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FORMULATION OF HERBAL IRON TONIC

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ABSTRACT

Globally, there is an interest in rate of usage of herbal medicine was increased for iron deficiency Anemia (IDA). It is the most common nutritional deficiency now a day's mostly in women. As per WHO, iron deficiency is the major deficiency of all types of anemia. Some of the iron rich herbs paves the way for treatment of Anemia. The syrup was formulated with Astragalus root, Moringa leaves, curry leaves, Sarsaparilla root, Bhringraj, Blackstrap molasses, Nettle root and evaluated its physiochemical parameter along with its changes in accelerated stability study, FTIR spectrum identification of compounds and possible microbial growth. It is more effective, less harmful and cheaper and safer when compared with conventional therapy. Modern iron formulation consist of iron salts which leads to long term treatment with side effects of Constipation, heart burn, nausea, metallic taste. All these, Problems will overcome only by herbal based formulations.

KEYWORDS

Anemia, Iron, Herbs and Herbal formulation.

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INTRODUCTION

Iron deficiency anemia (IDA) is a global health crisis in India. It is a serious health problem. As it causes general debility, lethargy, Suboptimal work Performance and in certain situations mental retardation, poor intelligence and abnormal immune response. As per the third National family health family (NPHS) Conducted in 2005-2006 in India, the prevalence of anemia Among Indian population was 70%In child aged 6-9 months, 55% in females aged 15-49 years and 24% in males aged 15-49.

Iron is the essential nutrient required for Growth, Development, Normal cellular function, Synthesis of hormones and connective tissue and it also

incredibly important for Oxygenation of the brain and cognitive function. Actually iron is a mineral that can be found in plants, animal, soil, water, air and including some rocks. Dietary iron has two main forms; Heme form and the Non- heme form. It is best to obtain iron from food provide benefits such as energy fibre, other nutrients and reduced risk of iron overload^{1,2}. Plant and iron fortified foods have the non -heme iron only whereas meat, sea food and poultry contain both heme and non-heme iron. Most of the 3 to 4grams of elemental iron in our bodies is in our Hemoglobin and as part 4 of our myoglobin. Much of the remaining iron is stored in the form of Ferritin in the liver, spleen, bone marrow in the muscle.

The body uses stored iron from the muscle, spleen, liver and bone marrow first. But when levels of iron stored in the body become low, iron deficiency anemia sets in. Red blood cells become smaller and contain less hemoglobin Shown in Figure No.1 and Figure No.2. As a result, blood carries less oxygen from the lungs to throughout the body. Less than the normal range of hemoglobin leads to iron deficiency anemia. It can be occurs due to blood loss like heavy periods in women. Various hemoglobin levels of male, female, child, infant, and newborns were discussed in below Table No.1. Most people are suffering from iron deficiency due to food habits, physical conditions and social behaviors'. We need to consume enough iron through the foods we eat. However, sometimes we need a little help in case of anemia. Homemade herbal iron syrup is a wonderful plant based way to boost iron intake for people with iron deficiency. Herbal iron is packed with nature's most powerful herbs containing plant based iron so our body will get recognized and absorbed³. In this particular recipe, we start with a decoction of Dried Moringa leaves, Stinging nettle leaf, Astragalus root, Sarsaparilla root, Curry leaves, Bhringraj, with little amount of water and then we added a base of honey, blackstrap molasses and alcohol for preservative purpose.

This herbal syrup is a blood- building and iron-boosting tonic meant to nourish and restore over a

longer period of time. To increase iron level and improves the health of the organ that transport blood, absorb iron, and remove waste. And while its meant to support healthy iron level not to necessarily treat iron deficiency¹.

Function of iron in our body

Iron plays a huge role in our health. Its most well-known role is as an essential mineral used in blood production.

In this role, iron serves to carry oxygen from your lungs around to all of the cells in your body from top of your head and down to your toes. Without oxygen, our tissues will die.

