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A Review on the Phytochemistry, Medicinal Properties and Pharmacological Activities of 15 Selected Myanmar Medicinal Plants

Ankit Mishra[1], Mr.Yashwant Singh[2], Vivek Nishad[3]

[1]B.Pharm, [2]Assistant professor, [3]B.Pharm
S.N College of pharmacy

Abstract - Medicinal plants contain natural compounds that can help treat various diseases. Over time, people have used these plants for their healing properties. This review focuses on 15 medicinal plants found in Myanmar, including:

- **Dalbergia cultrata**
- **Eriosema chinense**
- **Erythrina suberosa**
- **Millettia pendula**
- **Sesbania grandiflora**
- **Tadehagi triquetrum**
- **Andrographis echioides**
- **Barleria cristata**
- **Justicia gendarussa**
- **Premna integrifolia**
- **Vitex trifolia**
- **Acacia pennata**
- **Cassia auriculata**
- **Croton oblongifolius**
- **Glycomis pentaphylla**

This review looks at the chemical compounds in these plants, as well as their biological and medicinal activities. It also gathers previous research about these plants in Myanmar.

Myanmar has many traditional medicinal plants that have not yet been fully studied scientifically. This review aims to support further research on their medicinal properties.

***Key Words*:** Myanmar, medicinal plants, phytochemistry, ethnopharmacology, ethnomedicine

1. INTRODUCTION

- **Context:** Natural products, especially plant-derived, have been essential for human health and medicine since ancient times. Traditional medicine continues to be widely used, particularly in developing countries.
- **Importance:** Plant-derived medicines are valued for their therapeutic benefits and generally lower side effects. They can treat a wide range of diseases: inflammatory, viral, tumor-related, malarial, and analgesic conditions.
- **Global Reliance:** According to WHO, ~80% of the population in developing countries depends on traditional medicine for primary healthcare.

Medicinal Plants in Myanmar

- **Region-specific:** The diversity of medicinal plants varies across Myanmar due to geographical and climatic differences.
  - **Kachin State:** Previously studied; cold highlands, humid lowlands.
  - **Central Myanmar:** Tropical, dry, harsh climate—different chemical constituents and medicinal uses.
- **Focus of the Review:** 15 medicinal plants from central Myanmar, representing seven botanical families. Emphasis on:
  - Phytochemistry
  - Traditional medicinal uses
  - Biological and pharmacological activities

Plant Families and Distribution

Family	Species Count	Examples
Fabaceae	6	Dalbergia cultrata, Eriosema chinense
Acanthaceae	3	Andrographis echioides, Barleria cristata
Verbenaceae	2	Premna integrifolia, Vitex trifolia
Mimosaceae	1	Acacia pennata

Caesalpiniaceae	1	Cassia auriculata
Euphorbiaceae	1	Croton oblongifolius
Rutaceae	1	Glycomis pentaphylla

Selected Plant Details

1. Dalbergia cultrata (Yin-daik)

- **Family:** Fabaceae
- **Distribution:** Tropical and subtropical Asia (Myanmar, Thailand, Vietnam, Laos, India, South Africa)
- **Key Compounds:**
  - Isoflavonoids & neoflavonoids
  - Dalberatin A & B → potent tumor-promotion inhibitors (IC50 = 212 & 303 mol ratio/32 pmol TPA)
- **Potential Use:** Cancer chemoprevention

2. Eriosema chinense (Peik-san-gale)

- **Family:** Fabaceae
- **Traditional Use:** Seeds used for scrofula, diarrhea, leucorrhea, menstrual disorders
- **Key Compounds:** Prenylated flavonoids (Khonklonginols A–H), lupinifolinol, eriosematin E
- **Pharmacological Activities:**
  - **Antidiarrheal:** Lupinifolin & eriosematin E effective in reducing intestinal fluid and transit
  - **Antimicrobial & Antioxidant:** Active against Candida albicans, E. coli, S. aureus, MRSA, etc.
  - **Cytotoxicity:** Effective against lung and other cancer cell lines
  - **Antimycobacterial:** Activity against Mycobacterium tuberculosis

