



Common medicinal plants of Nepal: A review of Triphala: Harro (*Terminalia chebula*), Barro (*Terminalia bellirica*), and Amala (*Emblica officinalis*)

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Abstract: The chronicle of the medicinal plants has been widely acknowledged in terms of serving mankind all around the world. Medicinal plants are reported to have reduced or fewer chances of side effects as allopathic medicines. This article is aimed to review and demonstrate the conventional and medicinal utilization of the three constituents of Triphala. Triphala is a polyherbal formulation in Ayurvedic medicine. It comprises an equal proportion of the three medicinal plants namely *Terminalia chebula*, *Terminalia bellirica*, and *Emblica officinalis*. Triphala is supposed to be significantly effective in coping with the complication of human body systems. It is well known for detoxifying the human body and also boosting the immunity system. *Terminalia chebula*, also referred to as 'King of Medicines', is a well-known remedy in abdominal disorders and revitalization of the human systems. *Terminalia bellirica* has got importance from its curative potentials. The different parts of the *Terminalia bellirica* have been used in the therapeutic cures. Likewise, *Emblica officinalis* is widely accepted for its efficacy in cooling effect, anti-venom effect, and cardioprotective effect. It is an integral part of the medicine that supports wellness and healthy aging.

ब्रूमिक रूपमा हेनें हो भने जडिबुटीले संसारभरिका मानवजातीलाई व्यापक रूपमा सेवा पुऱ्याएको मान्यता रहिआएको छ । जडिबुटीहरूलाई औषधिको रूपमा उपयोग गर्दा एकदमै कम साइड इफेक्ट परेको र पर्ने सक्ने सम्भावना भएका प्रतिवेदन हरू आइसकेका छन् । यस लेखको मुख्य उदेश्य त्रिफलाका तिन भाग हरौं, बरौं र अमलाको परम्परागत र औषधिय प्रयोगको समिक्षा र प्रदर्शन गर्ने हो । त्रिफला आयुर्वेदिक औषधिमा बहुधर्मिय सूत्र हो । यसमा तिन जडिबुटीहरूलाई बराबर अनुपातमा मिसाइन्छ । त्रिफलाले मानव शरीरमा पैदा हुने विभिन्न जटिलताको प्रभावकारी रूपले सामना गर्ने गरेको मानिन्छ । यसमा मानव शरीर डिटोक्सिफाइ गर्ने र रोग प्रतिरोधात्मक क्षमताको विकास गर्ने सामर्थ्य रहेको पाइन्छ । हरौंलाई औषधिको राजा पनि भनिन्छ र यसलाई पेटको विकार हटाउनको साथसाथै मानव प्रणालीको पुनरुद्धारको लागि पनि प्रयोग गरिन्छ । बरौंको विभिन्न गुणकारी क्षमता भएको कारणले यसका विभिन्न अंशहरु धेरैपि उपचारहरूमा उपयोग गरिएको पाइएको छ । त्यसै गरि, अमलालाई शीतलन प्रभाव, एन्टि भेनम प्रभाव र कार्डियो सुरक्षात्मक प्रभावको लागि व्यापक रूपमा मान्यता दिइएको छ । यो औषधिको एक अभिन्न अंग हो जसले स्वास्थ्य र स्वस्थ जीवनको लागि टेवा पुऱ्याउँदछ ।

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Keywords: Ayurvedic medicine, Anti-bacterial activity; Antimicrobial activity Traditional use,



INTRODUCTION

Nepal is a magnificent treasure house of social legacy and the usage of plants as traditional curatives has been well accepted throughout human civilization development. Roughly, 1700 types of flowering plants are at present being used as medications in Nepal (Baral and Kurmi, 2006) and the number is foreseen to grow as infrastructure permits expanded access to un-investigated portions of the nation. People in rural areas of Nepal practice the local plant-based therapy commonly (Manandhar, 1998). Triphala is a well-recognized conventional ayurvedic herbal formulation. It involves equivalent parts of three medicinal plants namely *Terminalia chebula* (Family: Combretaceae), *Terminalia bellirica* (Family: Combretaceae), and *Emblica officinalis* (Family: Euphorbiaceae). The constituents of this tridoshic formula are recognized for its countless biological and pharmacological activities. Triphala contains nutrients like vitamin C, tannins, proteins, amino acids, minerals, and various lifesaving phytochemicals. The use of Triphala has been highly recognized as the drug against numerous sicknesses (Reddy et al., 1990). The drupes of these three medicinal plants are assumed to have an antiviral and antibacterial property (Hozumi and Oyama, 1997).

