

# Huang Lian (Rhizoma Coptidis)



## 黃連 黄连

**Pinyin Name:** *Huang Lian*

**Literal Name:** “yellow connection,” “yellow link”

**Alternate Chinese Names:** *Chuan Lian, Ya Lian, Wei Lian, Ji Zhua Lian*

**Original Source:** *Shen Nong Ben Cao Jing* (Divine Husbandman’s Classic of the Materia Medica) in the second century

**English Name:** coptis, coptis root

**Botanical Name:** *Coptis chinensis* Franch. (*Huang Lian*); *Coptis deltoidea* C. Y. Cheng et Hsiao (*San Jiao Ye Huang Lian*); *Coptis teetoides* C. Y. Cheng (*Yun Lian*); *Coptis omeiensis* (Chen) C. Y. Cheng (*E Mei Ye Lian*)

**Pharmaceutical Name:** Rhizoma Coptidis

**Properties:** bitter, cold

**Channels Entered:** Heart, Liver, Stomach, Large Intestine

### CHINESE THERAPEUTIC ACTIONS

#### 1. Clears Heat and Dries Dampness

**Damp-heat in the Intestines:** Very bitter, very cold, and extremely drying in nature, *Huang Lian* (Rhizoma Coptidis) is one of the strongest herbs to clear heat, dry dampness and eliminate toxins. It is commonly used to treat diarrhea or dysentery that may or may not contain pus and blood, burning sensations of the anus after defecation, foul-smelling stools, rectal tenesmus, feelings of incomplete evacuation, abdominal pain, epigastric distention and fullness, thirst with no desire to drink, vomiting or nausea, a slippery, rapid pulse, and a red tongue with greasy, yellow coating.

- Diarrhea or dysentery with burning sensations of the anus: combine *Huang Lian*, *Huang Bai* (Cortex Phellodendri), *Qin Pi* (Cortex Fraxini), and *Bai Tou Weng* (Radix Pulsatillae). **Exemplar Formula:** *Bai Tou Weng Tang* (Pulsatilla Decoction).
- Diarrhea with rectal tenesmus: use this herb with *Mu Xiang* (Radix Aucklandiae) and *Bing Lang* (Semen Arecae). **Exemplar Formula:** *Shao Yao Tang* (Peony Decoction).
- Diarrhea in exterior syndromes: combine with *Ge Gen* (Radix Puerariae). **Exemplar Formula:** *Ge Gen Huang Qin Huang Lian Tang* (Kudzu, Coptis, and Scutellaria Decoction).
- Diarrhea with bleeding: use *Huang Lian* with garlic.

**Stomach heat:** This condition is usually caused by frequent intake of spicy foods or a chronic state of Liver overacting on the Spleen and Stomach. Common symp-

toms and signs of Stomach heat include vomiting, nausea, gastric pain or burning sensations, acid regurgitation, foul breath, preference for cold drinks, constipation, hunger, swollen or painful gums, toothache, yellow and scanty urine with red tongue and yellow tongue coating. Heat in the Stomach reverses the normal downward flow of Stomach qi and causes nausea and vomiting. Heat enhances the digestive function of the Stomach and thus the patient feels constant hunger. Rising Stomach fire causes the burning epigastric pain, acid reflux, foul breath and swollen, painful gums.

- Nausea, vomiting and feelings of oppression in the chest: use *Huang Lian* with *Gan Jiang* (Rhizoma Zingiberis) and *Ban Xia* (Rhizoma Pinelliae). **Exemplar Formula:** *Ban Xia Xie Xin Tang* (Pinellia Decoction to Drain the Epigastrium).
- Nausea and vomiting from heat in the Stomach: use this herb with *Ban Xia* (Rhizoma Pinelliae) and *Zhu Ru* (Caulis Bambusae in Taenia).
- Gastric pain and ulcers due to Liver fire attacking the Stomach: combine it with *Wu Zhu Yu* (Fructus Evodiae), *Xiang Fu* (Rhizoma Cyperi) and *Yan Hu Suo* (Rhizoma Corydalis).
- Acid regurgitation: add *Hai Piao Xiao* (Endoconcha Sepiae) and *Zhe Bei Mu* (Bulbus Fritillariae Thunbergii).
- Bleeding peptic ulcer: use *Huang Lian* with *Bai Ji* (Rhizoma Bletillae) and *Wu Bei Zi* (Galla Chinensis).
- Feeling of fullness and oppression beneath the Heart with pain during palpation: use it with *Ban Xia* (Rhizoma Pinelliae) and *Gua Lou Shi* (Fructus Trichosanthis). **Exemplar Formula:** *Xiao Xian Xiong*

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*Tang* (Minor Sinking Into the Chest Decoction).

