

**Mini Review****Nutritional Potential of Citrus Sinensis and its Pharmacological Action: A Concise Review****Madiha Khan Niazi^{1*}, Farooq Hassan², Syed Zahoor ul Hassan Zaidi³, Ayesha Aslam¹, Quratul Ain Shahid¹, Wajeeha Arooj¹, Talha Noor³, Saira Ghaffar⁴, Azka Afzal Sahi¹ and Nimra Naeem¹**¹University Institute of Diet and Nutritional Sciences, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan²Punjab Healthcare Commission, Lahore, Pakistan³Faculty of Eastern Medicine, Hamdard University, Karachi, Pakistan⁴University College of Conventional Medicine, Faculty of Medicine and Allied Health Sciences, Islamia University of Bahawalpur, Pakistan**ARTICLE INFO****Key Words:**

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Madiha Khan Niazi

University Institute of Diet and Nutritional Sciences,
Faculty of Allied Health Sciences, The University of
Lahore, Lahore, Pakistandr.madiahaniazi@gmail.comReceived Date: 1st February, 2023Acceptance Date: 21st February, 2023Published Date: 28th February, 2023**ABSTRACT**

Currently, the pharmaceutical industry is becoming increasingly interested in the quest for novel medications derived from natural resources. Since ancient times, new pharmaceuticals have been created using natural ingredients. Secondary metabolites that have been discovered to have advantageous qualities are abundant in plants. This review highlights the medicinal potential of *C. sinensis* as a source of natural chemicals with significant health-promoting properties that could be exploited to create novel medications

INTRODUCTION

The largest fruit tree crop in the world is citrus. The Rutaceae family of evergreen shrubs and small trees includes citrus [1]. Citrus is produced in tropical, subtropical, and temperate climates. In the Northern Hemisphere, fruits especially oranges and grapefruit—mature between mid-December and early April. Fruit is generally available all year long. The vitamin C, carotenoids, flavonoids, pectin, calcium, potassium, and other vital nutrients in citrus fruit make it one of the most

significant fruits in the world. Citrus fruits are prized as a valuable source of soluble and insoluble fiber with several advantages, including eliminating toxins from the body [2]. Citrus fruit has higher concentrations of phenolic compounds, vitamins C and A, terpenes, phytonutrients, flavonoids, and terpenoids than other fruits [3].

Chemical Composition

The pharmacological effects attributed to *C. sinensis* are a result of the many secondary metabolites found in this

plant [4]. The fruits, peel, leaves, juice, and roots of *C. sinensis* have been reported to contain the following categories of chemical substances: Flavonoids, Steroids, alkanes, fatty acids, and hydroxyamides, coumarins, peptides, carbohydrates, carbamates and alkylamines, carotenoids, volatile compounds and dietary components [5] as shown in Table 1.

Component	Citrus Sinensis
Moisture (g)	88.4
Protein (g)	0.8
Fat (g)	0.3
Fiber, g	0.5
Carbohydrates (g)	9.3
Minerals (g)	0.7
Calcium (mg)	40
Phosphorous	30
Iron (mg)	0.7
Vitamin C (mg)	50
Energy, Kcal	43

Table 1: Chemical composition of Citrus Fruits (per 100g of edible portion)

Pharmacological Actions

Antibacterial Activity

The antibacterial properties of *C. sinensis* essential oil, raw extracts, and purified components have been demonstrated in several studies [6]. The minimum inhibitory dose (MID) against *Enterococcus faecium* and *E. faecalis* was 50 mg/L, and the MIC range for bergamia essential oils was between 0.25 and 0.5% (v/v). *L. monocytogenes*, *E. coli*, and other germs were effectively combated by *C. sinensis* oil [7]. *C. sinensis* extracts in hexane and acetone demonstrated 27 mm inhibitory zones for *Helicobacter pylori*. In this investigation, the examined extracts had less activity than the usual medications. However, it is feasible to obtain molecules with more activity from the extract that is the most active as depicted in Figure 1[8].

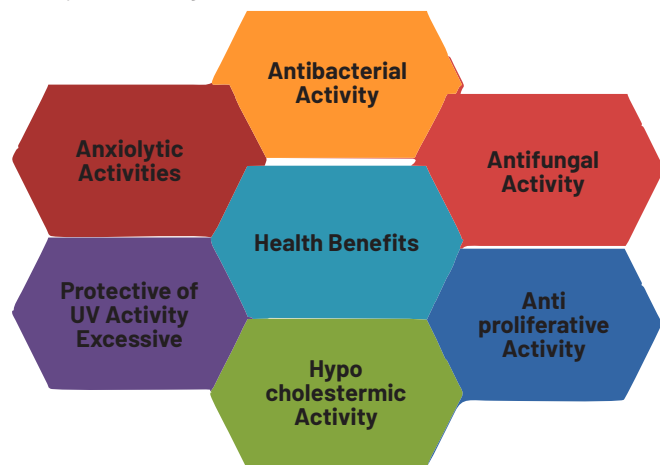


Figure 1: Pharmacological Action of Citrus Sinensis

Antifungal Activity

Finding novel antifungal medicines has become necessary due to the rise in fungal infections, and *C. sinensis* is a strong contender in this regard [9]. Identified compounds from the damaged peel of *C. paradisa MacFaden* or *C. sinensis L. Osbeck. Cladosporium cucumerinum* and *Candida albicans* were both active against by cv. Marsh [10].

Antiproliferative Activity

C. sinensis fruit juice reduced the growth of normal human prostatic epithelial cell line PZ-HPV-7 and Chinese hamster lung fibroblast cell line V79-4 [11]. Polymethoxyflavone-rich *C. sinensis* peels showed effectiveness against human lung cancer cells [12]. A number of flavones derived from orange peel extract were shown to have inhibitory effects against cell proliferation (IC50) and to induce apoptosis (AC50) when applied to HL-60 cell lines [13]. Flavones and isoflavones have been shown to promote cell death and suppress cell growth in MCF-7 breast cancer cells [14].

Hypocholesterolemic Activity

C. sinensis has advantageous qualities that are related to cholesterol, a severe health issue [15]. Because the fruit's micro sized insoluble fibers increased the excretion of bile acids (129%-133%) and cholesterol (123%-126%) in stool, the levels of blood triglycerides and total cholesterol were reduced [16].

Protective of UV Activity Excessive

C. sinensis red orange extract shown protective properties against ultraviolet B (shortwave) damage that was brought about in human keratinocytes [17]. This function may prevent oxidative stress-related cellular processes like inflammation and apoptosis. Orange is a potential contender for sun care products [18].

Anxiolytic Activities

The use of essential oils and extracts in aromatherapy is a complementary medical procedure [19]. Dental patients experienced a calming and relaxing effect after being exposed to the ambient scent of *C. sinensis* pure essential oil. *C. sinensis* extracts in methanol and dichloromethane exhibited sedative-like effects in Wistar rats [20].

CONCLUSIONS

Natural substances can be used to create new pharmaceutical compounds, and this tendency will persist. Recently, natural product research has drawn increased interest as a result of conventional drug discovery methods' failure to yield a large number of lead molecules in critical therapeutic areas. This review is a great resource for learning more about *C. sinensis* because there is a need to educate the general public on the importance of this plant and the importance of finding new and potent drug compounds.

Conflicts of Interest

The authors declare no conflict of interest.

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