
IJAPC
Vol. 13 Iss. 1
E ISSN
2350 0204
WWW.IJAPC.COM
GGP

Int J Ayu Pharm Chem

REVIEW ARTICLE

www.ijapc.com

e-ISSN 2350-0204

Therapeutic Evaluation of *AyushKwatha*: A Review

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ABSTRACT

In December 2019, China had reported a new respiratory tract infection which occurred due to infection caused by coronavirus and the diseased was later named as COVID19. All modern physicians along with all healthcare faculties worldwide got engaged in the search of effective medicine against Covid19. In India under preventive and prophylactic treatment, Ministry of AYUSH suggested a combination of four traditional medicine named Tulasi (Ocimum sanctum L.), Twaka/Dalchini (Cinnamom umzeylanicum BL.), Shunthi/Sontha (Zingiber officinalisRosc.) and Maricha/ Kali Mirch (Piper nigrum L.) named as AyushKwatha which is said to be used in the form of decoction. Each herb was used as a traditional medicine as single drug and in different formulations. The current article tries to explain the therapeutic value of these four Ayurveda herbs as a health promoter and immunity booster. Also, it gives strength to the respiratory system. AyushKwath may play a key role in prevention of diseases as well as in management of autoimmune diseases..

KEYWORDS

AyushKwatha, Antioxidant activity, Immunomodulatary activity, Respiratory diseases

Greentree Group Publishers

Received 05/05/20 Accepted 05/06/2020 Published 10/07/2020

INTRODUCTION

On Feb 11, 2020 a new type of corona virus was identified and named 2019 novel corona virus (COVID-19) by the World Health Organization (WHO)[1-2]. The COVID-19 patients who were diagnosed as infected showed symptoms such as cough, fever and lung disorders with other symptoms such as diarrhea, myalgia and fatigue[3-4]. Consistent with previous analysis, WHO also concluded that till date, there is no specific medicine recommended to prevent or treat COVID-19[5]. A clinical management guideline for COVID-19 was developed by a panel of U.S. physicians, statisticians and other experts from healthcare providers. The guideline includes two broad categories of managements currently in use by healthcare providers for COVID-19, first is use of antiviral drugs and second is host modifiers and immune-based management, which may influence the immune response against the virus. The recommendations in these guidelines are based on scientific evidence and expert opinion. Currently there are no any approved drugs for COVID-19 by Food and Drug Administration (FDA). Finally, it is important to stress that the recommendations in these guidelines should not be considered as manadatory[6-7]. In April, 2020 Ministry of AYUSH, GOI issue a list of recommendation in pandemic -19 for self-care, all recommendations are advised for to boost immunity which are recommended by physicians across the India. These recommendations are basically advised for prevention and to boost immunity which is supported by Ayurvedic text and previous scientific publications but details are not to be given. In these measures there are total four measures in sub heading 1) General Measures, 2) Ayurveda Immunity Promoting measures, 3)Simple Ayurveda Procedures and 4) During Dry Cough/Sore Throat[8-9]. In sub head Ayurveda Immunity Promoting measures there is recommendation of Herbal Tea which is made by herbs mostly used by Indian *Ayurveda* physicians as well as mentioned in *Ayurveda* literature. Mostly Indian citizens are familiar with one or more components of the recommended herbal tea or decoction, because the herbal drugs are frontally used in kitchens of Indian families.

After the appreciation from The Prime Minister of India, on April 24, 2020 AYUSH Ministry published a guideline on *Ayush* health promotion product namely *AyushKwatha* or *AyushKudlneer* or *AyushJoshanda*. *AyushKwatha* is an herbal formulation, each herbal drug is used for the treatment of fever, cold, cough etc. *AyushKwatha* is a decoction (*Kadha*) made

from *Tulsi* (Basil), *Twaka/Dalchini* (Cinnamon), *Maricha/Kalimirch (Black pepper) and Shunthi (Dry Ginger)*[10].