Triphala is stipulated for diverse symptoms of illness, weariness, assimilation, and infectious diseases like TB, pneumonia, AIDS (El-Mekawey and Merelhy, 1995), gum disorders (Abraham et al., 2005). It is also known to pacify cough, urinary disorders, leprosy as well as ophthalmologic issues. It is a pleasant appetizer and nullifies malarial fever, typhoid, and pneumonia. Conventionally, it has also been utilized as a laxative in chronic constipation, digestion anomalies, and weak metabolism. Its use was also seen in cardiovascular disorders, high blood pressure, reducing cholesterol, liver dysfunction, and inflammatory bowel diseases (Mukherjee et al., 2006). Besides, it is also accepted to decrease the distress because of oxidative stress in investigational rats considerably (Srikumar et al., 2006).

Triphala can be used in various forms like churna (fine powder), kwatha (decoction), taila (oil), mashi (ash), and gritha (Triphala cooked with clarified butter or Ghee) depending on medical condition (Gupta, 2010). The objective of this review article is to explore the novel benefits of Triphala, which could be beneficial for the welfare of mankind. Secondary literature was the major source of data for this study (Dhami et al., 2020). Data were collected through online portals like Google scholar and research gate (Timilsina et al., 2020). The literature was reviewed thoroughly and information was collected and interpreted in the paper.

CONSTITUENTS OF TRIPHALA: *TERMINALIA CHEBULA*

Terminalia chebula: It belongs to the family Combretaceae. It is a significant medicinal plant utilized for the treatment of numerous diseases in the Unani System of Medicine (USM) from the beginning of civilization (Akhtar & Husain 2019). The tree is endemic to India, Bangladesh, Myanmar, Nepal, Pakistan, Sri Lanka, Cambodia, Indonesia, Malaysia, Vietnam, and southwestern China (Akbar 2020). It is medium size perennial (Sanjeewa et al. 2015) & deciduous tree attaining a height of 25-30 m; with advancing branches and an extensive roundish crown (Rathinamoorthy and Thilagavathi 2014). *T. chebula* and its phytochemical compound have a healing effect with no toxic consequences (Akhtar & Husain 2019). It is also entitled as 'Wonder herb' (Kolla et al. 2017), 'Mother of medicines' (Muhammad et al. 2012) & 'King of Medicines' (Moghimpour & Handali 2015) on account of its vast therapeutic characteristics and remarkable potentiality of healing. The fruit and bark are specially used for medicinal motives in USM (Dinesh et al., 2017). It contains ample nutrients



like vitamin C, protein, amino acids, minerals & phytochemicals like chebulic acid, gallic acid, ellagic acid, tannic acid, amino acids, flavonoids like luteolin, rutin, and quercetin, etc. (Dodke & Pansare 2017).



Fresh fruit of *Terminalia chebula* (Source: Revathi et al., 2018)

Traditional uses: The improvement of gastric and cognitive abilities is supposed to improve after the use of its fruits in Ayurvedic formulation as a part of Triphala (Akbar 2020). Its use has also been recognized in gastrointestinal and revitalizing cure (Peterson et al., 2017). Conventionally, it was also used to cure asthma, sore throat, vomiting, hiccough, diarrhea, dysentery, bleeding piles, ulcers, gout, heart and bladder diseases (Bag et al., 2013). Despite immense health benefits, it is contraindicated in a few cases because of its astringent and hot nature (Meher et al., 2018).

Antibacterial activity: It has been documented that *T. chebula* is used against various pathogenic gram-positive and gram-negative bacteria. The ethanolic extract of the fruits of *T. chebula* was profoundly viable against *Bacillus subtilis*, *S. epidermidis*, *S. aureus*, *SA. Typhi* and *Pseudomonas aeruginosa* (Kanna et al., 2015).

