



“Polyherbal Syrup for Anemia: Formulation, Characterization and Therapeutic Potential”

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ABSTRACT :

Anti-anaemic syrup is used in the treatment of anaemia. Anemia is common form of nutritional disorder, the principal cause of which iron deficiency. It is prevalent in both industrial and developing countries. Iron deficiency is the most common single nutrient deficiency in the world, affecting about 15% of the world population, 35% of women and 43% of young children. Decoction method is used to formulate anti-anaemic syrup. Following drugs are used in the formulation of anti-anaemic syrup Gilloy, Drumstick, Pomegranate, Amla, Raisins. Sugar base is used in formulation. Evaluation tests like pH, Odour, Taste, Colour, Smell, Viscosity are carried out.

Keywords: Anemia, iron deficiency, health survey, child health, maternal health.

INTRODUCTION :

Anemia is a common blood disorder that affects people of all ages, although those at greater risk are the elderly, young women of child-bearing age, and infants. Medically, anemia stands for a lowered hemoglobin level (normal for males: 13.5 - 17.0 gm% & for females: 12.0-15.5 gm%), either with normal or lowered red blood cells, depending on age and sex. Hemoglobin is a basic requirement of the body necessary for transporting oxygen throughout the body. Hemoglobin functions as the moving power station in the body. So, lowered hemoglobin may cause fatigability, unusual tiredness, and energy shutdown in all parts of the body. There are over 400 types of anemia, many of which are rare, but in all cases, there is a lower than the normal number of circulating red blood cells. Presently, more than half of the world's population experiences some form of anemia in the air lifetime. Anemia usually presents a wide range of symptoms. Each patient may suffer from different symptoms according to their disease and intensity.

The common symptoms are lack of concentration, getting irritated for trivial issues, feeling exhausted with profound weakness, giddiness/ fainting / blackouts / headaches, short shallow breath with a requirement of deep breath often, weak rapid pulse and low blood pressure, palpitations and breathing difficulty on exertion or climbing stairs, chest pain / vague discomfort in the chest on exertion, pallor of the skin / nails / mucous membranes of the skin / nails / mucous membranes of mouth, smooth glossy tongue with cracks or sores, cracks or sores in the angle of the mouth, tinnitus, loss of appetite, spoon-shaped nails/brittle nails, spleen enlargement, ankle oedema, poor growth, etc. Dietary changes and iron supplementation are commonly preferred for the management of anemia. Oral iron therapy has many disadvantages such as insufficient absorption and lack of compliance.

Furthermore, consuming high quantities of these iron supplements can lead to serious health-related complications such as certain neurogenic disorders or cancer. All these facts demonstrate the need to have a safe and effective alternative for the management of anemia. To address this pressing issue of anemia, the formulation and evaluation of a polyherbal syrup for anemia offer a promising avenue for holistic treatment. This innovative approach involves blending various medicinal herbs, natural ingredients, and known for their hematopoietic and iron-boosting properties, ultimately aiming to create an effective and well-tolerated remedy for anemia.

This introduction will explore the rationale behind such an endeavor, emphasizing the need for a safe and efficient polyherbal syrup to combat anemia and improve the quality of life for those affected. The formulation and evaluation of a polyherbal syrup for anemia are an intricate process that combines traditional knowledge with modern scientific research. The combination of various medicinal herbs can offer synergistic benefits, addressing not only the iron deficiency at the core of anemia but also factors like inflammation, oxidative stress, and absorption issues that contribute to the condition's complexity. The formulation of such a syrup involves the careful selection of herbs with known hematopoietic properties, iron-rich constituents, and compounds that enhance iron absorption.

Evaluating its efficacy and safety includes rigorous scientific testing, clinical trials, and quality control measures to ensure that the syrup is not only effective but also free from adverse effects. In an era where the demand for natural and holistic treatments is on the rise, a well-formulated and

thoroughly evaluated polyherbal syrup for anemia could provide a valuable addition to the arsenal of healthcare solutions. It holds the potential to improve the lives of millions suffering from anemia, offering a safe, convenient, and complementary approach to conventional therapies.

TYPES OF ANEMIA :

Types of anemia:

Iron deficiency anemia. Too little iron in the body causes this most common type of anemia.

Bone marrow needs iron to make hemoglobin. Without enough iron, the body can't make enough hemoglobin for red blood cells.