- Ulcers on the tongue: add *Xi Xin* (Herba Asari) and *Zhi Zi* (Fructus Gardeniae) to *Huang Lian*.
- Toothache from Stomach fire: use it with *Sheng Di Huang* (Radix Rehmanniae), *Sheng Ma* (Rhizoma Cimicifugae) and *Bai Zhi* (Radix Angelicae Dahuricae). **Exemplar Formula:** *Qing Wei San* (Clear the Stomach Powder).
- Excessive hunger and thirst from Stomach fire: combine it with *Tian Hua Fen* (Radix Trichosanthis) and *Sheng Di Huang* (Radix Rehmanniae).
- *Xiao ke* (wasting and thirsting) syndrome: use it with *Shi Gao* (Gypsum Fibrosum), *Tian Hua Fen* (Radix Trichosanthis) and *Zhi Mu* (Radix Anemarrhenae).

## 2. Sedates Fire

**Liver fire:** Clinical manifestations of Liver fire include dizziness, headache, redness of the face and eyes, a bitter taste in the mouth, dry throat, short temper, irritability, insomnia or nightmares, burning hypochondriac pain, tinnitus, constipation, hematemesis or epistaxis, a red tongue with yellow coating, and a wiry, slippery and rapid pulse.

- Liver fire: use *Huang Lian* with *Wu Zhu Yu* (Fructus Evodiae), *Chai Hu* (Radix Bupleuri) and *Bai Shao* (Radix Paeoniae Alba).
- Red eyes due to Liver yang rising: use it with *Shi Jue Ming* (Concha Haliotidis), *Jue Ming Zi* (Semen Cassiae), *Long Dan Cao* (Radix Gentianae), *Mu Zei* (Herba Equiseti Hiemalis) and *Ye Ming Sha* (Excrementum Vesperilionis Murini).
- Photophobia, blurred vision, spots in front of the eyes, night blindness and acute conjunctivitis caused by Liver blood deficiency and Liver yang rising: use *Huang Lian* alone in decoction. It can also be used as an external wash for the eyes.

**Heart fire:** Insomnia, tongue ulcers, irritability, mania, incoherent speech, hematemesis, epistaxis, burning sensations in the chest, thirst, red face, dry stools, scanty yellow urine, red tongue tip, scarlet red tongue body, and rapid pulse are all symptoms and signs associated with Heart fire.

- Insomnia and irritability caused by Heart fire: use *Huang Lian* with *Zhu Sha* (Cinnabaris) and *Sheng Di Huang* (Radix Rehmanniae).
- Insomnia and irritability associated with Heart fire and deficiencies of yin and blood: combine it with *E Jiao* (Colla Corii Asini) and *Bai Shao* (Radix Paeoniae Alba).
- Hematemesis and rectal bleeding due to heat in the blood: use *Huang Lian* with *Huang Qin* (Radix

Scutellariae) and *Da Huang* (Radix et Rhizoma Rhei).

- Aversion to heat and irritability due to excess heat and fire: add *Zhi Zi* (Fructus Gardeniae) and *Huang Qin* (Radix Scutellariae). **Exemplar Formula:** *Huang Lian Jie Du Tang* (Coptis Decoction to Relieve Toxicity).
- Delirium: use *Huang Lian* with *Shi Chang Pu* (Rhizoma Acori), *Tian Zhu Huang* (Concretio Silicea Bambusae), *Lian Qiao* (Fructus Forsythiae), and *Sheng Di Huang* (Radix Rehmanniae).

## 3. Clears Fire Toxin

**Dermatological disorders arising from toxic fire:** *Huang Lian* is commonly used to eliminate heat and toxins present at the skin level, characterized by abscesses and lesions. Apply the powder of this herb topically.

- Abscesses, lesions, carbuncles, furuncles, burns, swelling and inflammation due to heat toxins: use this herb with *Huang Qin* (Radix Scutellariae), *Da Huang* (Radix et Rhizoma Rhei) and *Lian Qiao* (Fructus Forsythiae) to clear heat and eliminate toxins. **Exemplar Formula:** *Huang Lian Jie Du Tang* (Coptis Decoction to Relieve Toxicity).