Most Westerners / Indians do not take Ayurveda seriously, considering it unscientific in its understanding of the human body and the nature of disease and its treatment. The adoption of *Ayurveda* in industrialized countries is impeded by a lack of quality control and the absence of scientific and clinical proof of their effectiveness. A past editorial in *JAMA* emphasizes that the fundamental issue is not traditional medicine versus alternative medicine, but medical practice supported by clinical and scientific evidence[11]. There is an urgent need to conduct a review to support claims. In this review, after investigating a number of related literatures, we summarized traditional uses, pharmacological activity/medicinal uses of contents of *AyushKwatha* to provide references for further researches and developments. This is an attempt for exploring *AyushKwatha's* potential in boosting immunity with special reference to respiratory health as well as in preventing and treating diseases related to respiratory system.

AIM

The aim of this article is to provide systemic organized data on traditional uses of each herbal content used in *AyushKwatha* and to critically analyze evidences in online published scientific articles which support its therapeutic potential for the prevention and treatment of human diseases. Traditional uses of each herbal drug used in *AyushKwatha* and detailed pharmacological activities are key areas to investigate. Relevant information on each components of *AyushKwatha* was collected through published scientific materials, including PubMed, Science Direct, Wiley, Springer, Google Scholar, Ayush portal and Research Gate etc and other literature sources like The *Ayurveda* Pharmacopeia of India(API),1999, classical treaties of Ayurveda i.e. *CharakaSamhita, SushrutaSamhita, Ashtanga Hridaya* . For online search key words such as Basil, Cinnamon, Dry Ginger, Black pepper, *Ocimum sanctum, Cinnamom umzeylanicum, Zingiber oficinalis, Piper nigrum* etc. were used. Scientific materials are selected for study on basis of requirement without any specific period of time.

RESULTS

AyushKwatha is a decoction made from *Tulsi, Twaka, Maricha and Shunth* as mentioned in table no.1, traditional uses are mentioned in table no.2, name of different

groups in which these ingredients are mentioned in classical text are mentioned in table no.3.

Table 1 Contents of *AyushKwatha*

Sr.No.	Name of Drugs	English Name	Latin Name	Family	Parts used	Quantity
1.	*Tulsi*	Basil	*Ocimumsanctum* L.	Lamiaceae	*Patra*(Leaves)	4 parts
2.	*Twaka / Dalchini*	Cinnamon	*Cinnamomumzeylanicum* BL.	Lauraceae	*Twaka* (Stem bark)	2 parts
3.	*Sunthi / Sonth*	Dry Ginger	*Zingiberofficinalis* Rosc.	Zingiberaceae	*Kanda* (Rhizome)	2 parts
4.	*Maricha / Kali Mirch*	Black pepper	*Piper nigrum* L.	Piperaceae	*Phala* (Fruit)	1 parts

Table 2 Traditional use of drug of *AyushKwatha* in diseases mentioned in literatures given below[12-14] :

S. No.	Drug	*CharakaSamhita*	*SushrutSamhita*	*Ashtangahridya*	API
1.	*Tulsi*	*Hikka,Kasa,shawas, Visha,pasharvshool*	-	*Hikka,Kasa,shawas, Visha,pasharvshool*	*Shwasa, Kasa, Pratishyay, Hikka, Kushtha, Krimiroga, Aruchi*
2.	*Twaka/Dalchini*	-	-	*Kandu*	*Pinasa, Mukhsosa, Krimiroga, Vastiroga*
3.	*Sunthi/Sonth*	-	-	-	*Shwasa, Agnimandya, Aadhman, Pandu, Udarroga, Aamvat*
4.	*Maricha / Kali Marich*	-	-	-	*Shwasa, Shool, Krimiroga, Twakaroga*

Table 3 Name of groups (*Mahakshaya/Varga/Gana*) in which *drug* of *AyushKwatha are mentioned*[11-12&15]:-

