



Review Article

Herbal Blood Purifier Syrup: Formulation and Evaluation of Trifolium Pratense and Curcuma Longa Combination

Tanvi Salunke*, Ruchita Phalaskar, Pranali More, Sakshi Mene, Simran Sakpal

Raigad College of Pharmacy, Mohopre, Dr. Babasaheb Ambedkar Technological University Lonere, 402103

This review includes a review of the formulation and scientific validation of a polyherbal syrup developed to purify the blood using Trifolium pratense (Red Clover) and Curcuma longa (Turmeric). These two herbs have many beneficial qualities including strong antioxidant properties, anti-inflammatory actions, hepatoprotective activity, and ability to remove toxins from the body; thus allowing the removal of toxins from the body through detoxification of all parts of the body using these herbs in conjunction with other herbs such as Amla and Yashtimadhu to support this process on differing levels of the three stages of detoxification: neutralization, conversion, and elimination. The pharmacological actions, modes of action, and why they are important for the treatment of blood-related impurities in skin disease, liver failure and metabolic stress are also emphasized for all of the ingredients. The organoleptic properties (taste), pH, viscosity, specific gravitation, and preliminary phytochemical analysis, including two-dimensional thin layer chromatography (TLC), that provide information on how this formula can be standardized for quality, are also highlighted in this review. In summary, there is sufficient scientific support to justify the formulation of a potent, stable polyherbal syrup that purifies the blood using these ingredients.

Keywords: Trifolium pratense, curcuma longa, Blood purifier, Alternative, Detoxification, curcumin, Formulation, Hepatoprotective.

INTRODUCTION

The Basis of Blood Purification – An Introduction – To achieve and sustain positive health, traditional medical systems such as Ayurveda and Traditional Chinese Medicine (TCM) incorporate the cleansing of the blood (Raktashodhan) to remove damaging toxins and metabolic waste products from the body through the combined action of the liver, kidneys and lymphatic system [13]. In modern society, however, many stressors are placed on the body's detoxification systems by contemporary living, resulting in excessive toxic overload that the body's natural detoxifying capabilities cannot handle alone [1]. Consequently, external support is needed to support and enhance our natural detoxification processes [3]. The use of herbal medicine as a safe, effective and readily available source of detoxification support is gaining in popularity due to the ability of herbal preparations to act upon multiple targets in the body

and produce fewer side effects than synthetic pharmaceutical products [2]. The present document will examine the synergistic benefits of the combination of Trifolium pratense and Curcuma longa as a means of developing a new and scientifically validated blood purification formulation [62].

Blood Purification: Definition, Origin, And Effects

Blood purification is scientifically extracting harmful materials, metabolizing wastes, and generating free radicals through validating functions (i.e., liver health, antioxidant function, lipids) [3].

Disease and Injury (Derivative) Causes of Unclean Blood

Toxic build up occurs due to many pollutants, including: improper digestion and formation of undigested toxic by product; constant use of artificial chemicals (pollutants); use of processed food and/or alcohol; excessive exposure to free radicals through an oxidative state [4]. When the body's detoxification systems are mal-functioning (compromised), ultimately results in accumulation, leading to varying degrees of bodily or whole-body physical symptoms resulting in various types of physical and physiological distress [3]:

Skin Disorders: Unclean blood cells are linked with repeated episodes of chronic skin disturbances, such as acne, dermatitis, urticaria, or rashes, often considered to be the skin attempting to remove toxins [5].

Liver Dysfunction: Long-term toxic consumption causes hepatotoxicity, which can lead to dysfunction of liver functions causing jaundice and/or dark urine [5].

Cyclical systemic widespread symptoms would be fatigue, headaches, joint and/or muscle pain/weaknesses, poor blood circulation; all indicating there is impairment of the overall physical systems cleansing process and long-term inflammation [3].