Iron is found in every cell and is an essential component for the creation of blood.

It is the main component in the protein hemoglobin, which helps to carry oxygen to our organs and tissues.

An essential component of proteins needed for respiration and energy metabolism.

Used to makeup enzymes that is responsible for collagen production.

Used in the synthesis of some neurotransmitters¹.

It is also important for immune function, building collagen, healthy nervous system functioning and brain activity³.

Disadvantage of herbal syrup

Herbal medicines can produce adverse effect if they are mixed with drugs like antidepressants.

Herbal medicines also has minor disadvantage like risk of self-dosing of herbs.

The effectiveness of herbal medicine is not optimized in laboratory so it take time to produce effects⁴.

MATERIAL AND METHODS

Ingredients

Various ingredients, equipments and instruments used for formulation are listed below in Table No.2, 3 and Table No.4.

STINGING NETTLE ROOT

Botanical name: *Urtica dioica*.

Biological source: It consists of dried root of stinging nettle *Urtica dioica*.

Family: Urticaceae⁵.

Chemical constituents: Nettle is a mineral powerhouse rich of iron and potassium, magnesium, calcium, vitamin A, vitamin B, vitamin C, vitamin D, vitamin K and more^{6,7}.

Uses

It makes a wonderful addition to any kind of herbal blood-building regimen.

It also offers energy, histamine response, healthier hair, brighter skin and more⁵.

It relieves fatigue, anemia and stimulate blood circulation⁵.

Astragalus root

Botanical name: *Astragalus membranaceus*.

Biological source: It is the dried root of perennial herb of *Astragalus membranaceus*.

Family: Fabaceae.

Chemical constituents: Flavonoids, Phytosterols, Alkaloids and trace elements like Copper, zinc, iron, Magnesium, Manganese, Sodium, Cobalt and Silver.

Uses

Astragalus root is mostly used to strengthen the immune system.

It also consumed to stimulate appetite, improve digestive health and also helps in treating anemia.

Moringa leaves

Botanical name: *Moringa oleifera*.

Biological source: It consist of dried long, slender, triangular seed-pods of *Moringa Oleifera*.

Family: Moringaceae.

Chemical constituents: Extract of Moringa leaves consist of flavonoid, glycosides, tannins and saponins^{8,9}.

Uses

It aids in facilitating the absorption of iron, increasing the red blood cell count and helping to maintain normal blood parameters¹⁰.

Moringa is used for "tired blood" (Anemia), Arthritis, Asthma, Cancer, diabetes, stomach pain and ulcers^{11,8}.

SARSAPARILLA ROOT

Botanical name: *Smilax ornata*.

Biological source: It consist of dried root from *Hemi desmusindicus*.

Family: Apocynaceae.

Chemical constituents: Sarsasaponin, Sarsapic acid, fatty acid, dextrose, resins, flavonoids, saponins, minerals like calcium, iron, magnesium, chromium and zinc.

Uses

It has the highest iron content and act as a Blood purifier, liver cleanser and treatment for skin issues and Anemia.

It contains anti-tumor and cancer preventative properties.

Bhringraj

Synonym: False daisy, *Eclipta alba*.

Botanical name: *Eclipta prostrata*.

Biological source: It consist of entire herb of *Eclipta alba*.

Family: Asteraceae¹².

Chemical constituents: Flavonoids, glycosides, saponins, alkaloids^{13,14}.

Uses

It helps to improve body metabolism and increase immunity.

It helps to control blood sugar level.

It is also used for treatment of Anemia, Jaundice and ulcer.

Curry leaves

Synonym: *Bergera koenigii*

Botanical name: *Murraya koenigii*.

Biological source: It consist of small strong Smelling perennial shrub of *Murraya koenigii*.

Family: Rutaceae.

Chemical constituents: Flavonoids, glycosides, Alkaloids, tannins, saponins and trace elements like potassium, calcium, Iron, vitamin A, B and C¹⁵.