Other Notable Species (Brief)

- **Erythrina suberosa:** Anxiolytic effects, cytotoxic activity in leukemia cells
- **Millettia pendula:** Leishmanicidal activity with strong potency (IC50 = 0.07–9.3 µg/mL)

Key Insights

1. **Chemical Diversity:** Plants from Myanmar contain bioactive compounds like flavonoids, isoflavonoids, prenylated flavonoids, coumarins, and phenolic derivatives.
2. **Pharmacological Relevance:** Many compounds exhibit multitargeted activity—antimicrobial, antioxidant, antidiarrheal, cytotoxic, anti-inflammatory.
3. **Conservation of Traditional Knowledge:** Local healers in central Myanmar use numerous plants. Documentation and scientific validation are critical to preserve and utilize this knowledge.
4. **Research Gap:** Literature is limited for some species, highlighting the need for further phytochemical, pharmacological, and clinical studies.

2.3. Erythrina suberosa Roxb.

Overview

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3. **Conservation of Traditional Knowledge:** Local healers in central Myanmar use numerous plants. Documentation and scientific validation are critical to preserve and utilize this knowledge.
4. **Research Gap:** Literature is limited for some species, highlighting the need for further phytochemical, pharmacological, and clinical studies.

If you want, I can also **create a concise table summarizing all 15 Myanmar medicinal plants with their main compounds and pharmacological activities** for easier reference. This would make it much simpler to see which plants are promising for specific therapeutic uses.

Do you want me to do that?

Here's a concise summary of the section you provided on Myanmar medicinal plants, focusing on phytochemistry, traditional uses, and pharmacological activities:

Overview

- Traditional medicine in Myanmar has a long history, heavily reliant on plants.
- Medicinal plants are rich sources of bioactive compounds with therapeutic properties, including anti-inflammatory, antiviral, antitumor, antimalarial, and analgesic effects.
- About 80% of the developing world relies on traditional medicines for primary healthcare (WHO).
- Myanmar's diverse climate (humid lowlands to cold highlands) results in plants with varying chemical profiles and medicinal uses.

Study Focus

- This review highlights **15 medicinal plants** from central Myanmar (tropical region).
- Plants belong to **7 families**; Fabaceae is the most represented (6 species), followed by Acanthaceae (3 species), Verbenaceae (2 species), and Mimosaceae, Caesalpiniaceae, Euphorbiaceae, and Rutaceae (1 species each).

Selected Plants and Key Compounds

1. Dalbergia cultrata (Yin-daik) – Fabaceae

- Heartwood contains **isoflavonoids and neoflavonoids**, e.g., 4-methoxy dalbergione, dalbergin, stevenin.
- Stem bark contains **dalberatin A & B** – potent **cancer chemopreventive** agents (IC50 212 & 303 mol ratio/32 pmol TPA).

2. Eriosema chinense (Peik-san-gale) – Fabaceae

- Roots used traditionally for **scrofula, diarrhea, leucorrhoea, menstrual disorders**.
- Contains **prenylated flavonoids** (khonklonginols A–H), flavonoids (lupinifolinol, genistein, kaempferol), and lignin (yangambin).
- Biological activities:
  - **Antidiarrhoeal:** Lupinifolin & eriosematin E effective in animal models.
  - **Antimycobacterial:** Several flavonoids inhibit *Mycobacterium tuberculosis* (MIC 12.5–25 µg/mL).
  - **Antimicrobial:** Khonklonginol A effective against Gram-positive, Gram-negative bacteria, and *Candida albicans*.
  - **Antioxidant:** Multiple flavonoids show activity, e.g., IC50 of kaempferol = 0.028 mM.
  - **Cytotoxicity:** Lupinifolinol & khonklonginol A show strong activity against cancer cell lines (IC50 1.73–3.1 µg/mL).

