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Medicinal Properties of *Āmla* (Fruit) *Phyllanthus emblica* L-Unani Medicine for Promotion of Longevity and Healthy Ageing: A Review

[1]Shamim, [2]Saad Ahmed, [3]Amanullah, [4]Asim Ali Khan and [5]Lubna Fatima

[1]Research Associate (Unani), Central Council for Research in Unani Medicine, Ministry of Ayush, Govt. of India, Janakpuri, New Delhi, India.
[2]Consultant (Unani), Central Council for Research in Unani Medicine, New Delhi, India.
[3]Research Officer (Unani), Scientist-III, Central Council for Research in Unani Medicine, Ministry of Ayush, Govt. of India, Janakpuri, New Delhi, India.
[4]Director General, Central Council for Research in Unani Medicine, Ministry of Ayush, Govt. of India, Janakpuri, New Delhi, India.
[5]Research Officer (Unani), Scientist-I, Central Council for Research in Unani Medicine, Ministry of Ayush, Govt. of India, Janakpuri, New Delhi, India

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***Corresponding Author Email:** shamim.bums@gmail.com

Abstract

Āmla (*Phyllanthus emblica*) is one of the most important herbs in the Indian traditional medicine system, especially in Unani Medicine used for longevity and geriatric care since long time. *Āmla* is widely distributed in tropical and subtropical areas, is native to India and also grows in tropical and subtropical regions of Pakistan, Uzbekistan, Sri Lanka, South East Asia, China and Malaysia. In India *Āmla* is mostly collected in winter season after ripening and in Kashmir in summer. Emblica officinalis is rich in Vitamin C, Alkaloids, Calcium, Iron, Essential amino acids and many other vitamins and minerals. It has *Mu'mmir* (Longevity promoting agent), *Muqawwī-i-'Ām* (General tonic), *Muqawwī-i-Dimagh* (Brain tonic), *Muqawwī-i-Qalb* (Cardio tonic), *Mufarriḥ* (Exhilarant), *Muqawwī-i-Baṣar* (Eye tonic), *Muqawwī-i-Mi'da* (Stomachic), *Muqawwī-i-Sha'r* (Hair tonic), *Mu'addil-i- Ṣafrā'* (Normalizing yellow bile) etc. properties. It is used in *Ḍu'f-i-'Ām* (General debility), *Ḍu'f-i-Dimāgh* (Cerebrasthenia), *Ḍu'f-i-Qalb* (Cardiac insufficiency), *Khafaqān* (Palpitation), *Ḍu'f-i-Baṣar* (Poor eyesight), *Nisyān* (Forgetfulness), *Ḍu'f-i- Mi'da* (Gastric debility), *Qarḥa'-i- Mi'da* (Gastric ulcer), *Humūḍat-i-Mi'da* (Hyperacidity), *Ḍu'f-i-Kabid* (Hepatic insufficiency), *Ishāl* (Diarrhoea) etc. It showed Anti-oxidant and free radical scavenging, Immunomodulatory, Anti-ageing, Gastro-protective, Hepato-protective, Cardio-protective, Nephro-protective etc. activities. In this paper, an attempt has been made to review the Unani pharmacological actions & therapeutic uses for a comprehensive understanding of the importance of *Āmla* (*Phyllanthus emblica*) for promotion of longevity and healthy ageing.

Keywords
Mu'mmir, Khafaqān, Ḍu'f-i-Dimāgh, Longevity, Anti-oxidant, Immunomodulatory.

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INTRODUCTION:

Āmla consists of pericarp of mature fruits of *Phyllanthus emblica* L. Syn. *Emblica officinalis* Gaertn. (Family-Phyllanthaceae). *Āmla* is mostly collected in winter season after ripening and in Kashmir in summer. Drug yielding plant is a small or medium sized tree, found both in natural state in mixed deciduous forests of the country ascending to 1300 m on hills, cultivated in garden, home yards or grown as a roadside tree. (Anonymous, 2007a)

Unani medicine for promotion of longevity and healthy ageing based on three primary sources of drugs; plant, animal and minerals has been described. It is interesting to mention here that while describing various pharmacological actions of drugs, the Unani scholars introduced many unique terms that not only have correlation with the philosophy of Unani Medicine but also have contemporary scientific relevance. The terms of *Mu'ammir* (longevity promoting agents), *Muqawwī-i-A'ḍā' Ra'īsa* (tonic for vital organs) and *Mufarriḥ* (exhilarant) bring about a whole new understanding to the pharmacological actions of Unani drugs that may be of immense interest for those working in the fields of geriatrics and gerontology. Such drugs, may help delay ageing process, strengthen body faculties, prevent and control chronic diseases and thus ensure longevity and healthy ageing. *Āmla* is plant origin drug having *Mu'ammir* (longevity promoting agents), *Muqawwī-i-A'ḍā' Ra'īsa* (tonic for vital organs) and *Mufarriḥ* (exhilarant) properties mentioned in Unani literature. (Anonymous, 2021)