Antimicrobial activity: It has been investigated that *T. chebula* has promising antimicrobial activity and can act as a substitute to artificial antimicrobials (Dhiman et al., 2019).

Wound healing activity: Due to the powerful anti-bacterial & angiogenic activity, dried unripe fruits of *T. chebula* are responsible for cutaneous injury mending (Li et al., 2011).

Antiviral activity: Extract of different parts of *Terminalia chebula* has antiviral effects (Oyuntsetseg et al. 2014). It has been found that the plant extract of *T. chebula* can cure enterovirus (Joshi et al., 2020).

Hepatoprotective activity: Bioactive compounds obtained from the water extract of *Terminalia chebula* probably contribute to the hepatoprotective effect (Choi et al., 2015).

Antiprotozoal activity: The alcoholic extract of *T. chebula* showed adequately good antiplasmodial activity (Joshi et al., 2016).



Anti-arthritic activity: The hydro-alcoholic extract of *Terminalia chebula* acts against joint swelling (Nair et al., 2010)

Antioxidant activity: *T. chebula* is a potent source of antioxidants and very useful to maintain the balance of the nervous system (Bag et al., 2013).

CONSTITUENTS OF TRIPHALA: *TERMINALIA BELLIRICA*

Terminalia bellirica: It is a large deciduous tree that belongs to the family Combretaceae with extensively elliptic leaves grouped at the terminal of the branches (Meena et al., 2010). It is fiercely distributed all through the world particularly the Indian subcontinent, Sri Lanka, Pakistan, Nepal, and South East Asia (Gupta et al., 2017). The tree of *T. bellirica* attains a height of about 20-30 m and is found growing wildly at a wide range of ecology with an elevation up to 1200 m (Warrier et al., 1996). It is generally utilized in regular medication because of its wide range of healing capacities (Gupta et al., 2017). Glucosides, tannins, gallic acid, ellagic acid, ethyl gallate, galloylglucose, chebulanic acid are accepted to be chiefly liable for its wide curative actions (Kumar & Khurana 2018).



Fresh fruit of *Terminalia bellirica* (Source: Revathi et al., 2018)

Traditional Uses: *Terminalia bellirica* exhibit various curative potentials (Singh et al., 2018). Different parts of the tree have been conventionally used in therapeutic cures. Fruits of the tree are used in the cure of hepatitis, bronchitis, asthma, dyspepsia, piles, diarrhea, coughs, hoarseness of voice, eye diseases, and scorpion-sting or bite (Singh 2011; Ram & Rastogi 2004). It is also believed that the intake of the plant purifies the blood and promotes hair growth (Singh et al., 2018). Half ripen fruit is utilized as the purgative, kernel is used as a narcotic, pulp in cure of dysenteric-diarrhea, dropsy, piles, and leprosy whereas gum extract of the tree bark is used as a demulcent and purgative (Mallik et al., 2012; Deb et al., 2016).

Wound healing: The paste of the *Terminalia bellirica* promotes healing of the wound (Saha et al., 2011).

Anti-Diabetic Effects: The extract from the fruit of *Terminalia bellirica* possess anti-diabetic antioxidant activity (Sabu & Kuttan 2009).



Anticancer activity: The extract from the *Terminalia bellirica* inhibits the growth of cancerous cells (Pinmai et al., 2008).

Leucoderma and skin diseases: The oil extract from the seeds of the plant is typically used for the cure of leucoderma and skin diseases (Singh et al., 2018).

Anti-microbial activity: Leaf and Steam extract of *Terminalia bellirica* have shown antibacterial activity against Gram-positive and negative bacteria (Saraphanchotiwiththaya et al., 2008).

Antioxidant activity: Crude aqueous concentrate of the fruits of *Terminalia bellirica* have antioxidant properties since this contains enzymatic and non-enzymatic antioxidants, these can be powerful against organisms causing different maladies (Deb et al., 2016).

Heart disease: Previous researches have shown that the oral intake of *Terminalia bellirica* can improve cholesterol levels in humans with heart disease (Khan & Gilanii 2008).