S. No.	*Drug*	*CharakaSamhita*	*SushrutSamhita*	*Ashtangahridya*
1.	*Tulsi*	*Haritvarga , ShwasaharMahakshaya*	*Phalavarga, Surasadigana*	*Shaakvarga, Surasadigana*
2.	*Dalchini/Twaka*	*Sheetnashaklepa*	*Eladigana*	*Aushadhvarga*
3.	*Sunthi/Sonth*	*Aaharyogivarga TriptighanaMahakshaya, ArshoghanaMahakshaya, SatanyashodhanMahakshaya, TrishnanigharnaMahakshaya*	*Phalavarga, Pippalyadigana, Triyushangana*	*Vatsakadigana, Vachadigana, Aushadhvarga*

Pharmacological Action

1. ***Tulsi*:**

Botanical name of Holy basil is Ocimum sanctum.

4.	*Maricha / Kali Marich*	*Aaharyogivarga DeepaniyaMahakshaya, KrimighanMahakshaya, ShirovirechanopaghMahakshaya, Aaharyogivarga*	*Phalavarga, Pippalyadigana, Trikatugana*	*Aushadhvarga, Vatsakadigana*

The common name of Ocimum sanctum is Tulsi. It belongs to family Lamiaceae. Ocimum sanctum contains an active constituent named as Eugenol present in leaf. Other alkaloids present in leaf are flavonoids and tannins.

a. Antioxidant activity

Eugenol is a main constituent of volatile oil which showed antioxidant activity[16]. It has ability to remove free radicals. The leaves of this plant exhibited antioxidant activity in experimental animals[17-23].

b. Immunomodulatory activity

Eugenol has been shown to be immunostimulant claiming the therapeutic potential in disorders related with immunosuppression[23-25].

c. Antimicrobial Activity

Ocimum sanctum showed antibacterial activity due to presence of flavonoids and tannins[26]. In another study it was found that antimicrobial activities were due to Eugenol which is present in leaves of Ocimum sanctum[27].

d. Other Pharmacological Activity/medicinal uses

Ocimum sanctum showed many pharmacological actions like, anti-pyretic, anti-allergic, anti-inflammatory, anti-asthmatic, antitussive, mosquito repellent, anti-diarrheal, anti-cataract, chemopreventive, radioprotective, hepatoprotective, neuroprotective, cardioprotective, anti-diabetic, anti-hypercholesterolemia, anti-thyroid, anti-fertility, anti-ulcer, anti-emetic, anti-spasmodic, anti-arthritic, adaptogenic, anti-stress, anti-hypertensive, anti-carcinogenic, analgesic, central nervous system depressant, memory enhancement, diaphoretic, anti-leucodermal and anti-coagulant activities[28-32]. It acts as a potent adaptogen, due to unique combination of pharmacological actions[32].

It was reported that Ocimum sanctum showed analgesic activity due to high concentration of Eugenol[26]. Study on leaves and seeds of Ocimum sanctum showed that plant was useful to reduce blood and urinary uric acid levels as well as diuretic property in albino rabbit's experimental model[23&33]. Tulsi also has anti-tubercular activity as it inhibits in-vitro growth of M. tuberculosis[25].

2. *Twaka/Dalchini*:

Botanical name of *Twaka* is Cinnamomum derived from the Greek word 'kinnamomon' which means 'spice'[41]. The

bark of Cinnamon is one of the most popular spices used worldwide in cooking and also in traditional and modern medicine[35-36]. Cinnamon bark contains nearly 50.5% of cinnamaldehyde. It contains phenolic compounds, flavonoids, polyphenols, volatile phenols and isolated components. Each of these components plays an important role in the advancement of human health[36].

a. Antioxidant activity

The Antioxidant activity of Cinamon is due to presence of Ascorbic acid. It is reported in a study in which Cinnamon n-Butanol Extract (CBE) derived from Cinnamon bark showed significant antioxidant activity, in vitro study in which hydrogen scavenging method and ascorbic acid was used as standard[36].