Pregnant individuals can develop this type of anemia if they do not take iron supplements. Blood loss can also cause anemia. Blood loss might be due to heavy menstrual bleeding, an ulcer, cancer, or regular use of some pain relievers, especially aspirin.

Vitamin deficiency anemia: Besides iron, the body lacks folate and vitamin B-12 to make enough healthy red blood cells. A diet that doesn't have enough of these and other essential nutrients can result in the body not producing enough red blood cells. Additionally, some people cannot absorb vitamin B-12. This can lead to vitamin deficiency anemia, also known as pernicious anemia.

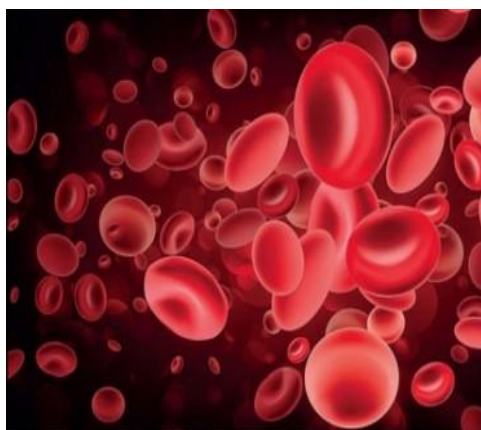
Anemia of inflammation: Diseases that result in ongoing inflammation can prevent the body from producing enough red blood cells. Examples include cancer, HIV/AIDS, rheumatoid arthritis, kidney disease, and Crohn's disease

Aplastic anemia: is a rare, life-threatening condition that occurs when the body doesn't produce enough new blood cells. Causes of aplastic anemia include infections, certain medications, autoimmune diseases, and being in contact with toxic chemicals.

Anemia linked to bone marrow disease: such as leukemia and myelofibrosis, can affect how the bone marrow produces blood. The effects of these diseases range from mild to life threatening.

Hemolytic anemia: This group of anemias occurs when red blood cells are destroyed faster than the bone marrow can replace them. Certain blood diseases increase how fast red blood cells are destroyed. Some types of hemolytic anemia can be passed through families, which is called inherited.

Sickle cell anemia: It is inherited and sometimes severe condition that is a type of hemolytic anemia. An unusual hemoglobin forces red blood cells into an unusual crescent shape, called a sickle. These irregular blood cells die too soon. That causes an ongoing shortage of red blood cells.



Plant Profile

Raisins

Scientific name: *Vitis vinifera*

Family: Vitaceae.

Black raisins contain magnesium (Mg), which plays a very important role in assisting the activation of vitamin D and regulating calcium requirements to support bone growth and formation. They contain good amounts of iron, copper, calcium, and vitamins that are essential for making red blood cells and carrying oxygen throughout the body. Raisins are also a good source of antioxidant compounds. They fight against cancer. Prevent too much acidity, and improve digestion.

Geographical Source: A raisin is a dried grape. Raisins are produced in many regions of the world and may be eaten raw or used in cooking, baking, and brewing. In the United Kingdom, Ireland, New Zealand, Australia, South Africa, India, Iran, and Turkey.

Morphology: They have a black color and a tangy, sweet taste.

Active constituents: Carbohydrates (including 4% fiber), protein, and negligible fat, several dietary minerals, riboflavin, vitamin B6, and phenolic and flavonoid antioxidants. One-half cup of raisins contains 1.3 milligrams of iron.

Use: aids digestion and reduces stomach issues. Shows anti-inflammatory properties, improves intestinal function. Increase the hemoglobin levels.



Amla

Scientific name: *Phyllanthus emblica*.

Family: Phyllanthaceae

Amla is one of the most popular botanicals with a wide range of uses in medicine, cuisine, and cosmetic industries. Amla is excellent for removing iron-deficiency anemia as it is a rich source of vitamin C, which helps in the absorption of iron. Once there is adequate absorption of iron in the body, there is more absorption of hemoglobin. It increases RBC count, hemoglobin level, and treats hemolytic anemia.

Geographical Sources: India, Southeast Asia, China, Iran, and Pakistan.

Morphology: The flowers are greenish-yellow. The fruit is nearly spherical, light greenishyellow, quite smooth, and hard in appearance, with six vertical stripes or furrows.

