



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Article

Toxicity and Adverse Effects of Herbal Ingredients in Cosmetic Products: A Comprehensive Review

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ARTICLE INFO

Published: 31 Oct. 2024

Keywords:

Side Effects, Toxicity,
Cosmetics, Natural.

DOI:

10.5281/zenodo.14016553

ABSTRACT

Herbal ingredients have gained widespread popularity in cosmetic formulations due to their perceived safety and natural origin. However, the assumption that "natural" equates to "safe" is not always valid. Several herbal compounds used in cosmetics are associated with adverse reactions, toxicity, and long-term health concerns. This review critically evaluates the safety of commonly used herbal ingredients in cosmetics, highlighting known toxicities, side effects, and regulatory challenges. By analyzing clinical studies, case reports, and toxicological assessments, this article aims to provide a comprehensive understanding of the potential risks associated with herbal cosmetics. Additionally, it emphasizes the need for stricter regulation and more rigorous safety evaluations to ensure consumer protection.

INTRODUCTION

In recent years, herbal ingredients have become increasingly popular in the cosmetic industry due to growing consumer demand for natural and organic products. Herbs are often incorporated into cosmetics for their antioxidant, anti-inflammatory, and skin-soothing properties, making them a favored choice for skincare, haircare, and body care formulations. Despite their benefits, the use of herbal ingredients is not without risk. Many consumers are under the

misconception that natural products are inherently safe, overlooking the potential for adverse reactions and toxicity.

Several herbs used in cosmetics contain bioactive compounds that can cause skin irritation, allergic reactions, photosensitivity, and even systemic toxicity upon prolonged use. For instance, ingredients like lavender oil, tea tree oil, and aloe vera, though widely used for their therapeutic properties, have been reported to cause adverse effects in certain individuals. Moreover, the lack

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



of standardized regulations and quality control in the herbal cosmetics sector adds to the uncertainty surrounding their safety. This review aims to explore the toxicological profile of commonly used herbal ingredients in cosmetic products, examining their potential side effects and the underlying mechanisms of toxicity. By analyzing existing scientific literature, we aim to provide a detailed understanding of the risks posed by these ingredients and offer recommendations for safer formulation practices and consumer use.

Mucocutaneous and Serious Complications

Acne -Chaste Tree (*Vitex agnus-castus*)

Alopecia- St. John's Wort (*Hypericum perforatum*)

Anaphylaxis- Caraway (*Carum carvi*), Cayenne (*Capsicum annuum*), Echinacea (*Echinacea angustifolia*), Flax linseed (*Linum usitatissimum*), German Chamomile (*Matricaria recutita*), Garlic (*Allium sativum*), Horse Chestnut (*Aesculus hippocastanum*), Mistletoe (*Phoradendron* species), Willow Bark (*Salix alba*)

Burning -Cowhage (*Mucuna pruniens*)

Carcinogenic- Alkanet (*Alkanna tinctoria*), Aloe (*Aloe barbadensis*; *Aloe capensis*: *Aloe vera*), Alpine Ragwort (*Senecio nemorensis*), Areca Nut (*Areca catechu*), Basil (*Ocimum basilicum*), Bergamot (*Citrus aurantium*), Cascara Sagrada (*Rhamnus purshiana*), Coca (*Erythroxylum coca*), Colt's Foot (*Tussilago farfara*), Comfrey (*Symphytum officinale*), Cypress Spurge (*Euphorbia cyparissias*), Dusty Miller (*Senecio aureus*), Forget-me-not (*Myosotis arvensis*), Golden Ragwort (*Senecio aureus*), Groundsel (*Senecio vulgaris*), Hemp Agrimony (*Eupatorium cannabinum*), Jalap (*Ipomoea purga*), Madder (*Rubia tinctorum*), Morning Glory (*Ipomoea hederacea*), Petasites (*Petasites hybridus*), Ragwort (*Senecio jacobaea*), Red Clover (*Trifolium pratense*), Rue (*Ruta species*), Sassafras (*Sassafras albidum*), Senna (*Cassia species*)