Uses

It lowers the risk of iron deficiency.

It regulates Blood sugar and cholesterol level.

Water

It pulls out an amazing amount of nutrients from our herbal allies and it helps to flush our liver and kidney⁶.

Black strap molasses

Blackstrap molasses is a plant based food which is dark and rich in iron, calcium, magnesium and potassium. We add it here predominantly for the strong flavor that blends well with bitter herbs from the recipe and often used as a supplement to treat iron deficiency anemia. It can be a great alternative for maintaining healthy blood sugar level⁶.

METHOD OF PREPARATION

Step No.1: Make a strong herbal decoction

Combine all dried form of ingredients like Stinging nettle root, Astragalus root, Moringa leaves, sarsaparilla root, bhringraj, curry leaves into a large soup potpot 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 like shown in Figure No.6.

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^{16,7}. Lable it as per Figure No.8.

Table No.1: Hemoglobin levels

S.No	Category	Hemoglobin Level (gm/dl)		
		Low Normal range	High normal range	Acceptable for donating
1	Male	13.5 gm/dL	17.5gm/dL	13.0gm/dL
2	Female	12.0 gm/dL	15.5gm/dL	12.5gm/dL
3	Child	11.0gm/dL	16.0gm/dL	-
4	Infant	9.5gm/dL	14.5gm/dL	-
5	Newborn	14.0gm/dL	23.5gm/dL	-

Table No.2: Ingredients

S.No	Ingredients
1	Stinging Nettle root
2	Astragalus root
3	Moringa leaves
4	Bhringraj leaves
5	Sarsaparilla root
6	Curry leaves
7	Blackstrap molasses
8	Honey
9	Water

Table No.3: Equipments

S.No	Equipments used
1	Measuring cups and spoons
2	Pot with lid
3	Spoon for stirring
4	Hot plate
5	Amber color bottle

Table No.4: Instruments

S.No	Instruments
1	FTIR (Fourier transform infrared spectroscopy)
2	UV (Ultraviolet and visible spectroscopy)
3	pH meter
4	Viscometer

ADVANTAGE OF HERBAL SYRUP

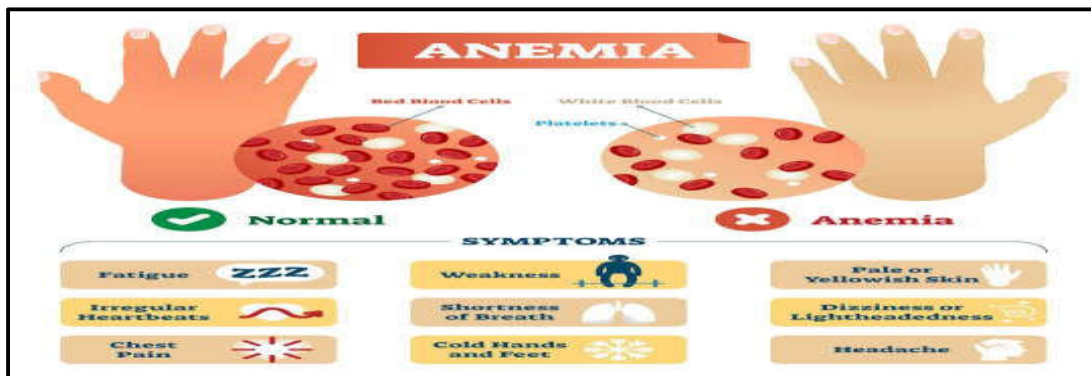
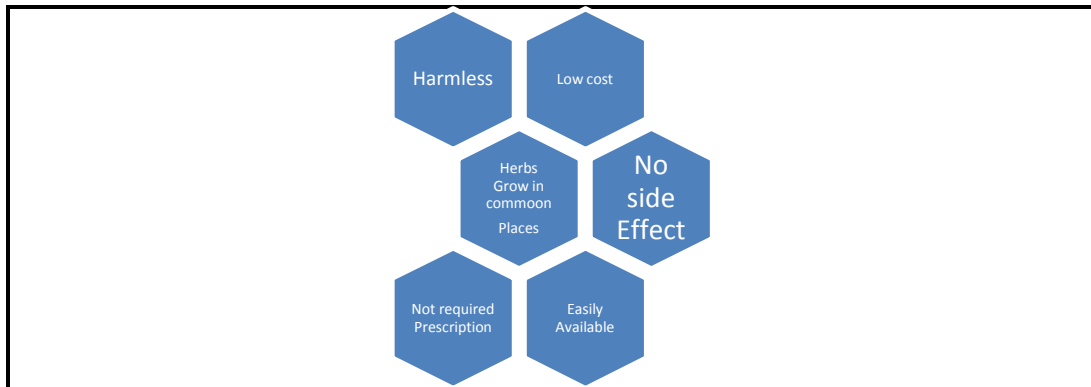