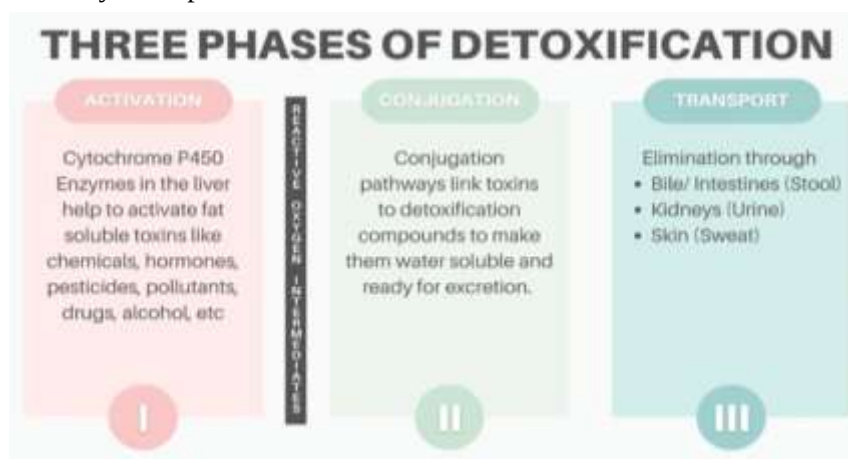
The Three Phases of Natural Detoxification The primary classification for herbs used as Blood Purifiers falls within the general category of "Alterative" herbs. An Alterative can be defined as an agent that brings about a favourable healing response within the body as it progressively returns the body systems into balance by restoring healthy bodily function due mainly to improved elimination

and/or metabolism [3]. This process, as well as how the systemic processes of Effects of Detoxification occur, can be dissected into 3 distinctly different phases which influence which multiple herbal detox programs are used [3]. A brief overview of each of the Detoxification Phases and a description of the herbs typically used in conjunction with these phases – and why they are typically used with these Phase protocols – Is as Follows:

1. Phase I – Process Toxins – In this phase the main focus of the detoxification process will be to neutralize/free radicals and Reactive Oxygen Species (ROS) in the blood and tissues by eliminating oxidative stress/inflammation that exists in the body's tissues as well as circulating through your bloodstream [28]. As a result of oxidizing these toxins, we are able to decrease the oxidative stress level within the tissues, thereby decreasing the potential for causing systemic inflammation of these tissue types [28].

2. Phase II – Conjugate Toxins – This phase occurs mainly in the liver where we metabolize our toxins, using the combined effects of bile and bile acids (cholagogue) and converting lipid-soluble (fat-soluble) toxins into water-soluble (water-soluble) by-products that can be readily eliminated from the body [19].

3. Phase III – Eliminate Processed Toxins – The primary goal of Phase III is to assist in the removal of chemically processed water-soluble by-products of detoxification through three means: Diuresis through your kidneys and Urine, and Lymphatic flow and skin (sweat) to eliminate through your lymphatic system [40].



General information and Mechanism of key herb

1. **Trifolium Pratense**

- Family: Fabaceae
- Active constituent: Isoflavones, flavonoids, phenolic acid
- Pharmacological Action: Antioxidant, Anti-inflammatory, Detoxifying effect, Estrogenic activity
- Uses: Skin disorder, Blood Purification, Menopausal disorder, Cardiovascular support

2. **Curcumin longa (Turmeric)**

- Family: Zingiberaceae
- Active constituent: Curcumin, Demethoxycurcumin, Bisdemethoxycurcumin
- Pharmacological Action: Anti-inflammatory, Antioxidant, Antimicrobial, Hepatoprotective
- Uses: wound healing, Blood Purification, liver disorder, skin diseases

Mechanism

The blood-purifying effect of this polyherbal formulation essentially emanates from blocking the NF- κ B signalling pathway. Isoflavones of *Trifolium pratense* and curcumin of *Curcuma longa* inhibit the activation of NF- κ B, thereby lowering the expression of pro-inflammatory cytokines like TNF- α , IL-6, and IL-1 β , thus decreasing inflammation and related

oxidative stress. The other aspect of the preparation relates to its antioxidant property, which helps in scavenging reactive oxygen species, thus protecting cells from damage. Combined anti-inflammatory and antioxidant activities form detoxification and purification of the blood [66,71].

