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UNLOCKING THE SECRETS OF TRIPHALA: A REVIEW OF ITS HEALTH BENEFITS

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ABSTRACT

Triphala, a traditional Ayurvedic herbal formulation consisting fruits of the 3 plant species *Emblica officinalis* (Amalaki), *Terminalia bellerica* (Bibhitaki), and *Terminalia chebula* (Haritaki), In addition to its laxative action, *Triphala* research has found the formula to be potentially effective for several clinical uses such as appetite stimulation, reduction of hyperacidity, antioxidant, anti-inflammatory, immunomodulating, antibacterial, antimutagenic, adaptogenic, hypoglycemic, antineoplastic, chemoprotective, and radioprotective effects, and prevention of dental caries. It has been used from centuries to promote overall well-being. This review aims to comprehensively explore the therapeutic potential of *Triphala*, drawing on both traditional knowledge and modern scientific research. This review discusses the mechanisms of action underlying Triphala's therapeutic effects, including its ability to modulate oxidative stress, inflammatory pathways, and metabolic processes. Furthermore, the article explores safety profile of Triphala and its potential interactions with other medications.

Keywords – *Triphala, Ayurvedic medicine, Digestive health, Antioxidant, Anti-inflammatory, Triphala Churna*

1. INTRODUCTION

Triphala is one of the respectable polyherbal formulation from Ayurveda. It is a Rasayana Drug which are used in Indian System of Medicine (ISM) [1]. it has been employed from centuries to promote health and well-being. Triphala is composed of the three myrobalans, *Terminalia chebula - Retz. (Haritaki), Terminalia bellerica Roxb. (Bibhitaki) and Emblica officinalis Gaertn. (Amalaki)* and all of this is one of the most commonly used Ayurvedic preparations [2].

Triphala is a combination of all three fruits, that thing making it a very usefull. The different properties and the charectertics of the various ingredients which are present in triphala is mentioned below:

1.1 Haritaki

Latin name - *Terminalia chebula* Linn.

Family - Combretaceae

Classical name - Haritaki

Sanskrit synonyms - Haritaki, Pathya, Abhaya, Avyatha,Vayastha

Hindi name - Harre, Harad

English name - Chebulic Myrobalan

Phytochemicals - Gallic acid 0.024% (w/w), Tannic acid 0.011% (w/w), Syringic acid 0.009% (w/w), Epicatechin 0.006% (w/w), Ascorbic acid 0.020% (w/w), Chebulinic acid, Anthraquinone, Phosphoric acid

1.2 Vibhitaki

Latin name - *Terminalia bellerica* Roxb.

Family- Combretaceae

Classical name - Vibhitaka

Sanskrit synonyms - Karnaphala Aksha, Kaliphala, Bhutavasa

Hindi name - Bahera, Baherha

English name - Belleric Myrobalan

Phytochemicals - Gallic acid 0.005% (w/w), Tannic acid 0.004% (w/w), Ascorbic acid 0.023% (w/w), β-sitosterol, Ellagic acid, Chebulic acid, Mannitol, Oxalic acid, Galloyl, Galactose, Fructose

1.3 Amalaki

Latin name - *Emblica officinalis* Gartn.

Family - Euphorbiaceae

Classical name - Amalaki, Dhatri

Hindi name - Awala, Amla, Aonla

Sanskrit synonyns - Amalaki, Dhatri, Vyastha

English name - Indian gooseberry

Phytochemicals - Ascorbic acid 0.036% (w/w), Gallic acid 0.081% (w/w), Nicotinic acid, Ellagic acid, Linoleic acid, Linolenic acid, Oleic acid

Triphala is one among the ayurvedic medicinal herbal formulation which are mostly preferred by medical practitioners [3]. It can be used by all peoples of different ages. It has various applications in medical field like laxative, eye rejuvenator, anti-inflammatory, antiviral, and many more. It also effective in headache, dyspepsia, ascites, leucorrhea, also used as a blood purifier and possess anti-inflammatory, analgesic, anti-arthritic, hypoglycemic and anti -aging properties. Triphala is also claimed that it have antiviral and antibacterial effect [4]. Triphala is prescribed for infectious diseases such as tuberculosis, pneumonia, AIDS, periodontal diseases etc [5]. Some studies shows that it inhibits the growth of Gram-positive and Gram-negative bacteria [6]. The recent studies proves that the triphala is rich source of gallic acid, vitamin C, ellagic acid, chebulic acid, bellaricanin, beta – sitosterol and flavonoids [7].