Figure No.1: Symptoms of anemia

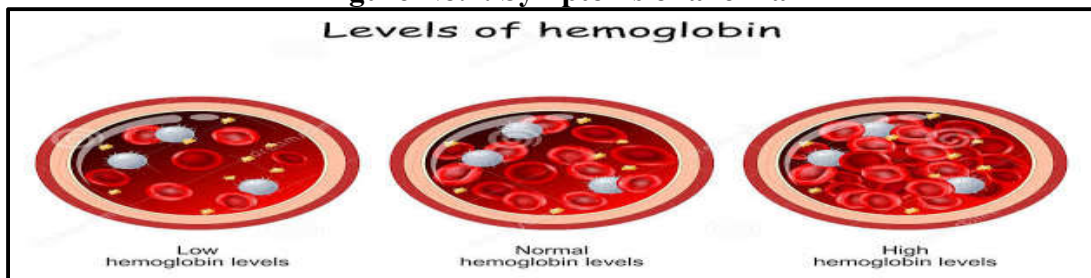


Figure No.2: Levels of hemoglobin



Figure No.3: Herbal ingredients



Figure No.4: Moringa

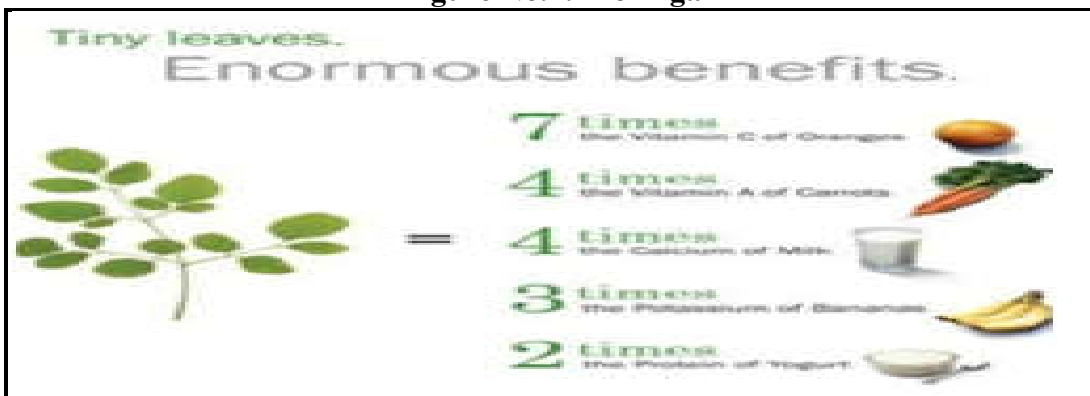


Figure No.5: Benefit of moringa

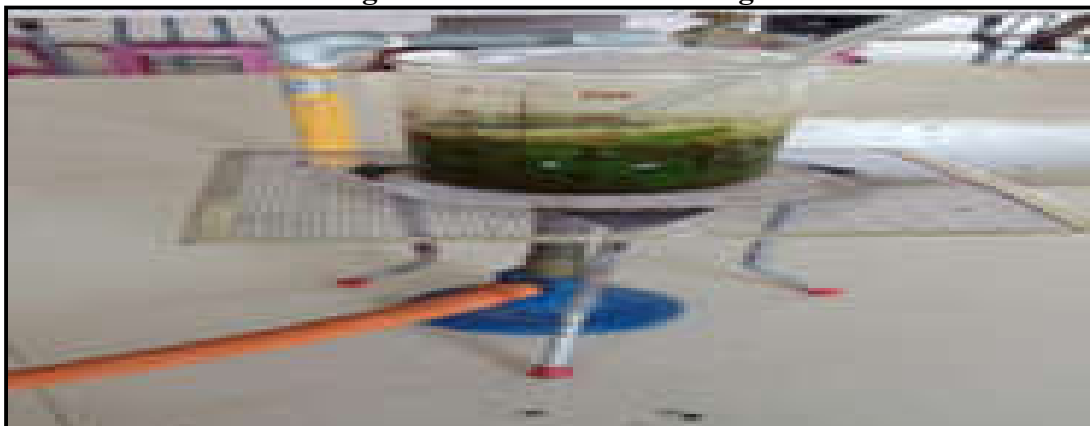


Figure No.6: Decoction method



Figure No.7: Herbal syrup

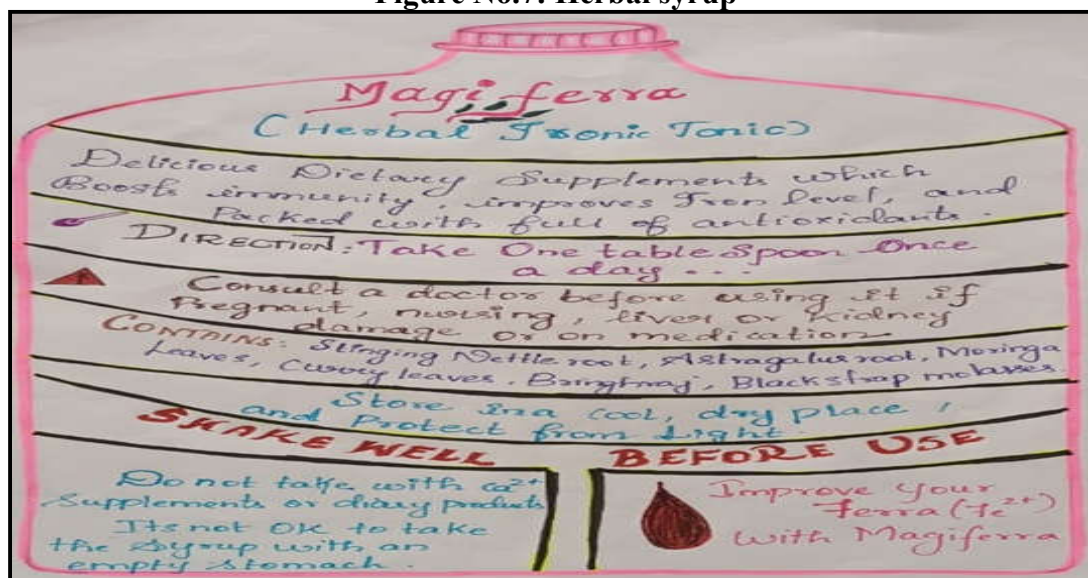


Figure No.8: Labelling of herbal syrup

CONCLUSION

In present study, we developed and safe and effective herbal iron syrup as per international guidelines and standard and could be easily and effectively used for iron deficiency anemia. Herbal iron formulation was appropriate and stable under accelerated condition of storage up to 6months Herbal based therapy is less harmful and more useful than conventional therapy.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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