Active constituents: The fruit of Amla is rich in vitamin C (ascorbic acid) and contains several bioactive phytochemicals, of which the majority are polyphenols (ellagic acid, chebulinic acid, gallic acid, chebulagic acid, apigenin, quercetin, corilagin, leutolin).

Uses: Helps fight against the common cold, Lowers Cholesterol Levels, improves digestion, anti-aging, cancer prevention, heartburn reduction, and heart-health effects, antianemic.

Antioxidants, antimicrobial, anti-anemic, anti-diabetic, and anti-radiation protection.



Giloy

Scientific name: *Tinospora cordifolia*.

Family: Menispermaceae.

Common names include gurjo, heart-leaved moonseed, guduchi, or giloy. It is a multipurpose plant, and its different dosage forms are used for various purposes. Giloy reduces blood sugar by making cells less insulin resistant. Helps in increasing blood. The methanolic extract of the stem of *Tinospora* has been reported antioxidant activities by increasing the erythrocyte membrane lipid peroxide and catalase activity. It shows anti-toxic activity.

Geographical source: Tropical areas of India, Myanmar, and Sri Lanka

Morphology: It is a large, deciduous, extensively-spreading, climbing vine with several elongated twining branches. Leaves are simple, alternate, and exstipulate with long petioles up to 15 cm (6 in) long which are roundish and pulvinate, both at the base and apex with the basal one longer and twisted partially and halfway around. It gets its name heart-leaved moonseed from its heart-shaped leaves and its reddish fruit.

Active constituents: Alkaloids, diterpenoid lactones, glycosides, steroids, aliphatic compounds, and polysaccharides. Giloy is known for its rich content of vitamins and minerals. It is a good source of vitamin C, iron, calcium, and zinc.

Uses: Immune-boosting properties. It is also believed to have anti-inflammatory, anti-arthritic, antioxidant, hepatoprotective, anti-asthma, and anti-aging effects. Some people use it to help treat fever, respiratory issues, and digestive problems.



Drumstick Tree

Scientific name: *Moringa oleifera*

Family: Moringaceae

It is a small, fast-growing, evergreen tree that grows in tropical regions. It is found in the Himalayan areas of India, Bangladesh, Afghanistan and Pakistan. Drumstick is also known as horseradish tree and drumstick. Globally, the most important cause of anemia is believed to be iron deficiency due to inadequate dietary intake, physiological demands for rapid growth, and iron loss during menstrual cycles. Other prevalent causes of anemia included, malaria, chronic infection, and nutritional deficiencies of vitamin A folate and vitamin B12. Vitamin C is a well-known enhancer of bioavailability. Every 100 gm portion of leaves could provide women with over a third of their daily need of calcium and give them important quantities of iron, protein, copper, and sulfur B-Vitamin.

Geographical source: India, Africa, and numerous other tropical and arid countries.

Morphology: It has a spreading, open crown of drooping, fragile branches, feathery foliage of tripinnate leaves, and thick, corky, whitish bark. The leaves are bipinnate or more commonly tripinnate, up to 45 cm long, and are alternate and spirally arranged on the twigs.

Chemical constituent: Phenolic acids, isothiocyanates, tannins, flavonoids, and saponins,

Uses: controls diabetes and high blood pressure, fortifies the bone, improves skin health, treats erectile dysfunction, and enhances libido. Drumstick Leaves Juice every day helps your skin to delay or prevent cell damage, reduces the elasticity of the skin, and wrinkles,



Pomegranate

Scientific Name: *Punica granatum*

Family: Punicaceae

A pomegranate is a sweet, tart fruit with thick, red skin. People have enjoyed pomegranates since ancient times for their health benefits. Modern research has found that the antioxidants in pomegranates can help protect your heart. The anti-inflammatory and antitumor properties of pomegranates may have promising use in cancer treatment and prevention also use in treatment of anemia.

Geographical Source: Its native range is Iran and northern India, yet it has successfully been cultivated in regions around these countries for long periods of time, including regions of the Middle East, Mediterranean, Northern Africa, and parts of Asia.

Morphology: The fruit is the size of a large orange, obscurely six-sided, with a smooth leathery skin that ranges from brownish yellow to red; within, it is divided into several chambers containing many thin transparent arils of reddish, juicy pulp, each surrounding an angular elongated seed.

Active Constituent: Pomegranate is a potent antioxidant. This fruit is rich in flavonoids, anthocyanins, punicalic acid, ellagitannins, alkaloids, fructose, sucrose, glucose, simple organic acids, and other components and has antiatherogenic, antihypertensive, and anti-inflammatory properties.