Other Drugs That Purify Blood

Trifolium pratense and *Curcuma longa* form a solid basis for 20 other herbs that work well together. These 20 herbs provide a strong foundation for supporting detoxification throughout the three phases (processing, neutralising and eliminating) of the detoxification process [58].

4.1 Liver Detoxifiers and Liver Activators (Phase One Processing)

This group focuses on enhancing the liver's ability to process and neutralise toxins. This is achieved by using cholagogue actions to stimulate the release of bile and enzymes that increase detoxification.

1) Guduchi (*Tinospora cordifolia*). This herb helps the liver detoxify, by regulating Phase I detoxification and dramatically increasing the activity of Phase II enzymes. It also demonstrates powerful anti-inflammatory properties related to its ability to protect the liver from damage due to toxins (chemical exposure) [20-21].

2) Bhringraj (*Eclipta prostrata*). This herb is considered one of the best liver tonics, since its active ingredient, Wedelolactone, not only restores antioxidant enzyme levels but has been shown to protect the liver from injury due to toxins [22-23].

3) Kutki (*Picrorhiza kurrooa*). This potent hepatoprotection is also a bitter tonic. Kutki works as a cholagogue to increase bile flow. Increased bile flow allows the liver to more efficiently eliminate toxins [24-25].

4) Dandelion Root (*Taraxacum officinale*). Dandelion Root promotes bile flow, facilitates liver and kidney detoxification, and supports the growth of beneficial bacteria in the gut by providing the prebiotic oligofructans. These oligofructans are vital

to the proper functioning of the gut-liver axis, which is important for detoxification [26-27].

5) Chitraka (*Plumbago zeylanica*). Chitraka is a strong promoter of metabolic fire (Agni) and aids in the absorption of nutrients and the elimination of toxins. Plumbagin, which is present in this herb, has strong hepatoprotective properties [54-55].

4.2 Free Radicals Neutralization and Immune Support:

This group of substances helps to eliminate free radicals and support your body's immune system.

- 1. Amla (*Embllica officinalis*):** Amla is very high in antioxidants (vitamin C and polyphenolic compounds) and is critical to neutralising reactive oxygen species and reducing oxidative stress [28-29].
- 2. Triphala (Amla, Haritaki & Bibhitaki):** The Triphala is an exceptional blend of three plants that provides high levels of antioxidants along with the ability to support your intestinal function as well as to facilitate the elimination process through gentle laxation [30-31].
- 3. Moringa (*Moringa oleifera*):** Moringa has a high concentration of quercetin and phenolic compounds that are powerful antioxidants and anti-inflammatory agents, as well as strong chelating agents [32-33].
- 4. Neem (*Azadirachta indica*):** This tree is highly regarded for its great antimicrobial and antifungal activity, as well as its strong antioxidant effects. For centuries people have treated skin disorders caused by an abnormality of the body's systems using Neem [34-35].
- 5. Khadira (*Acacia catechu*):** The Catechins in Khadira possess very high levels of antioxidant, anti-inflammatory and astringent properties and can help detoxify the body and protect the tissues from damage [36,48].
- 6. Chaparral (*Larrea tridentata*):** The chaparral is a plant from the western United States that contains the strong free radical scavenger

Nordihydroguaiaretic Acid (NDGA) and has historically been used for cleaning deep tissues and treating skin issues and rheumatism [56-57].