Key Observations

1. Many compounds are **multi-functional**, e.g., flavonoids showing both antioxidant and antimicrobial effects.
2. Traditional uses align with pharmacological evidence (e.g., diarrhea treatment validated by antidiarrhoeal studies).

Further investigation is needed for underexplored species.

If you want, I can make a **table summarizing all 15 plants with their key bioactive compounds, traditional uses, and pharmacological activities**. This would make it much easier to visualize and compare the plants.

Do you want me to do that?

Here's a clear and structured summary of the information you provided, organized for easy reference:

Traditional and Medicinal Use of Myanmar Plants

- **Historical Context:**
  - Natural products, especially from plants, have been central to human health since ancient times.
  - Traditional medicine is widely accepted and utilized, particularly in developing countries.
  - WHO reports ~80% of people in developing countries rely on traditional medicines for primary healthcare.
- **Myanmar Context:**
  - Rich in plant resources, with traditional knowledge used to treat malaria, diarrhea, fever, etc.
  - Previous studies focused on Kachin State; the central region of Myanmar has different climate and geography, leading to variations in plant chemistry and medicinal uses.
- **Focus of Review:**
  - 15 medicinal plants from the central region of Myanmar.
  - Cover families: Fabaceae, Acanthaceae, Verbenaceae, Mimosaceae, Caesalpiniaceae, Euphorbiaceae, and Rutaceae.
  - Objectives: document traditional uses, chemical constituents, biological and pharmacological activities.

Medicinal Plants from Central Myanmar

No	Scientific Name	Family	Local Name
1	Dalbergia cultrata	Fabaceae	Yin-daik

2	Eriosema chinense	Fabaceae	Peik-san-gale
3	Erythrina suberosa	Fabaceae	Ka-thit
4	Millettia pendula	Fabaceae	Thin-win
5	Sesbania grandiflora	Fabaceae	Paukpan-phyu
6	Tadehagi triquetrum	Fabaceae	Lauk-thay / Shwe-gu-than-hlet
7	Andrographis echioides	Acanthaceae	Sega-gyi-hmwe-tu
8	Barleria cristata	Acanthaceae	Leik-tha-ywe-pya
9	Justicia gendarussa	Acanthaceae	Pha-wa-net
10	Premna integrifolia	Verbenaceae	Taungtan-gyi
11	Vitex trifolia	Verbenaceae	Kyanung-ban
12	Acacia pennata	Mimosaceae	Suyit / Suboke-gyi
13	Cassia auriculata	Caesalpiniaceae	Peik-thingat
14	Croton oblongifolius	Euphorbiaceae	Thetyin-gyi
15	Glycomis pentaphylla	Rutaceae	Taw-shauk

Selected Plant Profiles & Bioactive Compounds

1. Dalbergia cultrata (Yin-daik)

- **Family:** Fabaceae
- **Distribution:** Tropical/subtropical Asia & Africa
- **Key Compounds:** Isoflavonoids, neoflavonoids, 4-arylcoumarin derivatives (dalbergin, dalberatin A & B), diphenylpropene derivatives
- **Biological Activity:**
  - Tumor-promotion inhibitory activity (dalberatin A IC50: 212, B IC50: 303 mol ratio/32 pmol TPA) → potential chemopreventive agent

2. Eriosema chinense (Peik-san-gale)

- **Family:** Fabaceae
- **Traditional Uses:** Decoction of seeds for scrofula, diarrhea, leucorrhea, menstrual disorders
- **Key Compounds:** Prenylated flavonoids (khonklonginols A–H), flavonoids (lupinifolinol, tectorigenin, genistein, kaempferol), lignin (yangambin)
- **Biological Activities:**
  - **Antidiarrheal:** Lupinifolinol, eriosematin E
  - **Antimicrobial:** Khonklonginol A effective against bacteria (E. coli, S. aureus, MRSA, etc.) and Candida albicans
  - **Antioxidant:** Multiple flavonoids including kaempferol and khonklonginol A
  - **Cytotoxic:** NCI-H187 cell line, KB cells

