

# **Iridoids, Other terpenoids & Naphthaquinones**

Gentian, Artemisia, taxus, carotenoids

**Presented By;-**  
**Mr. Samarpan Mishra**

# Gentian

Gentian is a bitter crude drug obtained from the dried roots and rhizomes of *Gentiana lutea* L. It belongs to the Gentianaceae family and is mainly used as a bitter tonic, stomachic, digestive stimulant, and appetite stimulant because of its secoiridoid glycosides.

## **Biosources**

|                           |                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------|
| Biological Name           | <i>Gentiana lutea</i> L.                                                               |
| Family                    | Gentianaceae                                                                           |
| Part Used                 | Dried roots and rhizomes                                                               |
| Geographical Distribution | Central and Southern Europe, including the Alps, Spain, France, Italy, and the Balkans |



## **Chemical Constituents**

1. **Gentiopicroside (Gentiopicrin)** – major bitter secoiridoid
2. **Amarogentin** – intensely bitter constituent
3. **Swertiamarin**
4. **Sweroside**
5. **Gentisin**
6. **Isogentisin**
7. **Gentianine**

## **Therapeutic Uses**

1. **Bitter tonic** – Stimulates appetite.
2. **Digestive aid** – Helps improve digestion.
3. **Dyspepsia** – Traditionally used for indigestion.
4. **Appetite stimulant** – Useful in loss of appetite.
5. **Carminative** – Helps relieve digestive discomfort and bloating.



**Commercial Applications**

| S.No | Commercial Product          | Active Constituent(s)         | Uses                                     |
|------|-----------------------------|-------------------------------|------------------------------------------|
| 1    | Gentian Tincture            | Gentiopicroside, Amarogentin  | Bitter tonic and appetite stimulant      |
| 2    | Gentian Liquid Extract      | Gentiopicroside, Swertiamarin | Digestive preparations                   |
| 3    | Gentian Dry Extract Tablets | Gentiopicroside, Amarogentin  | Used for appetite and digestive support  |
| 4    | Digestive Bitters           | Gentian bitter principles     | Improve appetite and digestion           |
| 5    | Herbal Digestive Drops      | Gentian extract               | Relief of digestive discomfort           |
| 6    | Herbal Tea                  | Gentian root constituents     | Traditionally used as a bitter digestive |
| 7    | Digestive Capsules          | Standardized Gentian extract  | Appetite and digestive support           |

# Artemisia

**Artemisia** is a large genus of aromatic medicinal plants belonging to the family **Asteraceae**. Several species are used in traditional medicine, pharmaceutical preparations, and as sources of biologically active compounds and essential oils. *Artemisia annua* is particularly important as a source of **artemisinin**, an antimalarial compound.

## **Biosources**

|                           |                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------|
| Biological Name           | Artemisia annua L.                                                                  |
| Family                    | Asteraceae (Compositae)                                                             |
| Part Used                 | Dried leaves and aerial parts                                                       |
| Geographical Distribution | China, India, Vietnam, East Africa, Europe, and other temperate/subtropical regions |



## **Chemical Constituents**

1. **Artemisinin** – Principal bioactive constituent
2. **Artemisinic acid**
3. **Artemisinic alcohol**
4. **Dihydroartemisinic acid**
5. **Arteannuin B**
6. **Camphor**

## **Therapeutic Uses**

1. **Antimalarial** – Artemisinin is used in the treatment of malaria.
2. **Antipyretic** – Traditionally used to help reduce fever.
3. **Antimicrobial** – Shows activity against selected microorganisms.
4. **Anti-inflammatory** – Certain constituents exhibit anti-inflammatory activity.
5. **Antioxidant** – Flavonoids and phenolic constituents contribute antioxidant activity.



**Commercial Applications**

| S.No | Commercial Product                          | Active Constituent(s)                   | Uses                                          |
|------|---------------------------------------------|-----------------------------------------|-----------------------------------------------|
| 1    | Artemisinin tablets/capsules                | Artemisinin                             | Antimalarial therapy                          |
| 2    | Artemisinin-based combination therapy (ACT) | Artemisinin derivatives                 | Treatment of malaria                          |
| 3    | Artemether formulations                     | Artemether                              | Antimalarial treatment                        |
| 4    | Artesunate injections/tablets               | Artesunate                              | Treatment of severe and uncomplicated malaria |
| 5    | Artemisia herbal tea                        | Plant constituents                      | Traditional herbal preparation                |
| 6    | Artemisia extract                           | Artemisinin and other phytoconstituents | Herbal/phytopharmaceutical preparations       |
| 7    | Artemisia essential oil                     | Camphor, 1,8-cineole, borneol, terpenes | Fragrance and traditional preparations        |

# Taxus

**Taxus** is an important medicinal plant genus belonging to the family **Taxaceae**. Species of *Taxus* are well known as sources of **taxane compounds**, particularly **paclitaxel (Taxol)**, an important anticancer drug.