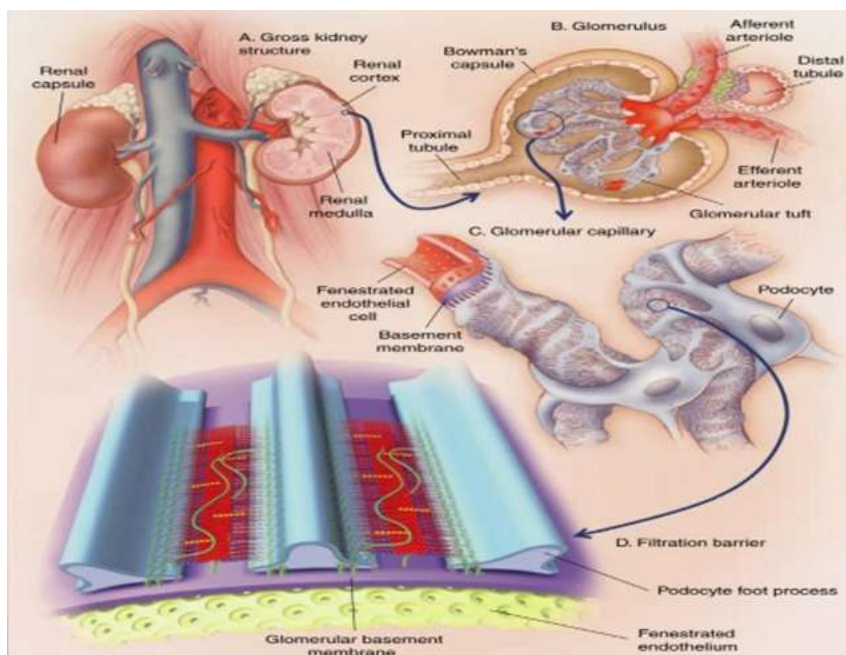
4.3. Diuretics and Lymphatic/Skin Purifiers (Phase of Elimination)

The following herbs are directed toward clearing toxins processed by the body through the kidneys, lymphatic system and skin.

- 1. Manjishta (*Rubia cordifolia*)** is the Ayurvedic gold standard or Raktashodhak; it actively cleanses the blood to support heart function, as well as promote circulation, due to its action on the body's vascularity via its anthraquinone and vasodilation actions; this is a direct result of Manjishta's chemical composition, which includes anthraquinones and amino acids in addition to other properties, as found in Ayurveda references [37-38].
- 2. Sariva (*Hemidesmus indicus*)** is an alterative with a cooling effect and has established efficacy in the treatment of skin conditions; Sariva is known for its anti-poison (Vishaghna) properties due to coumarins and phenolics present in its chemical composition [39,49,50].
- 3. Punarnava (*Boerhavia diffusa*)** contains a chemical called Punarnavine, which has been shown to have proven diuretic action; therefore... [40,41]
- 4. Chirayata (*Swertia chirayita*)** is a very bitter, hepatic tonic and stimulates the production of gastric juices, as well as an alterative, thus helping to remove toxins from the body [42,43].
- 5. Yashtimadhu (*Glycyrrhiza glabra*)** is an important harmonizer and taste-masking agent for other herbs and works to alleviate inflammation caused by the bitterness of other herbs while simultaneously protecting the liver [44,51].
- 6. Burdock Root (*Arctium lappa*)** is an alterative with a long history in Western herbalism; Burdock Root helps to improve the flow of lymph, as well as support the functioning of skin and liver [45,46].
- 7. Sarsaparilla (*Smilax sp.*)** has been used in herbal remedies to purify the blood to help detoxify skin and

joints; the saponins within Sarsaparilla can help to modulate immune function and support the cleansing of the entire system [52,53].

8. Calendula (*Calendula officinalis*) has been used for centuries in herbal remedies to support the healing process and protect against infections [47,76].



Blood Purification with Additional Natural Supplementations

Gotu Kola (*Centella asiatica*): Gradually improves the elimination of foreign materials through improvement of circulation at the microvascular level and antioxidant activity, it helps remove blood vessel toxins and skin tissue toxins. The compounds produced by this plant contribute to collagen development and provide support for the cells in the body that detoxify anything that gets into or is present in the blood [58].

Ashwagandha (*Withania somnifera*): A potent herbal tonic for both the body and mind, ashwagandha assists in the removal of toxins from both blood and tissue through the elimination of free radicals and metabolic waste by reducing overall oxidative stress on the body. It therefore supports a total detoxification of the entire system by normalizing immune function [58].

Gokshura (*Tribulus terrestris*): As its traditional use suggests, gokshura promotes urogenital health, but it also supports kidney function and promotes the excretion of toxins/metabolites via urine output. By doing this, it enables the detoxification of both the liver and the kidneys. This means that your body is

flushing out waste products and toxins that have been introduced via your urine output [40,41].