Contact Blistering- American Liverwort (*Hepatica nobailis*), Arnica (*Arnica montana*), Bergamot (*Citrus aurantium*), Bitter Orange (*Citrus aurantium*), Black Mustard (*Brassica nigra*), Bulbous Buttercup (*Ranunculus bulbosus*), Buttercup (*Ranunculus acris*), Cashew (*Anacardium occidentale*), Cayenne (*Capsicum annuum*), Clematis (*Clematis recta*), Cypress Spurge (*Euphorbia cyparissias*), Garlic (*Allium sativum*), Ginkgo (*Ginkgo biloba*), Globe Flower (*Trollius europaeus*), Henna (*Lawsonia inermis*), Juniper (*Juniperus species*), Marsh Marigold (*Caltha palustris*), Mezereon (*Daphne mezereum*), Pasque Flower (*Pulsatilla pratensis*), Poison Ivy, Oak, Sumac (*Rhus toxicodendron*) Poisonous Buttercup (*Ranunculus sceleratus*), Rue (*Ruta species*), Savin Tops (*Juniperus sabina*), Senna (*Cassia species*), Tea Tree (*Melaleuca alternifolia* [IgA linear dermatosis]), Traveller's Joy (*Clematis vitalba*), White Bryony (*Bryonia alba*), Wood Anemone (*Anemone nemorosa*)

Conjunctivitis- Black Mustard (*Brassica nigra*), Cypress Spurge (*Euphorbia cyparissias*), German Chamomile (*Matricaria recutita*), Goa Powder (*Andira araroba*), Psyllium (*Plantago ovata*), Psyllium Seed (*Plantago afra*)

Cutaneous, Nonspecific- American Hellebore (*Veratrum viride*), American Liverwort (*Hepatica nobilis*), Arnica (*Arnica montana*), Artichoke (*Cynara scolymus*), Asarum (*Asarum europaeum*), Birch (*Betula species*), Black Bryony (*Tamus communis*), Blessed Thistle (*Cincus benedictus*), Boneset (*Eupatorium perfoliatum*), Bulbous Buttercup (*Ranunculus bulbosus*), Burdock (*Arctium lappa*), Buttercup (*Ranunculus acris*), Camphor Tree (*Cinnamomum camphora*), (Continued Cashew (*Anacardium occidentale*), Castor Oil Plant (*Ricinus communis*), Chaste Tree (*Vitex agnus-castus*), Chaulmoogra (*Hydnocarpus species*), Chicory (*Cichorium intybus*), Chinese Cinnamon (*Cinnamomum aromaticum*), Chinese

Olive (Canarium species), Cinnamon (Cinnamomum verum), Clematis (Clematis recta), Clove (Syzygium aromaticum), Cowhage (Mucuna pruriens), Croton Seeds (Croton tiglium), Cypress Spurge (Euphorbia cyparissias), Elecampane (Inula helenium), English Ivy (Hedera helix), English Lavender (Lavandula angustifolia), Feverfew (Tanacetum parthenium), Ginkgo (Ginkgo biloba), Globe Flower (Trollius europaeus), Goa Powder (Andira araroba), Guaiac (Guaiacum officinale), Hemp Agrimony (Eupatorium cannabinum), Hops (Humulus lupulus), Hydrangea (Hydrangea arborescens), Indian Squill (Urginea indica), Jack-in-the-Pulpit (Arisaema atrorubens), Lesser Celandine (Ranunculus ficaria), Marsh Marigold (Caltha palustris), Mayapple (Podophyllum peltatum), Mugwort (Artemisia vulgaris), Nasturtium (Tropaeolum majus), Nerve Root (Cypripedium calceolus), Night-Blooming Cereus (Selenicereus grandiflorus), Orris (Iris species), Ox-eye Daisy (Chrysanthemum leucanthemum), Pasque Flower (Pulsatilla pratensis), Peppermint (Mentha piperita), Pipsissewa (Chimaphila umbellata), Poisonous Buttercup (Ranunculus sceleratus), Poplar (Populus species), Poppysseed (Papaver somniferum), Savin Tops (Juniperus sabina), Saw Palmetto (Serenoa repens), Scotch Pine (Pinus species), Soapwort (Saponaria officinalis), Spikenard (Aralia racemosa), Spurge (Euphorbia resinifera), Squill (Urginea maritima), Stavesacre (Delphinium staphisagria), Stillingia (Stillingia sylvatica), Tansy (Tanacetum vulgare), Tea Tree (Melaleuca alternifolia), Traveller's Joy (Clematis vitalba), White Bryony (Bryonia alba), White Mustard (Sinapis alba)

Cutaneous Yellowing- Kava Kava (Piper methysticum)

Death- Aristolochia (Aristolochia species), Arnica (Arnica montana), Cayenne (Capsicum annum), Comfrey (Symphytum officinale), Henna (Lawsonia inermis), Kava Kava (Piper

methysticum), Mistletoe (Phoradendron species), Rue (Ruta species), Senna (Cassia species), Yohimbine (Pausinystalia yohimbe)

Dermatitis-Bergamot (Citrus aurantium), Bitter Orange (Citrus aurantium) Bloodroot (Sanguinaria canadensis), Camphor Tree