Various studies prove that triphala possess various pharmacological and therapeutic activities.

2. PHARMACOLOGICAL AND THERAPEUTIC EFFECTS OF TRIPHALA

2.1 Antidiabetic Activity of Triphala

The oral administration of triphala extract on alloxan diabetic rat in dose of (100 mg /kg) reduced the blood sugar level in normal and in dose of (120 mg/kg) produced a sustained anti-diabetic effect. Some studies have investigated the possible anti-diabetic properties of combination of triphala in animal models, one in a high fructose diet induced and another in alloxan diabetic rats [8,9]. The results of these studies show that the administration of the triphala extract reduced the blood sugar level. They were found to inhibit lipid peroxide formation and to scavenge hydroxyl and superoxide radicals in vitro [8].

2.2 Triphala as an Anticancer Drug

The phytochemicals which are found in triphala having medical importance to cure the diseases. But In the modern system of medicine all drugs are synthetic and have lot of side effects in the human and animal body, however in this situation too research has shown that triphala contains various chemical compounds that effective in treating cancer cells at less side effects [10]. Triphala possess a

cytotoxic effect to cancer cell. The suppression of growth of cancer cells due to its major component gallic acid [11]. Recent studies observed that the increased concentration of triphala decreased the viability of breast cancer cells (MCF-7) without affecting the normal breast epithelial cells. Triphala resulted in an increase in the intracellular Reactive Oxygen Species (ROS) in MCF-7 cells. Triphala induced cytotoxicity in the tumour cells but not in the normal active cells [12]. Triphala inhibits the growth of human pancreatic cancer cells in both cellular and in vivo model. Survival of cells was significantly reduced when capan-2 cells were exposed to triphala for 24 hours. When triphala is orally administered at the dose of 50 mg/Kg or 100 mg/Kg then it suppressed the growth of capan-2 pancreatic tumour xenografts [13].

2.3 Antioxidant Activity of Triphala

Triphala is very rich source of polyphenols (38±3%) and tannins (35±3%). By converting reactive oxygen free radicals to non-reactive products, polyphenols and tannins which are contents in triphala are responsible for the antioxidant and radioprotection ability. Triphala significantly prevents cold-stress induced oxidative stress. Cold stress induced oxidative stress is measured by Lipid Peroxidation (LPO), enzymatic Superoxide Dismutase (SOD), Catalase (CAT), non-enzymatic (Vitamin C) antioxidation status. Administration of Triphala (1g/Kg/body weight/48 days) prevents Cold Stress induced oxidative stress and elevation in LPO and Corticosterone levels [14]. The aqueous extract of the fruits of Emblica officinalis, Terminalia chebula and Terminalia belerica and their equiproportional mixture of triphala were evaluated for their in-vitro antioxidant activity, The extracts were found to possess the ability to scavenge free radicals such as DPPH and superoxide [15].

2.4 Antimicrobial Activity of Triphala

The antimicrobial properties of Triphala are due to the presence of phenolic compounds and tannins. These natural substances can inhibit the growth of both Gram-positive and Gram-negative bacteria [16]. **Triphala** is a powerful Ayurvedic herbal blend that can help combat oral bacteria like Streptococcus mutans and Lactobacillus, which contribute to plaque formation. Which makes Triphala a promising natural alternative for oral health. Some studies shown that Triphala is effective popular mouthwash and also help in reducing plaque [17]. **Triphala** and its individual fruit components have strong antibacterial properties that can fight against a variety of harmful bacteria like Pseudomonas aeruginosa, Klebsiella pneumoniae, Shigella sonnei, Staphylococcus aureus, and Vibrio cholera. including bacteria which are found in HIV-infected patients [18]. **Triphala churna can also** exhibits potent antibacterial activity against a diverse range of bacterial pathogens. Aqueous extracts of Triphala churna have demonstrated significant inhibitory effects on Staphylococcus epidermidis, Staphylococcus aureus, and Pseudomonas vulgaris. While exhibiting milder antibacterial activity against Salmonella typhimurium and Bacillus subtilis, And no inhibitory effects against Escherichia coli, Escherichia aerogenes, and Pseudomonas aeruginosa [19]. Daily intake of triphala controls the enteric infections in human beings [20].

