

***Ocimum sanctum* as immunostimulant in Aquaculture-a review**

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ABSRTACT

Oscimum sanctum is considered as the queen of herbs, most important source of medicine and drugs treatment of bronchitis asthma, etc. The most effective method of controlling of aquaculture system is by developing the efficient immune system. The use of vaccine also been essential in aquaculture. Aquaculture remains an important production sector for producing higher protein rich food. Intensification is a major problem for emerging of diseases. In aquaculture this research article emphasise the medicinal properties of *Ocimum sanctum*.

KEY WORDS

Immunostimulant, Pathogens, Tulsi, Pharmacology, Antibacterial, Prophylactic, Antioxidants.

INTRODUCTION

Plants are one of the most important sources of medicines. The important advantages claimed for therapeutic importance. The important advantages claimed for therapeutic uses of medicinal plants in various oilment are their safety besides being economical, effective and their easy availability. Therapeutic uses of *Ocimum sanctum* with a note on eugenol and its pharmacological action [1]. The genus *Ocimum* belong to the family Lamiaceae, Comprises about 68 species indigenous to tropical Asia, Africa and central and south America. Tulsi is a wild plant of tropics and warm regions Tulsi is harvested in subcontinent. It is an erected branched plant and its height is about 30-60 cm when mature. It grows in moist soil. This plant belongs to the family lamiaceae, characterized by squarestem and specific aroma. Tulsi is a sacred plant of hindu religion worshipped all over India. Tulsi means incomparable one or matchless one and is derived from Sanskrit. The plant is known as holy basil in English [2].

TRADITIONAL USES

Tulsi is also known as the elixier of life since it promotes long evity. Different part of plant are used in Aurveda and cure of manyillnesses and everyday ailment like common cold, headache, cough, flue, ear, ache, fever, colic pain, tronchitis, asthma hepatic disease, malaria fever as an antidate for snake bite and scorpion sting, flaludence, magrains, headaches, faligue skin disease, wound insomnia, arthrits. The ethnic and rural people of Bangladesh have preserved a large bulk of traditional knowledge of medicinal uses of plants growing around them this knowledge is handed down to generation through word of mouth and is extensively used for

the treatment of common diseases and condition. Since ancient time the plant *Oscimum tenuiflorum* synonym *ocimum sanctum*. The medicinal plant is claimed for its therapeutic application not only because they are safe but also easily available, economical and effective [3]. Plant has great spiritual medicinal and therapeutic value in Hindu belief. Hindus reared it as an earthly manifestation of the goddess tulasi she is regarded as a great worshipper of the god Vishnu. Nature has provided a complete store house of remedies to cure ailment of mankind. About 80% of the world population depends wholly or partially on traditional medicine for its primary health care needs. The plant found through Indian up to an altitude 1800m in Himalaya and in Andaman and Nicobar Island. Different part of the plant have been claimed to be valuable in a wide spectrum of disease [4]. Plant are considered as one of the most important source of medicine and drugs of today and many secondary metabolites and essential oils come from medicinal plant[5]. Tulsi is a highly aromatic herb of the family Lamiaceae. It is popularly known as holy basil and is present in almost every household in Indian sub continent mainly because of its medicinal nutritional and spiritual properties [6]. *Ocimum tenuiflorum* also called *Ocimum sanctum* holy basil tulsi is associated degree aromatic plant within the native to the Indian landmass widespread as atracheophytes throughout the Southeast Asian tropics. In recent years scientific in many aspect of complementary medicine particularly in medicinal plant has increased considerably [7]. Plants are potent biochemists and have been components of phytomedicine since times immemorial men are able to obtain from them a wondrous assortment of industrial chemical. Plants are potent biochemists and have been. Component of phytomedicine since times immemorial man is able to obtain from them a wondrous assortment of industrial chemicals. *Ocimum sanctum* are considered as one of the most important source of medicine and drugs with many secondary metabolites and essential oil recommended for treatment of bronchitis, bronchial asthma, malaria diarrhea, dysentery, skin disease, arthritis, painful eye disease, chronic fever disease. Tulsi in Hindu or Tulsi in Sanskrit is a highly revered culinary and medicinal aromatic from the family Lamiaceae. That is indigenous to the Indian subcontinent and been used within Ayurvedic medicine more than 3000 years. Plants are one of the most important sources of medicines. Today the large number of drugs in use are derived from plants, like morphine from *Papaver somniferum*, *Aswagandha* from *Withania somnifera*, ephedrine from *vulgar*, Atropine from *Atropa belladonna*, Reserpine from *Rouphia serpentina*.