(Cinnamomum camphora) Caraway (Carum carvi), Cayenne (Capsicum annum), Garlic (Allium sativum), German Chamomile (Matricaria recutita), Ginger (Zingiber officinale), Ginkgo (Ginkgo biloba), Hawthorn (Crataegus species), Henna (Lawsonia inermis), Horse Chestnut (Aesculus hippocastanum), Juniper (Juniperus species), Kava Kava (Piper methysticum), Lavender (Lavandula), Licorice (Glycyrrhiza glabra), Onion (Allium cepa) Peppermint (Mentha piperita), Quinine (Cinchona pubescens) Rue (Ruta species), Squill (Urginea maritima), Stavesacre (Delphinium staphisagria) Tea Tree (Melaleuca alternifolia), Turmeric (Curcuma domestica/longa), Yarrow (Achillea millefolium), Yohimbine (Pausinystalia yohimbe)

Dermatitis, Allergic Contact- Black Mustard (Brassica nigra), German Chamomile (Matricaria recutita), Parsley (Petroselinum crispum), Poison Ivy, Oak, Sumac (Rhus toxicodendron), Rosemary (Rosmarinus officinalis), Tea Tree (Melaleuca alternifolia)

Dermatitis, Contact Irritant- Boxwood (Buxus sempervirens), Cajuput (Melaleuca leucadendra), Copaiba Balsam (Copaifera langsdorffi), Feverfew (Tanacetum parthenium), Lesser Celandine (Ranunculus ficaria), Nutmeg (Myristica fragrans)

Dermopathy—Pellagra-like- Kava Kava (Piper methysticum)

Dyspigmentation, Hair- Trailing Arbutus (Epigae repens)

Dyspigmentation, Skin- Bergamot (Citrus aurantium), Bitter Orange (Citrus aurantium), Cayenne (Capsicum species), Henna (Lawsonia inermis), Trailing Arbutus (Epigae repens)



Dyspigmentation, Teeth- Cayenne (*Capsicum annuum*)

Edematous- Aloe (*Aloe barbadensis*: *Aloe capensis*: *Aloe vera*), Asa Foetida (*Ferula foetida*)—lips, Bitter Orange (*Citrus aurantium*), Buckthorn (*Rhamnus catharticus*), Butterbur (*Petasites hybridus*), Cascara Sagrada (*Rhamnus purshiana*), Chinese Rhubarb (*Rheum palmatum*), Cypress Spurge (*Euphorbia cyparissias*)—eyelid, Ergot (*Claviceps purpurea*)—local, Flax Linseed (*Linum usitatissimum*)—eyelid, Frangula (*Rhamnus frangula*), Ginseng (*Panax species*), Henna (*Lawsonia inermis*), Juniper (*Juniperus species*), Licorice (*Glycyrrhiza glabra*), Mezeoreon (*Daphne mezereum*), Mistletoe (*Phoradendron species*)—lip, Pagoda Tree (*Sophora japonica*)—face, Phellodendron (*Phellodendron species*), Rue (*Ruta species*), Senna (*Cassia species*)

Erythematous- Bergamot (*Citrus aurantium*), Bitter Orange (*Citrus aurantium*), Butterbur (*Petasites hybridus*), Cashew (*Anacardium occidentale*), Flax Linseed (*Linum usitatissimum*), Ginkgo (*Ginkgo biloba*), Henbane (*Hyoscyamus niger*), Henna (*Lawsonia inermis*), Horse Chestnut (*Aesculus hippocastanum*)—facial, Juniper (*Juniperus species*), Mandrake (*Mandragora officinarum*), Mezeoreon (*Daphne mezereum*), Mistletoe (*Phoradendron species*), Poison Ivy (*Rhus toxicodendron*), Rue (*Ruta species*), Stavesacre (*Delphinium staphisagria*), Yohimbe Bark (*Pausinystalia yohimbe*)

Erythema Multiforme- Henna (*Lawsonia inermis*), Tea Tree (*Melaleuca alternifolia*)

Erythema Nodosum- Echinacea (*Echinacea angustifolia*), Mistletoe (*Phoradendron species*)

Erythroderma, Exfoliative- St. John's Wort (*Hypericum perforatum*), Yohimbine (*Pausinystalia yohimbe*)

Fasciculation-

Horse Chestnut (*Aesculus hippocastanum*), Poppysseed (*Papaver somniferum*), Wormseed (*Artemisia cina*)