## DOSAGE

2 to 10 grams in decoction. The maximum dosage of *Huang Lian* is 15 grams. *Huang Lian* has different functions depending on how it is processed:

- The unprocessed herb is stronger to clear heat, sedate fire and dry dampness.
- Frying with grain-based liquor gives *Huang Lian* an ascending function and diminishes its bitter and cold impact.
- Frying with *Sheng Jiang* (Rhizoma Zingiberis Recens) and *Wu Zhu Yu* (Fructus Evodiae) gives *Huang Lian* dispersing and ventilating functions, weakens its bitter and cold effects, and enhances its nausea-relieving function.
- Frying with pig bile enhances the effectiveness of *Huang Lian* to sedate fire of the Liver and Gallbladder.

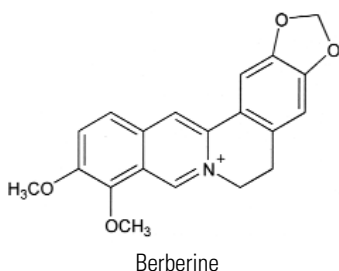
## CAUTIONS / CONTRAINDICATIONS

- *Huang Lian* is bitter, cold and drying. It must be used with caution in patients who have cold, yang deficiency, yin deficiency, or deficiency of the Spleen and Stomach.
- *Huang Lian* is relatively safe, but may be associated with the following side effects: allergic reaction, allergic rash, dizziness, headache, tinnitus, nausea, vomiting, palpitations, shortness of breath, abdominal fullness, diarrhea, and reduction of red blood cells.

## CHEMICAL COMPOSITION

Berberine, coptisine, palmatine, jatrorrhizine, epiberberine, worenine, columbamine, magnoflorine.<sup>1,2</sup>

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## PHARMACOLOGICAL EFFECTS

- **Antibiotic:** *Huang Lian* has a broad spectrum of antibiotic effects against *Bacillus dysenteriae*, *Mycobacterium tuberculosis*, *Salmonella typhi*, *E. coli*, *Vibrio cholerae*, *Bacillus proteus*, *Pseudomonas aeruginosa*, *Diplococcus meningitidis*, *Staphylococcus aureus*, beta-hemolytic streptococcus, *Diplococcus pneumoniae*, *Corynebacterium diphtheriae*, *Bordetella pertussis*, *Bacillus anthracis*, and leptospira. The inhibitory effect is strongest against *E. coli*, *Mycobacterium tuberculosis*, and *Staphylococcus aureus*. Use of *Huang Lian* or its components individually is commonly associated with resistance. On the other hand, the use of *Huang Lian* within an herbal formula reportedly enhances its antibiotic effectiveness over tenfold with little incidence of resistance. Berberine, one of the components of *Huang Lian*, is most effective for gastrointestinal infection, but not for systemic infection, since it has poor absorption by the intestines and a short half-life. In addition to its antibacterial effect, *Huang Lian* also has antifungal and antiviral activities. According to one report, a 15% decoction of *Huang Lian* is effective against numerous pathogenic fungi and dermatophytes. Lastly, *Huang Lian* has an inhibitory effect against influenza and hepatitis viruses.<sup>3,4,5</sup>
- **Anti-inflammatory:** Oral administration of 50 mg/kg of berberine in rats has demonstrated a marked anti-inflammatory effect.<sup>6</sup>
- **Cardiovascular:** Intravenous injection of berberine at 0.1 to 6.0 mg/kg lowered blood pressure in anesthetized dogs, cats and rats. The mechanism of blood pressure reduction is dilation of the blood vessels and inhibition of secretion of the adrenal glands. Berberine also has antiarrhythmic actions.<sup>7,8</sup>
- **Antipyretic:** Intravenous injection of *Huang Lian* has demonstrated antipyretic effects in rabbits. Though the exact mechanism of action is unclear, it is related to cAMP in the central nervous system.<sup>9</sup>
- **Cholagogic:** *Huang Lian* and berberine act to increase production and decrease density of bile acid. Additionally, they reduce the plasma level of cholesterol.<sup>10</sup>
- **Antiulcer:** *Huang Lian* inhibits the secretion of gastric acid and is commonly used in conjunction with other herbs to treat peptic ulcers.<sup>11</sup>

- **Others:** *Huang Lian* has local anesthetic and antidiarrheal effects.<sup>12</sup>