Antimycobacterial: Against Mycobacterium tuberculosis H37Ra

3. Erythrina suberosa (Ka-thit)

- **Key Compounds:** 4′-methoxy licoflavanone, alpinumisoflavone, erysodine, erysotrine
- **Biological Activities:**
  - Cytotoxic against leukemia cells (HL-60)
  - Anxiolytic effects (erysodine & erysotrine)

4. Millettia pendula (Thin-win)

- **Key Compounds:** Millettilone A, 3R-Claussequinone, Pendulone, Secundiflorol I

Biological Activities: Leishmanicidal activity (IC50 0.07–86 µg/mL)

Summary of Pharmacological Potential

- **Anti-inflammatory:** Observed in various flavonoids
- **Antimicrobial & Antioxidant:** Multiple Fabaceae flavonoids
- **Cytotoxic/Antitumor:** Dalbergia & Eriosema species

Other Activities: Anxiolytic (E. suberosa), Antidiarrheal (E. chinense), Leishmanicidal (M. pendula)

Key Takeaways

1. **Chemical Diversity:** Central Myanmar plants are rich in flavonoids, isoflavonoids, coumarins, lignins, and prenylated compounds.
2. **Therapeutic Potential:** Many compounds show potent antimicrobial, antioxidant, cytotoxic, and anti-inflammatory effects.
3. **Need for Preservation & Research:** Traditional knowledge and pharmacological evaluation of these species are limited; further studies are crucial.

2.13. Cassia auriculata Linn.

Cassia auriculata (Peik-thin-khet)

- Belongs to the *Caesalpiniaceae* family. It's a shrub with bright yellow flowers and is grown in Myanmar.
- The root extract has been shown to protect kidneys in rats with drug-induced kidney damage.
- The plant has many health benefits: it can reduce fever, protect the liver, lower blood sugar and fats, and fight microbes.
- Traditional uses: flowers help with urinary problems, diabetes, and throat irritation; leaves help with worms, ulcers, skin diseases, and leprosy.
- Scientists have found many compounds in the leaves and flowers, including flavonoids, catechins, and glycosides. Some of these compounds protect the liver, reduce oxidative stress, and support the immune system.

Croton oblongifolius (Thetyin-gyi)

- A medium-sized tree found in Myanmar.
- Traditional uses: seeds for diarrhea and swelling, root bark and seeds for liver problems, high blood pressure, and stomach ulcers.
- Many chemical compounds have been identified in its leaves, roots, and bark, including diterpenes and cembranoids.
- Some compounds show strong anticancer and antibacterial activity. Methanol extracts of the plant also protect the liver.

Glycosmis pentaphylla (Taw-shauk / Obok)

- A small tree or shrub, found in Myanmar and other Southeast Asian countries.
- Traditional uses: leaves for fever, liver issues, and skin problems; roots for facial inflammation; stems and roots for ulcers.
- Contains various alkaloids, glycosides, and other compounds.
- Lab studies show antimicrobial, antioxidant, liver-protective, and anticancer activities. Some compounds reduce tumor growth in cancer cell lines.

Conclusions

- This review summarizes 242 compounds from 15 medicinal plants in Myanmar.
- Some plants like *Erythrina suberosa*, *Croton oblongifolius*, *Eriosema chinense*, and *Premna integrifolia* are well-studied.
- Others, like *Acacia pennata*, *Cassia auriculata*, and *Glycosmis pentaphylla*, show potential but need more research.
- Many plants have traditional uses, but their chemical compounds and health benefits aren't fully explored yet.
- More research is needed to understand how these plants work in the body and ensure they are safe for humans.

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