TULSI AS PROPHYLACTIC AGENT

Tulsi is an important constituent of many cough syrups and expectorants. It helps to mobilize mucus in bronchitis and asthma. Also it is used as a remedy for night blindness and conjunctivitis being nerve tonic they are used as a remedy for night it is good source of antioxidants and after substantial protection against free radical induced damage [8]. In recent time focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plant used in various traditional system. The use of plant and plant product as medicines could be traced as far back as the beginning could be traced as far back as the beginning of human civilization. Medicinal plants are a valuable source

compounds for the pharmaceutical industry and traditional medicine. Although synthetic drugs and antibiotics prerequisites for current medical practice, plants provide a major to the pharmaceutical industry. Tumor neoplasm is a mass of tissues formed as a result of abnormal excessive mouse and purposeless growth of all Tumors is of two types. Benign and malignant begin tumor is harmless while the malignant tumor known as cancer is very harmful, leading to death of human beings as well as animals. Role of Tumor mark ere in cancer. Aqueous extract of whole plant of us ametiorated the amnesic effect of scopolamine diazepam and aging induced memory [9]. Tulsi is an important symbol of hindu religious tradition. All through the word Tulsi gives the incomparable one its other name. Vishnupriya names the one that pecesses lord Vishnu. The plant is grown through the country from Andaman and Nicobar Island to the Himalayas up to 1800 meter above the sea level. It is also abundantly found in malasia Australia west Africa and some of the Arab countries [10].The genus *Ocimum* belongs to the family Lamiaceae, comprises. About 68 species indigenous to tropical regions of Asia, Africa and central and South America.

IMMUNOMODULATORY ACTIVITY

Antibiotic are chemicals that are produced by living organisms which even in minute amounts, inhibit the growth of or kill another organism [11]. Most of the pharmacological activities of *Ocimum sanctum* fixed oil were evaluated following administration of oil by intraperitoneal route most of the studies of *Ocimum sanctum* have been carried out with leaves aqueous and non-aqueous extract of leaves. Since ancient time the plant *Ocimum sanctum*. The medicinal plant is claimed for its therapeutic medicine [12]. The world of fish pharmacologes is now changing quickly. As aquaculture continues to expend there is a need for greater knowledge of medicinal treatment both for the prevention and treatment of disease and for the economics husbandry of fish [13]. Tulsi essential oil contain a valuable source of bioactive compound such as camphor, eucalyptol, eugenol, nalpha, bisablene, beta bisabolene, and beta caryophyllene. Tulsi is an important symbol of the hindu religious traditions although the word tulsi gives the implication of the incomparable.

IMMUNOSTIMULANT ON IMMUNE SYSTEMS

One of the most promising method of controlling disease in aquaculture is by strengthening the defense mechanisms of fish through prophylactic administration of immunostimulants. Fish are palatable and proteinaceous food for human beings. India is now of the threshold of blue revolution and it has made a progress in the field of inland fisheries, fishes not only play an important role in the demand of food for humans but they are widely used for various biological and have been component of phytomedicine since times immemorial man is able to obtain from them a wondrous assortment of industrial chemical. *Ocimum sanctum* plants are considered as one of the most important source of medicine and drugs with many important sources of medicine and drugs with many secondary metabolities.