Vernacular Name

English: Embolic Myrobalan; Hindi: *Āmla, Āonla, Amlikā*; Urdu: *Āmla, Āmlaj*; Arabic: *Āmlaj, Āmlaj*; Persian: *Āmla* (Khān, 2012; Ibn Sīnā, 1987; *Ibn Baytār*, 1985; Ghani, YNM; Anonymous, 2007a)

Temperament

Bārid (Cold) [1] *Yābis* (Dry) [2] (Khān, 2012; Ibn Sīnā,1987)

Chemical Constituents

Hydrolysable Tannins	Emblicanin A and B, Punigluconin, Pedunculagin, Chebulinic acid (Ellagitannin), Chebulagic acid (Benzopyran tannin), Corilagin (Ellagitannin), Geraniin (Dehydroellagitannin), Ellagotannin
Alkaloids	Phyllantine, Phyllembein, Phyllantidine
Phenolic compounds	Gallic acid, Methyl gallate, Ellagic acid, Trigallayl glucose
Amino acids	Glutamic acid, Proline, Aspartic acid, Alanine, Cystine, Lysine
Carbohydrates	Pectin
Vitamins	Ascorbic acid
Flavonoids	Quercetin, Kaempferol
Organic acids	Citric acid

(Anonymous, 2021; Kulkarni & Ghurghure,2018)

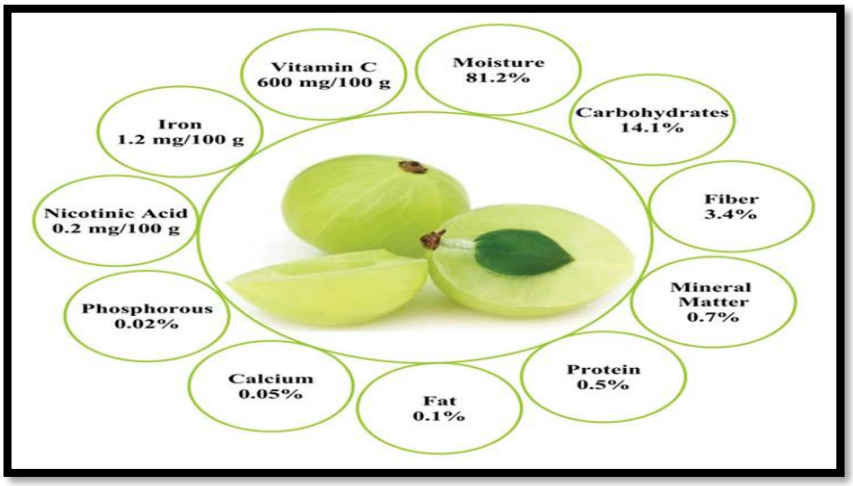

Fig. Nutritional value of fruit of *Phyllanthus emblica* (% or per 100 g) (Jain *et al.,* 2016)

Pharmacological Actions:

Mu'mmir (Longevity promoting agent)

Muqawwī-i-'Ām (General tonic)

Muqawwī-i-Dimagh (Brain tonic)

Muqawwī-i-Qalb (Cardio tonic)

Mufarriḥ (Exhilarant)
Muqawwī-i-Baṣar (Eye tonic)
Muqawwī-i-Mi'da (Stomachic)
Muqawwī-i-Sha'r (Hair tonic)
Mu'addil-i- Ṣafrā' (Normalizing yellow bile)
(Anonymous, 2021; Khān, 2012; Ibn Sīnā, 1987; *Ibn Baytār*, 1985; Al-Harawi, 2002; Ghani, YNM; Anonymous, 2007a; *Kabīruddīn*, 2000).

Therapeutic Uses:

Ḍu'f-i-'Ām (General debility)
Ḍu'f-i-Dimāgh (Cerebrasthenia)
Ḍu'f-i-Qalb (Cardiac insufficiency)
Khafaqān (Palpitation)
Ḍu'f-i-Baṣar (Poor eyesight)
Nisyān (Forgetfulness)
Ḍu'f-i- Mi'da (Gastric debility)
Qarḥa'-i- Mi'da (Gastric ulcer)
Humūḍat-i- Mi'da (Hyperacidity)
Ḍu'f-i-Kabid (Hepatic insufficiency)
Ishāl (Diarrhoea)
(Anonymous, 2021; Khān, 2012; Ibn Sīnā, 1987; *Ibn Baytār*, 1985; Al-Harawi, 2002; Ghani, YNM; Anonymous, 2007a; *Kabīruddīn*, 2000)

Important Formulations:

