patients as an alternative or adjunct treatment, especially to those who cannot afford or do not trust the conventional ones.

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Conflicts of interest

There are no conflicts of interest.

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