2.5 Antiaging Effects of Triphala

Triphala is a traditional Ayurvedic herbal formulation which has gained significant attention for its potential benefits for skin health, particularly in the realm of anti-aging. Recent in vitro studies have provided compelling evidence that Triphala extract exerts highly protective anti-aging effects on human skin cells. Triphala extract was found to inhibit melanin production and hyperpigmentation due to the presence of protective phytochemicals. The extract of triphala stimulate the expression of genes which responsible for collagen-1, elastin and essential proteins synthesis that contribute to skin elasticity and firmness [21]. By increasing the production of these structural proteins, Triphala helps to reduce the appearance of wrinkles and fine lines. These results suggest that Triphala could be beneficial for skin health, promoting collagen and elastin production, increasing cellular antioxidants, and reducing hyperpigmentation.

2.6 Triphala in Gastrointestinal Health

Ayurvedic medicine uses Triphala as a pillar of gastrointestinal treatment. **Triphala** is a well-known Ayurvedic herbal formulation which is popular for its beneficial effects on gastrointestinal health.Some in vivo studies shows that both aqueous and alcohol-based

extracts of Triphala prevent diarrhea [22]. In a rodent model, Triphala refilled the depleted protein in the intestinal villi of the brush border as well as glutathione and phospholipid levels, It means Triphala helped to restore essential nutrients in the intestines and reduced inflammation [23]. Triphala helped to prevent stomach ulcers in rats [24]. **It also helped to reduce inflammation in the intestines of mice,**This was likely because of its antioxidant effects and high levels of flavonoids contained in Triphala [25]. Human clinical trial that investigated the use of Triphala in patients with gastrointestinal disorders is reported that the treatment reduced constipation, mucous, abdominal pain, hyperacidity, and flat ulence while improving the frequency, yield, and consistency of stool [26].

2.7 Immunomodulatory Property of Triphala

Triphala shows an immunomodulatory activity when tested using carbon clearance test and Delayed Type Hypersensitivity (DTH) response. The potent immunomodulatory effects of Triphala are likely due to its rich phytochemical composition, which contains flavonoids, alkaloids, tannins, saponins, glycosides, and phenolic compounds [27]. A study which are conducted by Srikumar R. The researchers found that triphala significantly enhanced phagocytosis, phagocytic index, and antioxidant activities while concurrently reducing corticosterone levels in animals exposed to noise stress [28].**This study shows that the Triphala can help protect the body from stress.** It was shown to improve the body's ability to fight against infections, reduce stress hormones, and protect cells from damage.

2.8 Triphala Against Stress

Stress-induced disorders such as Anxiety and other stress-related problems are the main reasons for disability in adults worldwide [29]. And triphala supplementation has a protective effect against stress. Some animal studies shown that administration of triphala for 48 days (1g/kg/animal body weight) Prevents the development of cold-induced stress and reverses stress-induced behavioural changes and biochemical alterations, such as increased lipid peroxidation and corticosterone levels [30]. Triphala helps to prevent the harmful effects of noise stress in antioxidant system and immune response in rats. Changes induced by at 100 dB for 4 hour/d/15 days were controlled by dose of Triphala at 1g/Kg/body weight/48 days [31]. These studies suggest that triphala may be a promising natural approach for managing stress-related conditions.

2.9 Anti-Radiation Activity of Triphala

Triphala extract was found to protect mice from radiation sickness. When aqueous extract of triphala administered intraperitoneally to mice before they were exposed to high levels of radiation, this treatment of mice with different doses of aqueous extract of triphala regularly done for five days which results, Triphala delayed the onset of death and reduced the symptoms of radiation sickness in mice. Triphala was also found to be safe, with no toxic effects up to a dose of 240 mg/kg and the LD50 dose i.p. of triphala was found to be 280 mg/kg b.w. This study suggests that the Triphala could be a promising natural radioprotective agent [32].

3. CONCLUSION

Triphala stands out as a potent polyherbal rasayana in the Ayurvedic system, with a wealth of scientific studies validating its traditional and modern uses. This review has highlighted Triphala's diverse therapeutic properties, including its antioxidant, anti-inflammatory, anti-aging, and anticancer effects. Additionally, it demonstrates gastroprotective and neuroprotective benefits, showcasing efficacy in managing conditions such as diabetes, obesity, and infectious diseases. Numerous studies, articles, journals also suggests that Triphala may enhance cognitive function, improve gut health, and promote overall well-being.

Even with promising results, more research is needed to fully understand Triphala, their mechanism of action and their uses for different health problems. However, what we know now suggests that Triphala can be a helpful and safe way to improve your health.

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