Tulsi (*Ocimum sanctum*): In addition to its capability to reduce pain and inflammation, tulsi will stimulate the activity of hepatic and renal enzymes that break down these same toxins. This provides a dual benefit: an effective end product of the detoxification of both liquid and solid waste that has entered your body through your blood stream [58].

Green Tea: Green tea is a very potent anti-inflammatory agent. It aids in cleansing of the colon and has various food, vitamin and mineral properties to support healthy digestion [32,33].

Lemongrass: Known to increase urine production, lemongrass helps support the removal of toxins through urine. These toxins are usually released through urine because they are in a soluble form and can be easily excreted from the body [40].

Hibiscus: The hibiscus flower contains antioxidants that help to eliminate the harmful effects of pollutants on the heart and blood vessels. Hibiscus also helps to decrease the amount of toxic substances in the blood and on the cardiovascular system [58].

Papaya: The leaves of papaya have been found to promote the development of platelets and to aid in the removal of toxins through liver function. Papayas also support blood purification and support the immune system [58].

Beets: Beets are a great blood purifier and detoxifier. They contain a large amount of nitric oxide. Nitric oxide increases circulation, which allows a person to eliminate toxins from their body more efficiently [58].

Aloe Vera: Aloe Vera has the ability to remove toxins from the blood and the intestines; therefore it is often used in detoxification products. Aloe Vera can bind to and remove waste materials from the liver and other organs of the body, as well as aid in regulating liver function [58].

Nigella sativa (Black Seed): famous for its antioxidant and anti-inflammatory properties, Nigella sativa (Black Cumin) can also increase blood purification by removing free radicals and helping with microcirculation through congested arteries by clearing out toxic waste particles from the circulatory system. But even though it works this way, it does take some time to see results because it is an indirect approach [56,57].

Guggul (Commiphora mukul): Exerts potent detoxifying effects by stimulating bile flow from the liver, enhancing liver enzyme activities for toxin removal. Guggulsterones are potent hypolipidemic agents. Biological activity data show 2-beta-hydroxy-3-methyl-16alpha-trans-5-hydroxy-Sci-zeopentyl-5-sterone (C₂₃H₃₆O₅) is one such substance with 20-fold 3X greater effect on both liver fat and serum cholesterol levels than the corresponding free 19,17-dihydroxyandrostanoic acid as well as 40X that of its intramuscularly active ethanolic ester (C₂₁H₃₄O₃)—all in parallel studies performed in a two-group controlled trial situation [59].

Trikatu (Piper nigrum, Piper longum, Zingiber officinale) Increases the body's ability to make digestive enzymes, detoxify the gastrointestinal (GI) tract, help with the excretion of metabolic waste products by enhancing the ability to digest food, help eliminate toxins from the body, and aid in the process of helping the body to feel better after eating due to

excess toxins being removed from the GI tract [60,61].

Bhumi Amla (Phyllanthus niruri) This herb has both liver cleansing and kidney cleansing properties and therefore is beneficial in improving the function of the liver and kidneys in detoxification. The kidney detoxification function allows for breaking down of the liver matrix, liver detoxifying through the action of enzymes, encouraging the breakdown of trash (xenobiotics) and aiding in the removal of waste from the bloodstream [20].

Shatavari (Asparagus racemosus): is an adaptogen that contains saponins which help harmonize or restore hormone function in both men and women through gentle detoxification. The saponins enhance the antioxidants in the bloodstream that help detoxify the liver as well [58].

Licorice Root (Glycyrrhiza glabra): supports both the liver and gastrointestinal (GI) tract through the glycyrrhizin compound that stimulates the conjugation and elimination of toxins from the body [44,51].

Celery Seed (Apium graveolens): is a natural diuretic that works to remove and excrete toxins through the kidneys. Herbalists believe that celery is effective in detoxifying the body by helping to remove [40].

Trigonella Foenum-Graecum (Fenugreek) – Fenugreek is rich in dietary fibre & contains saponins that help liver detoxification. Fenugreek may help enhance the natural elimination of waste medicines from the liver and purify the blood [60].

Cynara Scolymus (Artichoke Leaf) – The primary herbal agent used for liver detoxification is Artichoke Leaf. The use of artichoke leaf supports healthy gallbladder function, helps liver enzymes to work more effectively and assists the body in removing toxic substances that affect cholesterol levels, thereby enhancing blood purification [59].