FUNCTION OF IMMUNOSTIMULANT

Immunostimulant activate different elements of the immunesystem in humans and animals. The selection of suitable immune stimulant with a capacity to enhance protection in fish present a difficult, task and in a strict sense, no such major effect or research funds have been diverted[14]. The use of vaccines has been essential in aquaculture and has been under development for over 10 years since the first successful fish vaccine was formulated. Globally fish and shell fish culture are subjected to many diseases that lead to great losses and decreases in the production. Plants are of the important source of medicine and large number of drugs in use is derived from plants. The therapeutic uses of plant are safe, economical and effective as their ease of availability. The leaf juice of *Ocimum sanctum* along with triphala is used in Ayurvedic eye drop preparation recommended for glaucoma, cataract, chronic conjunctivitis and other painful eye disease. The medicinal plants are rich in secondary metabolites and essential oils of therapeutic importance. The continuing research indicates that turmeric and its active compound curcumin are unique antioxidants, antimutagenic, anticarcinogenic, antiinflammatory antiarthritis, antimicrobial and hypocholesterolenic properties. In Indian scenario, poultry, industry has become a means for earning livelihood for the economically distressed farmers in India due to its promising result in productivity and national economy [15]. Cancer is a dreaded disease which is best characterized by abnormal cell division [16]. Tulsi is known as the mother medicines of nature and the "queen of herbs. There are three *Ocimum* species belonging to the family Lamiaceae are *Ocimum sanctum* and widely distributed in south Asia. The immune system is a system of biology structure and processes within an organism that protects against disease. Disorders of the immune system can best result in autoimmune disease, inflammatory disease and cancer and immunodeficiency [17]. Tulsi is an important symbol of the Hindu religious tradition. Although the word tulsi gives the connotation of the incomparable one is other name [18]. Due to different combination of the essential oils, various varieties of *Ocimum basilica* differ in fragrance. Different chemovarieties are found in different regions of the world. The medicinal plants in various ailment are their safety besides being economical, effective and their easy availability center [19]. Cancer is a dreaded disease which is best characterized by abnormal cell division and is caused by mutation of genes involved in the control of cell division culture remains a growing vibrant and important production sector for higher protein food the growth of intensive aquaculture production has led to a growing intensive aquaculture production has led a growing intensive aquaculture production has led to a growing interest in treating or preventing fish disease [20].

ANTIBACTERIAL ACTIVITY

The antibacterial activity of *O.basilicum* essential oil extracted from leaves was studied against gram negative and gram positive bacteria including *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus cereus*, *Staphylococcus aureus*, respectively (21). Tulsi is known to possess antimicrobial activity against various bacteria, the most common being *Candida albicans*, *Staphylococcus aureus*, *Escherichia coli* by its phytoconstituents isolated from various parts (22).

The aqueous leaf extract showed activity against gram positive and gram negative bacteria, however it was not effective against *Shigella* and *Salmonella*, *Staphylococcus citreous*, *E.coli* and *Aspergillus niger* (23). Basically in vitro studies are performed against specific pathogens under laboratory growth or the inhibition of the *pathogen*. In majority of case dose dependent effects are observed for a specific period of time (24). *Ocimum sanctum* fixed oil showed good antibacterial activity against *Bacillus pummels*, *Pseudomonas aeruginosa* higher content of linolenic acid in *Ocimum sanctum* fixed oil could contribute towards its antibacterial activity (25).

PHARMACOLOGICAL ACTIVITY

The leaves are demulcent diaphoretic and expectorant in bronchitis, cough cold and cough and fever. It is an insecticide antihelmenthic and deodorizer and also have has been used as laxative, stimulant and anti-inflammatory cardi tonic and blood purifier in hepatic disorder (26). Most of the pharmacological activities of *O.scimum sanctum* fixed oil were evaluated following administration of oil by intraperitoneal route. The reasons for selecting administration is that absorption from intraperitoneal route is free from the effects gastric emptying or presystemic gastrointestinal or gut wall metabolism, which affects oral absorption (27). *Ocimum sanctum* has specific aromatic odour because of the presence of essential or volatile oil, mainly concentrated in the leaf. This aromatic volatile oil mainly contains phenols, trepans and aldehydes (28).The *Oscimum sanctum* oil was found to be devoid of analgesic activity in experimental pain models. However it was effective against acetic acid induced method in mice in a dose dependent manner. The writing inhibiting activity of the oil is suggested to be peripherally mediated due to combined inhibitory effects of prostagland in shistamines and acetylcholine (29). Herbal anti-cancer compounds are unique in their feature of having antioxidant and immunostimulant activity preventing cancer growth indirectly along with a direct cytotoxic effect towards malignantand their apoptotic cell (30). The analgesic activity of fixed oil from the seeds of *Oscimum sanctum* were investigated in mice and rats using the tail flicks, tail clip, tail immersion and acetic acid induced writhing methods (31). *Oscimum sanctum* is one such plant showing multifarious medicinal properties viz. Analgesic activity, Immunomodulatory activity, antis tress activity in addition to possenssing useful memory enhance and neuroprotective activity(32). Tulsi extract and essential oil have also been found to possess insecticidal and larvicidal activity against mosquitoes. *Oscimum sanctum* has also antifertility, anticancer, antidiabetic, antifungal, antimicrobial, analgesic and antispasmodic actions. Localty it is taken in many forms, to herbal tea, it is taken in many forms, as herbal tea, dried power of fresh leaf (33).Vitamin A and Vitamin C are also found in this herb which stimulates antibody production up to 20% to provide protection against disease.

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