## **Biosources**

|                           |                                                                         |
|---------------------------|-------------------------------------------------------------------------|
| Biological name           | <b>Taxus baccata L. (European yew)</b>                                  |
| Family                    | <b>Taxaceae</b>                                                         |
| Part used                 | <b>Leaves/needles and young twigs; bark is also a source of taxanes</b> |
| Geographical distribution | <b>Europe, North Africa, Western Asia, and Himalayan regions</b>        |



## **Chemical Constituents**

1. **Paclitaxel (Taxol)** – Principal anticancer constituent
2. **10-Deacetylbaccatin III (10-DAB III)** – Important precursor of paclitaxel
3. **Baccatin III** – Taxane precursor
4. **Cephalomannine** – Taxane compound
5. **7-Epitaxol** – Related taxane
6. **Taxine alkaloids** – Toxic constituents
7. **Flavonoids** – Minor constituents

## **Therapeutic Uses**

1. **Anticancer** – Paclitaxel is used in the treatment of several cancers.
2. **Breast cancer** – Used as part of chemotherapy regimens.
3. **Ovarian cancer** – Used in chemotherapy.
4. **Non-small-cell lung cancer** – Used in selected treatment regimens.
5. **Kaposi sarcoma** – Paclitaxel may be used in advanced disease.

## **Commercial Applications**

| S.No | Commercial Product                        | Active Constituent                                           | Uses                                                  |
|------|-------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|
| 1    | Paclitaxel Injection                      | Paclitaxel                                                   | Treatment of various cancers                          |
| 2    | Albumin-bound Paclitaxel (nab-paclitaxel) | Paclitaxel                                                   | Used in breast, pancreatic and lung cancers           |
| 3    | Docetaxel                                 | Semi-synthetic taxane derived from Taxus precursor compounds | Used in breast, prostate, lung and other cancers      |
| 4    | Paclitaxel-eluting Stent                  | Paclitaxel                                                   | Helps reduce restenosis after coronary intervention   |
| 5    | 10-DAB III Extract/Intermediate           | 10-Deacetylbaccatin III                                      | Pharmaceutical intermediate for taxane synthesis      |
| 6    | Taxane Extracts                           | Paclitaxel and related taxanes                               | Used as raw material for pharmaceutical manufacturing |

# Carotenoids

**Carotenoids** are naturally occurring **yellow, orange, and red pigments** found mainly in plants, algae, and some microorganisms. They are important as **antioxidants, colouring agents, and precursors of vitamin A**.

## **Biosources**

|                                  |                                           |
|----------------------------------|-------------------------------------------|
| <b>Biological name</b>           | <b>Daucus carota L. (Carrot)</b>          |
| <b>Family</b>                    | <b>Apiaceae</b>                           |
| <b>Part used</b>                 | <b>Root</b>                               |
| <b>Geographical distribution</b> | <b>India, Europe, Asia, North America</b> |



## **Chemical Constituents**

1.  **$\beta$ -Carotene** – Major provitamin A carotenoid
2. **Lycopene** – Major antioxidant carotenoid
3. **Lutein** – Important xanthophyll
4. **Zeaxanthin** – Important xanthophyll
5.  **$\alpha$ -Carotene** – Provitamin A
6.  **$\beta$ -Cryptoxanthin** – Provitamin A
7. **Capsanthin** – Red pigment of chilli

## **Therapeutic Uses**

1. **Antioxidant** – Protects cells from oxidative stress.
2. **Provitamin A source** –  $\beta$ -Carotene helps in vitamin A formation.
3. **Eye health** – Lutein and zeaxanthin support retinal health.
4. **Cardiovascular support** – Carotenoids may help protect against oxidative damage.
5. **Skin protection** – Help protect skin from oxidative stress caused by environmental factors.

## **Commercial Applications**

| S.No | Commercial Product                 | Major Active Constituent(s)               | Uses                                      |
|------|------------------------------------|-------------------------------------------|-------------------------------------------|
| 1    | Vitamin A supplements              | $\beta$ -Carotene                         | Vitamin A/provitamin A supplementation    |
| 2    | Eye-health supplements             | Lutein, Zeaxanthin                        | Nutritional support for eye health        |
| 3    | Food colour preparations           | $\beta$ -Carotene, Annatto carotenoids    | Natural yellow-orange colouring           |
| 4    | Tomato/Lycopene supplements        | Lycopene                                  | Antioxidant nutritional supplements       |
| 5    | Multivitamin preparations          | $\beta$ -Carotene, $\beta$ -Cryptoxanthin | Nutritional supplementation               |
| 6    | Cosmetic formulations              | $\beta$ -Carotene, Astaxanthin            | Antioxidant and skin-care formulations    |
| 7    | Animal-feed additives              | $\beta$ -Carotene, Astaxanthin            | Pigmentation and nutritional applications |
| 8    | Beverage and confectionery colours | Carotenoid extracts                       | Natural food colouring                    |



# Thank you

[www.pharmrecord.com](http://www.pharmrecord.com)