Formulation and Evaluation -

Reasoning behind Development and Evaluation of a product

The creation of an Herbal Blood Purifying Syrup is intended to deliver, absorb, and synergistically provide the four ingredients of herbs for optimal absorption and delivery to the consumer [58].

Reasoning behind the combination of herbs

The synergistic combination of two herbs (*Trifolium pratense* and *Curcuma longa*) and two supporting herbs (*Emblica officinalis* and *Glycyrrhiza glabra*) helps to detoxify the body in various ways:

1. *Trifolium pratense* works as an adaptogenic herb for detoxification and *Curcuma longa* provides hepatoprotective and antioxidant benefits as the primary detoxifiers for the entire body [62].

2. Supporting Agent *Emblica officinalis* (Amla): Amla is high in vitamin C and polyphenols, an antioxidant for the body, supports the following [28,29]:

a. Systemic antioxidant: all tissues are damaged by free radicals;

b. Tissue integrity: Amla helps maintain the structure of all connective tissues within the body.

3. Supporting Agent *Glycyrrhiza glabra* (*Yashtimadhu*): *Glycyrrhiza glabra* has anti-inflammatory effects, protects the liver, and adds taste and tolerance to the product by acting as a natural harmonizer [44,51].

Formulation –

Ingredients	Quantity for 50 ML	Role of Ingredient
<i>Trifolium Pratense</i>	4 gm	Antioxidant, phytoestrogen
<i>Curcumin longa</i>	2 gm	Anti-inflammatory
<i>Yashtimadhu</i>	3 gm	Demulcent
Amla	75 mg	Vitamin C
Green Tea	3 gm	Antioxidant
Honey	15 ml	Sweetner, viscosity enhancer
Peppermint oil	1 drop	Flavouring agent
Glycerine	5 ml	Co solvent, Humectant
Methyl paraben	50 mg	Preservative
Propyl paraben	10 mg	Preservative
Sucrose	30 gm	Syrup Base
Citric acid	75 mg	pH adjuster
Gum Acacia	0.5 gm	Suspending agent
Purified water	q.s to 50 ml	Vehicle

Evaluation Parameters

(1) Organoleptic Properties

The organoleptic properties of the syrup are evaluated for colour, odour, and flavour as determined through visual appearance, smelling and tasting the syrup. The organoleptic properties must be the same across batches of the syrup in order to ensure that the syrup is visually appealing to patients, palatable and has a consistent colour, odour and flavour. This ensures that the syrup will be used by patients and encourage the use of this oral medication [58].

(2) Appearance/Clarity

The appearance/clarity of the syrup are visually examined for homogeneity and any particulate matter. The syrup must be uniform and have a slight viscosity. It should be a clear to slightly cloudy, confirming that the syrup was made correctly and filtered to remove particulate material [63].

3. Evaluation of pH

Clarification: The pH is determined to assess chemical stability of components (i.e., to protect Curcumin), assuring preservative activity (i.e., Sodium Benzoate) and to ensure that the final product does not irritate the oral mucosa from the new syrup [59].

4. Specific Gravity

Clarification: Specific gravity is assessed by pycnometer as part of a Quality Control and consistency of manufacturing from batch-to-batch measurement. This measurement is representative of the entire mass of dissolved solids (sugar, herbal extract) in a volume of syrup [60].

5. Viscosity

Clarification: Viscosity is measured in a viscometer. Viscosity refers to the viscosity of the syrup, thereby affecting pouring characteristics and allowing consumers to dose correctly. Viscosity also determines the mouthfeel of the final product [61].

CONCLUSION:

The documentation of all 22 herbs, with Curcumin as the antioxidants and Formononetin as the alterative properties, creates a comprehensive pharmacological rationale for the complete polyherbal blood cleanser or detoxifier. Compared to simpler single acting remedies, this formula is the next step and additionally provides multi-organ support for complete to systemic detoxification of the body, with a historical record of use over a long period of time, evidence of well-established data, and as a natural compound, a scientifically validated multiple ingredient.

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