## CLINICAL STUDIES AND RESEARCH

- **Bacterial dysentery:** The use of *Huang Lian*, individually or in an herbal formula, was associated with excellent clinical results in treating over 1,000 patients with bacterial dysentery. The treatments showed marked effectiveness, a short treatment course, and low incidence of side effects.<sup>13</sup>
- **Acute gastroenteritis or enteritis:** An herbal formula (80% *Huang Lian* and 20% *Bai Dou Kou* (Fructus Amomi Rotundus)) was used to treat 100 patients with gastroenteritis at the dosage of 2 to 3 grams given four to six times daily. All patients reported marked improvement.<sup>14</sup>
- **Pulmonary tuberculosis:** In one study, 100 patients with pulmonary tuberculosis were treated with 0.3 grams of berberine three times daily for 3 months with good results.<sup>15</sup>
- **Suppurative otitis media:** An herbal solution (10% *Huang Lian* and 3% boric acid) was decocted twice and filtered. After cleaning the ears, the herbal solution was instilled in the affected ear three to four times daily. The effective rate was 50.8%.<sup>16</sup>
- **Arrhythmia:** One report describes 50 patients with hard-to-treat arrhythmia who were given 0.3 to 0.5 grams of berberine three to four times daily, with marked effectiveness in 40% of the patients.<sup>17</sup>
- **Hypertension:** Accordingly to one study, 88 hypertensive patients were treated with 0.6 to 1.8 grams of berberine three times daily with an effective rate of 70 to 93.3%.<sup>18</sup>
- **Osteomyelitis:** In one study, 87 patients with osteomyelitis were treated with *Huang Lian* decoction three times daily with a 100% success rate, with an average recovery period of 22.32 days. The decoction was prepared by cooking 65 grams of *Huang Lian* powder in 2,000 ml of boiling water for 15 minutes. The herb powder was not filtered out and no preservatives were added.<sup>19</sup>

## HERB-DRUG INTERACTION

- **Cyclophosphamide:** It was reported in an *in vitro* study that the use of berberine in rats was effective in preventing cyclophosphamide-induced cystitis. According to the report, administration of berberine has a dose-dependent effect to block cyclophosphamide-induced bladder edema and hemorrhage, as well as nitric oxide metabolites increase in rat urine and plasma. The study suggested that berberine could be a potentially effective drug in the treatment of cyclophosphamide-induced cystitis, and provides bright hope for the prevention and treatment of cyclophosphamide urotoxicity.<sup>20</sup>

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## TOXICOLOGY

The LD<sub>50</sub> for berberine in mice is 24.3 mg/kg via intraperitoneal injection, with respiratory depression as the main cause of death. In human, rare instances of fatality due to anaphylactic reaction have been reported after intravenous injection of berberine.<sup>21</sup> [Note: Anaphylactic shock is the most severe type of allergic reaction. Unfortunately, it is very difficult, if not impossible, to predict when patients will have such serious reactions. Though there is one case of anaphylactic reaction reported with injection of berberine, oral use of *Huang Lian* does not necessarily have a higher risk of allergy than other herbs.]

## AUTHORS' COMMENTS

*Huang Lian* and *Suan Zao Ren* (Semen Zizyphi Spinosae) both treat insomnia. *Huang Lian* is used for excess fire in the Heart disturbing the *shen* (spirit) and *Suan Zao Ren* is used for Heart and Liver deficiencies with lack of nourishment to the Heart and *shen*.

*Huang Lian* (Rhizoma Coptidis) and *Hu Huang Lian* (Rhizoma Picrorhizae) have similar names and functions. *Huang Lian* clears excess heat with dampness and eliminates toxins to relieve sores and carbuncles. *Hu Huang Lian* is used for steaming bones sensations, *wu xin re* (five-center heat) and other deficiency heat symptoms.

*Huang Lian*, *Chuan Mu Tong* (Caulis Clematidis Armandii), *Mai Men Dong* (Radix Ophiopogonis), and *Tian Zhu Huang* (Concretio Silicea Bambusae) all clear the Heart and eliminate irritability.

- *Huang Lian* is used for febrile disease with excess fire in the Heart disturbing the *shen* (spirit), manifesting in irritability and insomnia.
- *Chuan Mu Tong* is a diuretic that clears damp-heat to relieve irritability with oral ulcers and yellow urine.
- *Mai Men Dong* is a tonic used for deficient Heart yin with heat that manifests as irritability and insomnia.
- *Tian Zhu Huang* dissolves hot phlegm and is best for irritability with spasms and convulsions.

Dr. Shen Yen-Nan reports that specific organs injured by fire can be treated with optimum results by key herbs, as follows:

- Lung fire: *Huang Qin* (Radix Scutellariae) and *Sang Bai Pi* (Cortex Mori)
- Heart fire: *Huang Lian* (Rhizoma Coptidis)
- Stomach fire: *Shi Gao* (Gypsum Fibrosum)
- Liver fire: *Zhi Zi* (Fructus Gardeniae)
- Kidney fire: *Zhi Mu* (Radix Anemarrhenae)

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