Murabbā Āmla, Jawārish-i- Āmla Sāda, Anoshdārū, Jawārish Shāhī, Safūf-i- Āmla, Safūf-i-Hāḍim Kalān, Dawā-ul-Misk Mu'tadil Sāda and Mostly all Iṭrīfalāt (like Iṭrīfal Saghīr,Iṭrīfal Zamāni, Iṭrīfal Ustūkhūdūs). (Anonymous, 2021; Anonymous, 2007a; *Kabīruddīn*, 2000)

Pharmacological / Clinical studies (Evidence based studies):

Antioxidant and free radical scavenging activity:

- Prakash *et al.,* 2012 showed that Gallic acid equivalent as total phenolic content from fruit of E. officinalis has excellent Antioxidant properties and play an important role as free radical scavengers required in the maintenance of 'redox homeostasis' responsible for diverse degenerative diseases. (Hasan *et al.,* 2016)
- Methanolic extract of fruit pulp of *E. officinalis* showed in various studies that it has potent Antioxidant and free radical scavenging activities. (Hasan *et al.,* 2016; Jamwal *et al.,*2011; Mehrotra *et al.,* 2011; Liu *et al.,* 2008a; Liu *et al.,* 2008b, Hazra *et al.,* 2010; Majumdar *et al.,* 2010)
- A study carried out with aqueous extract of *E. officinalis* fruit prepared according to Thai Herbal Pharmacopoeia for free radical scavenging activity, the result showed that it has a strong potential for free radical scavenging, ferric reducing as well as inhibiting ROS (reactive oxygen species) production. (Charoenteeraboon *et al.,* 2010).

Antioxidant and Anti-cancer activity:

- *Āmla* is one of the richest sources of vitamin-C and low molecular weight hydrolysable tannins which makes it a good Antioxidant. The tannins of *Āmla* like emblicanin-A (37%), emblicanin-B (33%), punigluconin and pedunculagin are reported to provide protection against oxygen radical included haemolysis of rat peripheral blood erythrocytes. Emblicanin A & B of *Āmla* fruit are reported to possess strong Antioxidant and anti-cancer activities. (Ghosal *et al.,* 1996)
- The mechanism behind Antioxidant activity is due to the recycling of sugar moiety and conversion of the polyphenol into medium and high molecular weight tannins. The powerful Antioxidant Ellagic acid, present in *Āmla*, can inhibit mutations in genes and repair the chromosomal abnormalities. (Bhattacharya *et al.,* 1999; Kulkarni & Ghurghure, 2018)
- *Āmla* inhibits the growth and spread of various cancers like breast, uterus, pancreas, stomach and liver cancers. It can prevent and/or reduce the side effects of chemotherapy and radiotherapy. (Kulkarni & Ghurghure, 2018)
- More than 18 compounds were identified in *Āmla* fruit which can exert anti-proliferative activity on gastric and uterine cancer cells. The main mechanism behind its activity is by enhancing Natural Killer (NK) cell activity in various tumor cells. (Kulkarni & Ghurghure, 2018).

Immunomodulatory activity:

- A study was carried out with aqueous extract of dried *Emblica officinalis* fruit pulp powder for its immunomodulatory effect on male Swiss Albino mice. The result showed that there was significant dose dependent increase in haemagglutination antibody titer, sheep red blood cells induced delayed type of hypersensitivity reaction, macrophage migration index, respiratory burst activity of the peritoneal macrophages, total leukocyte count, percentage lymphocyte distribution, serum globulin and relative lymphoid organ weight in *Emblica* treated mice indicating its ability to stimulate humoral as well as cell mediated immunity along with macrophage phagocyte. (Suja *et al.,* 2009)
- A study carried out with fruit extracts of *Emblica officinalis* for Immunomodulatory properties was evaluated by utilizing chromium (VI) as an immunosuppressive agent. It additionally inhibited apoptosis and DNA fragmentation and relieved the immunosuppressive effects of chromium (Cr) on lymphocyte proliferation. (Jain *et al.,* 2016)

Anti-ageing activity:

- A study carried out with methanolic, ethyl acetate, n-butanol and aqueous extracts of *Emblica officinalis* fruit pulp for Antioxidant, anti-collagenase, anti-elastase and anti-hyaluronidase activities. *Emblica officinalis* of methanolic extracts showed significant Antioxidant, anti-collagenase, anti-elastase and anti-hyaluronidase activities. The study also revealed that *Emblica officinalis* may serve as a potent antiaging agent. These results suggested that *Emblica officinalis* could be used as an effective ingredient in cosmetics since it provides protection against various aging enzymes and can be beneficial for skin aging particularly photo aging. (Garg and Garg, 2018)
- *Emblica officinalis* (EO) has been used extensively as a nutraceutical in several diseases since it is known to boost immunity and offers numerous health benefits such as Antioxidant, and anti-aging effects. A study carried out with extract of *Emblica officinalis* on AMD RPE trans mitochondrial cell lines created by fusing mitochondria DNA-deficient APRE-19 (Rho 0) cells with platelets isolated from AMD patients, and therefore had identical nuclei but differed in mitochondrial DNA content. These AMD RPE cells were treated with EO extract followed by characterization of effects of EO using cellular and molecular assays. EO significantly improved live cell number and mitochondrial membrane potential, reduced apoptosis and oxidative stress, down regulated VEGF, and up regulated PGC-1α. Hence the result showed that EO improved cellular and mitochondrial health, thereby playing a key cyto-protective role in AMD *in-vitro*. (Nashine *et al.,* 2019)
- The effects of EO on the lipid metabolism and protein expression involved in oxidative stress during the ageing process. Sun *Āmla* or ethyl acetate (Et Ac) extract of *Āmla*, a polyphenol-wealthy fraction, was administered at a dose of 40 or 10 mg/kg physique weight per day for 100 days to younger rats aged 2 months and aged rats aged 10 months. The lipid levels, corresponding to cholesterol and TGs, in serum and liver had been markedly extended in aged manage rats, and at the same time, they had been enormously decreased by way of the administration of EO (*Āmla*). The peroxisome proliferator activated receptor alpha (PPA Ralpha) is famous to control the transcription of genes involved in lipid and cholesterol metabolism. The PPAR alpha protein stage in liver was reduced in aged manage rats. Nonetheless, the oral administration of *Āmla* vastly accelerated the hepatic PPAR alpha protein degree. In addition, oral administration of *Amla* drastically inhibited the serum and hepatic mitochondrial thio barbituric acid (TBA)-reactive substance levels in aged rats. The elevated expression stage of bax used to be drastically reduced after the oral administration of EO (*Āmla*) while the level of bcl-2 ended in a massive broaden. In addition, the expressions of hepatic nuclear factor (NF)-kappa B, inducible NO synthase (iNOS) and cyclo-oxygenase-2 (COX-2) protein levels have been also elevated with aging. Nonetheless, EO (*Āmla*) extract decreased the iNOS and COX-2 expression phases through inhibiting NF-kappa B activation in aged rats. These results point out that EO (*Āmla*) could preclude age-related hyperlipidemia via attenuating oxidative stress within the growing older system. (Yokozawa *et al,* 2007)

Additional activities:

- The fruit of *Phyllanthus emblica* L. has been reported to possess gastro-protective, hepato-protective, cardio-protective, nephro-protective, anti-ulcer, anti-diarrheal, spasmolytic, anti-microbial, anti-bacterial, anti-viral, anti-diabetic, anti-hypercholesteraemic/ hypo-lipidemic/ antiatherogenic, hair growth promotion, antibiotic, anti-amnesiac, anti-inflammatory, wound healing, ophthacare, memory enhancer etc. activities. (Anonymous, 2021; Dasaroju & Gottumukkala, 2014; Kulkarni & Ghurghure, 2018; Nashine et al., 2019; Hasan et al., 2016; Garg & Garg, 2018)

CONCLUSION:

Āmla is rich in Vitamin C, Alkaloids, Calcium, Iron, Essential amino acids and many other vitamins and minerals. It has *Mu'mmir* (Longevity promoting agent), *Muqawwī-i-'Ām* (General tonic), *Muqawwī-i-Dimagh* (Brain tonic), *Muqawwī-i-Qalb* (Cardio tonic), *Mufarriḥ* (Exhilarant), *Muqawwī-i-Baṣar* (Eye tonic), *Muqawwī-i-Mi'da* (Stomachic), *Muqawwī-i-Sha'r* (Hair tonic), *Mu'addil-i- Ṣafrā'* (Normalizing yellow bile) etc. properties. It is used in *Ḍu'f-i-'Ām* (General debility), *Ḍu'f-i-Dimāgh* (Cerebrasthenia), *Ḍu'f-i-Qalb* (Cardiac insufficiency), *Khafaqān* (Palpitation), *Ḍu'f-i-Baṣar* (Poor eyesight), *Nisyān* (Forgetfulness), *Ḍu'f-i- Mi'da* (Gastric debility), *Qarḥa'-i- Mi'da* (Gastric ulcer), *Humūḍat-i-Mi'da* (Hyperacidity), *Ḍu'f-i-Kabid* (Hepatic insufficiency), *Ishāl* (Diarrhoea) etc. It showed Antioxidant and free radical scavenging, Immunomodulatory, Anti-ageing, Gastro-protective, Hepato-protective, Cardio protective, Nephro-protective etc. activities. Regular use of *Āmla* in diet in prescribed doses may help

delay ageing process, strengthen body faculties, prevent and control chronic diseases and thus ensure longevity and healthy ageing.

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