b. Immunomodulatory activity

In experimental models for example, carbon freedom test, cyclophosphamide induced neutropenia, neutrophil grip test, impact on serum immunoglobulins, mice lethality test and aberrant hemagglutination test, it is discovered that the impact of immunomodulatory activity is because of terpenes present in cinnamon stem bark. The results of the present study substantiate the belief that cinnamon is an immune system booster[37].

c. Antimicrobial Activity

Cinnamic acid and cinnamaldeydes present in the bark are responsible for its Antimicrobial activity. They inhibited the growth of both gram positive and gram negative food borne pathogens. Flavonols present in the bark showed important role in Antifungal activity[38].

d. Other Pharmacological Activity/medicinal uses

Twaka / Dalchini is used as a coagulant agent to prevent bleeding[39]. It has been used as Anti-inflammatory as well as Anti carcinogenicagent[40]. In a review of pre-existing studies, cinnamon had distinctive biological and pharmacological actions on various diseases such as asthma, bronchitis, inflammation, microbial infection, abdominal disorder, nerves disorder, urinary infection, arthritis, cancer, diabetes, anemia and hypertension because of its bioactive compounds[41].

3.Sunthi/Sonth:

Shunthi, the word ginger originated from the English word gingivere. It contains gingerol and paradol, shogaols. . It also has significant concentration of essential nutrients, minerals and other bioactive compounds such as flavonoids, terpenoids, carotenoids and 2-3% volatile oil[42]. Volatile oil- Monoterpenoids (geraniol, β-phellandrene, camphene, cineole, curcumene, citral, terphineol, borneol, cineole, geranyl acetate, limonene, linalool)

and sesquiterpenoids [α-zingiberene (30–70%), β-sesquiphellandrene (15–20%), β-bisabolene (10– 15%), α-farnesene, zingiberol][43].

a.Antioxidant activity

Ginger has about 40 antioxidant compounds[44]. Gingerols showed oxidative stress due to stimulation of superoxide dismutase, catalase, glutathione peroxidase and GSH actions[45]. The bioactive compounds like gingerols, shogaols, zingerone, exhibit antioxidant activity[43]. Ginger has excellent antioxidative effect, this action has been studied by the inhibition of ascorbate/ferrous complex in rat liver microsomes[46-48].

b. Immunomodulatory activity

Ginger showed improvement in cells and humoral mediated immune response in immune suppressed mice[49]. The ginger rhizome powder is capable to improve non-specific immune response in fish (rainbow trouts)[43&50].

c. Antimicrobial Activity

Ginger showed anti-microbial activity[42].

d. Other Pharmacological Activity/medicinal uses

Ginger has anti-inflammatory, anti-pyretic, antithrombotic, anti-apoptotic, anti-tumourigenic, anti-hyperglycaemic, anti-obesity[42]. Ginger rhizome diet for 12 weeks showed increased haemoglobin, haematocrit, erythrocyte, MCH, MCHC, WBC values and neutrophils percentage[43]. *Ginger* has been used for curing several diseases like, asthma, nausea, travel sickness, morning sickness, arthritis, gastrointestinal complaints and cough[51].

4. Maricha / Kali Marich:

The word Pepper derived from the Sanskrit word *Pippali*. It contains an alkaloid named as piperine which has many pharmacological actions.

a. Antioxidant activity

Piper nigrum has antioxidant activity. This antioxidant property is due to presence of flavonoids and phenolic contents. The antioxidant properties of the methanolic extract of *Piper nigrum* were seen in Alzheimer's disease model in rats[52-55]. In vitro studies, it had proved that Piperine inhibited free radicals and reactive oxygen species, therefore showed protective effects against oxidative damage. In vivo studies, it is reported that Piperine help to decrease lipid peroxidation and prevent oxidative stress and these particles showed antibacterial activity of plant pathogens[55].