Uses: In treating diarrhea, dysentery and intestinal parasites. Pomegranate is well known for antioxidant properties. It helps in preventing the formation of skin cancer by reducing the frequency of lesions. It provides relief from minor skin irritations, such as dry skin, eczema.



Material used

1. Gilloy
2. Amla
3. Raisins
4. Drumsticks
5. Pomegranate
6. Preservatives: Sodium Benzoate
7. Essence: Pineapple

Method :

Step No.1: Make a strong herbal decoction

Combine all dried form of ingredients like Gilloy, Amla, Moringa leaves, Raisins, Pomegranate into a large soup pot except honey and molasses. Over medium-high heat, bring the mixture to just a boil, and then turn heat to low, place a lid on the pot, and gently simmer for 45 to 60 minutes.

Step No.2: Cool down the mixture

After removal of herbal decoction from heat, give the mixture a stir and then replace the lid on the pot. Allow the mixture to steep until the mixture has cooled down to just barley warm (-1 hour).

Step No.3: Strain the mixture

Use a fine mesh strainer and place it over a measuring glass. Carefully pour the mixture through the strainer. Then use the back of a spoon or gently press any remaining moisture from the mixture into the measuring cup.

Step No.4: Converting herbal decoction into herbal syrup

To a strained decoction, stir in the honey and blackstrap molasses until fully dissolved.

Step No.5: Store in a glass jar in the refrigerator Storing it in a well closed container in the refrigerator and enjoy it as daily tonic iron-boosting herbal syrup by the spoonful, shake well the syrup before using it.

EVALUATION METHOD FOR SURYP :

1. Determination of viscosity:

- Use hot chromic acid to thoroughly clean the Ostwald viscometer and add an organic solvent such as acetone if necessary.
- Attach the viscometer to a suitable base in a vertical position.
- Fill the dry viscometer with water up to mark G.
- Determine how many seconds it takes for the water to flow from mark A to mark B.
- Repeat step 3 at least three times to get an accurate reading.
- Clean the viscometer with the test liquid, fill it to mark A, and then measure the time it takes for calculating the densities of liquids shown in the density test
- Viscosity formula:
- Viscosity = viscosity of water × density of the test liquid × time required for the test liquid to flow / Density of water × time required for water to flow

1. Determination Of pH:

- pH of the syrup is evaluated by pH paper.
- Take pH paper and deep it into test syrup.

2. Organoleptic properties:

- **Colour:** The results obtained for the color of the batches of the syrup composition. The colour of the preparation was brown in the case of the optimized set. The colour of the preparation varies from brownish yellow to dark brown for sets F1, F2 and F3.
- **Order:** The results obtained based on the smell of the prepared syrups. In sets F1, F2 and F3, the smell of the preparation was aromatic.
- **Taste:** The results obtained when testing batches with the syrup composition. The composition test was sweet for batches F1, F2 and F3

respectively.

RESULT AND DISCUSSION :

Formulation Table

Ingredient	F1	F2	F3	F4
Gilloy	15 ml	15ml	15ml	2ml
Amla	10ml	5ml	8ml	2ml
Drumsticks	6ml	10ml	8ml	2ml
Raisins	6ml	5ml	4ml	2ml
Pomegranate	4ml	5ml	6ml	2ml
Sugar	9ml	9ml	9ml	2ml
Jaggery	-	-	-	40ml
Sodium Benzoate	q.s	q.s.	q.s.	q.s.
Pineapple essence	q.s.	q.s.	q.s.	q.s.
Total	50ml	50ml	50ml	50ml

Result of Evaluation Parameter

Sr.NO.:	Parameters	F1	F2	F3	F4
	Viscosity	0.01321	0.03088	0.0314	0.0582
	pH determination (pH paper)	4	4	3.70	4.58
	Organoleptic Character				
	Colour	Brown	Brown	Brown	Brown
	Odour	Aromatic	Aromatic	Aromatic	Aromatic
	Taste	Sweet	Sweet	Sweet	Sweet

CONCLUSION :

The studies indicates that polyherbal extract at the dose of 400mg/kg has better anti-anaemic activity. The haematological studies also showed increase in RBC and haemoglobin content and the overall improvement in blood quality. These changes are markedly good at higher test dose

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