Glossodynia- Asarum (*Asarum europaeum*), Black Hellebore (*Helleborus niger*), Celandine (*Chelidonium majus*), Croton Seeds (*Croton tiglium*), Cypress Spurge (*Euphorbia cyparissias*), Monkshood (*Aconitum napellus*), Mountain Laurel (*Kalmia latifolia*), Night-Blooming Cereus (*Selenicereus grandifloras*), Peppermint (*Mentha piperita*)

Halitosis- Garlic (*Allium sativum*)

High Morbidity- Blue Cohosh (*Caulophyllum thalictroides*)—shock, Ginkgo (*Ginkgo biloba*)—coma, Licorice (*Glycyrrhiza glabra*)—Rhabdomyolysis

Hypesthesia- Cowage (*Mucuna pruriens*), Croton Seeds (*Croton tiglium*), Cypress Spurge (*Euphorbia cyparissias*), Garlic (*Allium sativum*), Ginseng (*Panax species*), Monkshood (*Aconitum napellus*), Peppermint (*Mentha piperita*)—anal, Tea Tree (*Melaleuca alternifolia*), Tree of Heaven (*Ailanthus altissima*)

Hypohidrosis- Henbane (*Hyoscyamus niger*)

Infection, Predisposition- White Bryony (*Bryonia alba*)

Jaundice- Bishop's Weed (*Ammi visnaga*), Black Cohosh (*Cimicifuga racemosa*), Germander (*Teucrium chamaedrys*)

Keloid- Henna (*Lawsonia inermis*)

Keratosis- Bloodroot (*Sanguinaria canadensis*)

Lichenoid- Henna (*Lawsonia inermis*), Peppermint (*Mentha piperita*)

Leukoplakia- Bloodroot (*Sanguinaria canadensis*)

Lupus Erythematosus- Yohimbine (*Pausinystalia yohimbe*)

Mastitis / Mastodynia / Gynecomastia- Black Cohosh (*Cimicifuga racemosa*), Dong Quai (*Angelica sinensis*), Ginseng (*Panax species*)

Mucositis / Stomatitis- American Liverwort (Hepatica nobilis), Arum (Arum maculatum), Bitter Apple (Citrullus colocynthis), Bulbous Buttercup (Ranunculus bulbosus), Buttercup (Ranunculus acris), Clematis (Clematis recta), Elecampane (Inula helenium), Ginkgo (Ginkgo biloba), Globe Flower (Trollius europaeus), Green Hellebore (Helleborus viridis), Hedge-Hyssop (Gratiola officinalis), Horse Chestnut (Aesculus hippocastanum), Horseradish (Armoracia rusticana), Marsh Marigold (Caltha palustris), Mezereon (Daphne mezereum), Orris (Iris species), Peppermint (Mentha piperita), Poisonous Buttercup (Ranunculus sceleratus), Poke (Phytolacca americana), Spurge (Euphorbia resinifera), Traveller's Joy (Clematis vitalba), White Bryony (Bryonia alba)

Paresthesia- Echinacea (Echinacea angustifolia), St. John's Wort (Hypericum perforatum), Mountain Laurel (Kalmia latifolia)

Pemphigus- Garlic (Allium sativum)

Photoreactions- Angelica (Angelica archangelica), Bergamot (Citrus aurantium), Bishop's Weed (Ammi visnaga), Bitter Orange (Citrus aurantium), Burning Bush (Dictamnus albus), Celery (Apium graveolens), Contrayerva (Dorstenia contrayerva), Dill (Anethum graveolens), Dong Quai (Angelica sinensis), Haronga (Haronga madagascariensis), Henna (Lawsonia inermis), Hogweed (Heracleum spondylium), Kava Kava (Piper methysticum), Lovage (Levisticum officinale), Masterwort (Peucedanum ostruthium), Parsley (Petroselinum crispum), Parsnip (Pastinaca sativa), Pimpinella (Pimpinella major), Rue (Ruta graveolens), St. John's Wort (Hypericum perforatum), Tolu

Balsam (Myroxylon balsamum), Wafer Ash (Ptelea trifoliata), Yarrow (Achillea millefolium)

Pruritis- Arnica (Arnica montana), Black Cohosh (Cimicifuga racemosa), Chaste Tree (Vitex agnus-castus), Cowhage (Mucuna pruriens), Cypress

Spurge (Euphorbia cyparissias), Dan-Shen (Salvia miltiorrhiza), Ergot (Claviceps purpurea), Feverfew (Tanacetum parthenium), Ginkgo (Ginkgo biloba), Ginseng (Panax species), Henna (Lawsonia inermis), Horse Chestnut (Aesculus hippocastanum), Kava Kava (Piper methysticum), Mistletoe (Phoradendron species), Night Blooming Cereus (Selenicereus grandiflorus), Poppysseed (Papaver somniferum), Quinine (Cinchona pubescens), Sandalwood (Santalum album), Senna (Cassia species), Stavesacre (Delphinium staphisagria), St. John's Wort (Hypericum perforatum), Tea Tree (Melaleuca alternifolia)