CONSTITUENTS OF TRIPHALA: *EMBLICA OFFICINALIS*

Embllica officinalis, usually known as Indian gooseberry or amla, has a place with the family Euphorbiaceae (Lanka, 2018). It is accepted to be the first tree created in the Universe (Bhat et al., 2019). Amala, a tropical and subtropical plant commonly found in Asia, is a small to moderate sized deciduous tree attaining an average height of 8.18 m (Sriwatcharakul, 2020; Singh et al., 2019). This nutritive globular fruit, yellowish-green in color with obtusely triangular six-celled nut, is of great application in numerous folk and Indian conventional medicinal systems (Mirunalini & Krishnaveni, 2010). Most parts of the plant comprising the fruit, seed, leaves, root, flowers, and bark are utilized in both dried and fresh structure (Lanka, 2018). It possesses an eminent position in antiquated Indian mythological literary works like Vedas, Ramayana, Shivpuran, Charak Samhita, and many others and it is also known as 'Amrit phal' (life-giving fruit) because of its noteworthy restorative and nutritive worth (Bhat et al., 2019). It is one of the main constituents of Triphala which is a polyherbal formulation (Charmkar & Singh, 2017).

Traditional Uses: The drupe of Amala is traditionally utilized as a medicinal product in Southeast Asia, and is taken to cure diseases including diabetes, cough, asthma, bronchitis (Baliga & D'Souza, 2011). It has been used in various forms of viz. extracts, leaves, powders, flour, seeds, vegetables, fruits, and herbal mixtures in nine traditional recipes (Marwat et al., 2014). There is a saying that; one fresh gooseberry is equal to eating 16 bananas or 3 oranges or 2 apples (Charmkar & Singh, 2017). It is also entitled to Chakshyushya (beneficial for eyes) by many ancient Acharyas (Bhat et al., 2019). It is used as a primary component in Chyawanprash, which helps to improve intelligence and memory power (Charmkar & Singh, 2017).

Cooling effect: Amla has a cooling effect in burning sensation any place in the body and for different sorts of inflammation and fever (Priya & Islam, 2019).

Revitalizing effect: Several nutrients present in fresh Amla fruit has a revitalizing effect on the body and help in maintaining the stamina in aged people (Bhat et al., 2019).



Fresh fruit of Amala Source: Revathi et al., 2018)

Gastric ulcer: Methanolic extract present in *E. officinalis* reduces the offense factor (acid, pepsin) and increases the safeguarding factors (mucin secretion, cellular mucous), and acts as an anti-ulcer component (Bandyopadhyay et al., 2000).

Antioxidant activity: *E. Officinalis* can inhibit mutations in genes and repair the chromosomal abnormalities (Pandey, 2011).

Antineutrophilic: Key component present on the leaves has anti-neutrophilic activity and anti-platelet properties *in vitro* (Dhale & Mogle, 2011).

Cardioprotective effect: *E. officinalis* lowers oxidative stress and averts the development and continuation of hypertension (Bhat et al., 2019).

Urinary activity: Amla is useful to the urinary system and can cure mild burning sensation while urinating (Priya & Islam, 2019).

Anti- HIV effect: *E. officinalis* shows the highest inhibition of HIV-RT as compared to the standard anti-HIV drug (Thangadurai et al., 2020).

Use in scurvy: Amla is successfully used in the treatment of human scurvy due to its vitamin C richness (Madhuri et al., 2011).

CONCLUSION

Triphala is one of the crucial elements of the Ayurveda and Unani system of medicine since ancient times. It is well-known powerful herbal formulation generally utilized for avoidance and treatment of sicknesses. The tremendous healing efficacy of Triphala cannot be underrated on the intervention of various diseases. The three constituents of Triphala have remarkably increased the benefits of solving health complexities. The potential uses of Triphala include wound healing, hepatoprotective activity, anti-arthritis activity, anti-oxidant, anti-viral, anti-bacterial, anti-protozoal,



anti-venom, anti-cancer as well as cardioprotective effects. It plays a remarkable role in rejuvenating the entire human body systems. The therapeutic values of Triphala for varieties of pathology have been highly acknowledged.

CONFLICTS OF INTERESTS

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but the advancement of knowledge. In addition, the research was not funded by the producing company rather it was funded by the personal efforts of the authors.

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