b. Immunomodulatory activity

It was proved that when Piperine is administered it increased the bone marrow cellularity and alpha-esterase positive cells[57] and hence showed its immunomodulatory activity.

c. Antimicrobial Activity

Piper nigrum also has antibacterial activity. The leaf and stem extract of *piper nigrum* help to synthesize silver nanoparticles and these particles showed antibacterial activity of plant pathogens[56].

d. Other pharmacological activity/medicinal uses

Piperine helps to increase absorption and therapeutic efficacy of vaccines, nutrients and drug[58]. Another study also confirmed that Piperine leads to enhance bioavailability property[55,59]. Piperine exhibits many other pharmacological activities like anti-asthmatics, anti-inflammatory, antipyretic, antihypertensive, analgesic, antidiarrhoeal, antispasmodic, antidepressants, anticonvulsant, anti-thyroid, antifungal, hepato-protective, antiobesity, antidiabetic, antiepileptic, antifertility, GIstimulant, lipid metabolism accelerator, anticancer, CNS stimulant, diuretic, aphrodisiac, blood purifier and antiplatelet activities, insecticidal and larvicidalactivities[55-56]. The Syriac Book of Medicines in 5thcentury indicates black pepper in some illnesses such as heart disease, lung disease, liver problems, lung disease, gangrene, oral abscesses, hernia, constipation, diarrhea, earache, hoarseness, indigestion, insect bites, insomnia, joint pain, sunburn, tooth decay and toothache[59].

Pharmacological actions of these drugs are mentioned in table no.4 as per following-

Table 4 Pharmacological Activities of *drug* of *AyushKwatha*

S. No.	Drug	Pharmacological actions				
		Antioxidant activity if any	**Immunomodulator if any**	**Anti-microbial if any**	**Proposed mechanism contributes anti-asthmatic effect**	**Other Pharmacological activity**
1	*Tulsi*	+	+	+	Anti Allergic, Anti Inflammatoy, Antitussive	Potent Adaptogen, Hepato-protective, Antidiarrhoeal, Antispasmodic, cardio-protective etc
2.	*Twaka/Dalchini*	+	+	+	Anti Inflammatory	Anti carcinogenic, coagulant etc
3.	*Sunthi/sonth*	+	+	+	Anti Inflammatory	Antithrombotic, Anti-obesity etc
4.	*Maricha/Kali Marich*	+	+	+	Anti Inflammatory	Bioavailability property, antispasmodic,

	antidiarrhoeal, hepatoprotective etc

DISCUSSION

Ayurveda herbal medicine therapy is a mixture *Ayurveda* herbs prescribed by *Ayurveda* physicians depending on the differentiation of the patient's syndrome according to *Ayurveda* diagnostic patterns (inspection, palpation and inquiry). Herbs used in *AyushKwatha* have scientific evidence to play an important role on immunity to prevent diseases as well as other pharmacological activity against diseases. While there is no medicine for COVID-19 as of now, it will be good to take preventive measures which boost our immunity in these times. Ayurveda is known as science of life, propagates the gifts of nature in maintaining healthy and happy living. Ayurveda's broad information base on preventive consideration, gets from the ideas of "Dinacharya" (daily regimes) and "Ritucharya" (seasonal regimes) to keep up sound life. The simplicity of awareness about oneself and the harmony each individual can achieve by elevating and maintaining immunity is emphasized across *Ayurveda's* classical scriptures.

Each herb of *AyushKwatha* has therapeutic potential on a wide range of diseases described in *Ayurvedic* texts. Each herbal single drug has shown important pharmacological activities *in vitro/vivo* studies. *AyushKwatha*may play an important role in autoimmune diseases because maximum herbs had proved their antioxidant activities and immunomodulatory activities in different experimental studies. From this study we conclude that *AyushKwath*may play a key role in prevention of diseases as well as in management of autoimmune diseases.

CONCLUSION

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