Psoriasis- Henna (Lawsonia inermis)

Purpura / Hemorrhage / Bleeding Garlic- (Allium sativum), Ginger (Zingiber officinale), Ginkgo (Ginkgo biloba), Ginseng (Panax species), Horse Chestnut (Aesculus hippocastanum), Phellodendron (Phellodendron species), Saw Palmetto (Serenoa repens), St. John's Wort (Hypericum perforatum), Tolu Balsam (Myroxylon balsamum)

Pustular- Bitter Orange (Citrus aurantium), Black Bryony (Tamus communis), Chaste Tree (Vitex agnus-castus), Goa Powder (Andira araroba)

Sialorrhoea- Areca Nut (Areca catechu), Black Hellebore (Helleborus niger), Daffodil (Narcissus pseudonarcissus), Echinacea (Echinacea angustifolia), Jaborandi (Pilocarpus microphyllus), Kousso (Hagenia abyssinica), Mezereon (Daphne mezereum), Mountain Laurel (Kalmia latifolia), Quebracho (Aspidosperma quebrachoblanco),

Stavesacre- (Delphinium staphisagria)

Stomatitis, Ulcerative- Feverfew (Tanacetum parthenium), Mezereon (Daphne mezereum), Tolu Balsam (Myroxylon balsamum)

Sweet's Syndrome- Arnica (Arnica montana), Cayenne (Capsicum species)

Toxic Epidermal Necrolysis / Necrosis / Ulcers-



Arnica (*Arnica montana*), Black Mustard (*Brassica nigra*), Cayenne (*Capsicum annuum*), European Mistletoe (*Viscum album*), Ginseng (*Panax species*), Mezereon (*Daphne mezereum*), Savin Tops (*Juniperus sabina*), White Bryony (*Bryonia alba*)

Urticaria / Angioedema- American Pawpaw (*Asimina triloba*), Black Bryony (*Tamus communis*), Caraway (*Carum carvi*), Chaste Tree (*Vitex agnus-castus*), Echinacea (*Echinacea angustifolia*), European Mistletoe (*Viscum album*), Feverfew (*Tanacetum parthenium*), Garlic (*Allium sativum*), Henna (*Lawsonia inermis*), Milk Thistle (*Silybum marianum*), Psyllium (*Plantago ovata*), Psyllium Seed (*Plantago afra*), Stinging Nettle (*Urtica dioica*), Tolu Balsam (*Myroxylon balsamum*), Yarrow (*Achillea millefolium*)

Vasculitis / Petechiae- Black Cohosh (*Cimicifuga racemosa*), Ginkgo (*Ginkgo biloba*)

Xerostomia- Chaste Tree (*Vitex agnus-castus*), Henbane (*Hyoscyamus niger*), Mandrake (*Mandragora officinarum*), St. John's Wort (*Hypericum perforatum*), Yellow Jessamine (*Gelsemium sempervirens*)

Xerosis- Kava Kava (*Piper methysticum*)

CONCLUSION:

While herbal ingredients in cosmetics offer various benefits, their use is not without risks. This review highlights the potential toxicities and

adverse effects associated with many popular herbal compounds. The misconception that "natural" equates to "safe" has contributed to a lack of awareness about the possible side effects of herbal cosmetics. Regulatory gaps and inconsistent quality control further complicate the safety of these products. Therefore, it is essential for both manufacturers and consumers to be aware of the toxicological risks posed by herbal ingredients. Increased regulation, standardized testing, and better consumer education are necessary to ensure the safe use of herbal cosmetics and to protect public health.

REFERENCES

1. Zoe Diana Draeos Lauren A. Thaman, *Cosmetic Formulation of Skin Care Products* Cosmetic Science and Technology, Taylor & Francis Group, volume 30, 2006
2. Bruno Burlando, Luisella Verotta, Laura Cornara, and Elisa Bottini-Massa, *Traditional Herbal Medicines for Modern Times Herbal Principles in Cosmetics*, Taylor & Francis Group, 2010.

HOW TO CITE: Sayali N. Gade*, Ajay K. Shirsat, Geetanjali G. Tambe, Dr. Sagar S. Muley, *Toxicity and Adverse Effects of Herbal Ingredients in Cosmetic Products: A Comprehensive Review*, *Int. J. of Pharm. Sci.*, 2024, Vol 2, Issue 10, 1837-1842. <https://doi.org/10.5281/zenodo.14016553>