



## KALI MIRCH (BLACK PAPPER) (PIPER NIGRUM)

### Shuddhi Ayurveda

**ABSTRACT:** The Black pepper (*Piper nigrum* L) plant and its concentrates have been utilized as a folk medication by society and are the wellspring of the most usually utilized flavour around the world. The substance piperine is a significant bioactive segment present in black pepper (and white pepper too) that has various detailed physiological and medication like activities. The study gives proof that black pepper may have medical advantages, especially in improving digestion issues. Black pepper contains anti-cancer oxidant and anti-microbial properties.

**Keywords:** Kali mirach, Piperine, Piperamine , Virya , Anti-diabetic, Anti-immunomodulatory , Bioavailability enhancer.

**INTRODUCTION:** Since ancient times people have utilized spices for any advantages like preventing food deterioration and pathogenic diseases. Extracts of different parts of various plants employing variety of solvents have been tested against a number of bacterial and fungal strains [1] Black pepper is one of the oldest and most widely used spice of the world and also called “the king of spices”. The constituents of pepper exhibits to its position as a food additive are essential oil for fragrance and alkaloid constituents for pungency. More than 75% of the total populace actually depend on plants and plant constituents for maintaining their health. Black pepper is widely used in ayurvedic medicines and in folklore medicines [2,3]. India still uses the herbal remedies which are codified in Ayurvedic literature. Black pepper from the *Piper nigrum* L. plant is the most frequently utilized flavour around the world, and its concentrates have been utilized as a Folk medication in many cultures. *Piper nigrum* is utilized for the manufacturing both black pepper (from the unripened fruit) white pepper (from the dehulled developed berry). In old Sanskrit writings, black pepper use for therapeutic purposes was archived. [4] In India, it was one of the most ordinarily utilized herbs in Ayurvedic medication and has been considered for treatment of gastrointestinal issues and, significantly more as of late, of ongoing jungle fever. [5] Black pepper additionally was utilized for the treatment of epilepsy in conventional Chinese medication. In the Middle Ages, Black pepper was recorded as being utilized in flavouring and for covering the flavour of salted, relieved meat. [6]

## Taxonomical Classification of *Piper nigrum* [7]

Kingdom: Plantae

Class: Equisetopsida

Sub class: Magnoliidae

Super order: Magnoliana

Order: Piperales

Family: Piperaceae

Genus: *Piper* Species: *nigrum*



Fig.1 Kali Mirch Plant

Vernacular Names[8]	
English	Black pepper, Madagascar pepper, White pepper, Peppercorn, Green pepper.
Hindi	Kali Mirch
Sanskrit	Pippali
Urdu	Kali Mirch
Arabic	Fulful, Filfil
Chinese (Mandarin)	Hu jiao, Hu-chiao [hú jiāo]
French	Poivre
Georgian	P'ilp'ili, Pilpili, P'eritsa, Peritsa
German	Pfeffer
Russian	Perets
Sinhala	Gammiris
Turkish	Karabiber
Yiddish	Fefer
Thai	Prik thai dam
Malayalam	Kurumulagu, Yavanapriyam
Bengali	Golmorich
Bodo	Golmoris
Manipuri (Meitei-Lon)	Golmorok
Marathi	Mire
Tulu	Edde Munchi

**Morphology:** Black *nigrum* plant is a blooming woody perpetual climbing plant that has a place with Piperaceae family. Pepper plants effectively fill in the shade on supporting trees, lattices or posts up to most extreme stature of 13 feet's or 4 meters and roots may come out from leaf nodes if vines come in contact to the ground. The plants have heart shape as long as the leaves. The spikes reach up to the height of 7-15 cm. The black pepper's fruits are little (3 to 4 mm in breadth) called a drupe and the dried unripe fruits of *Piper nigrum* are known as a peppercorn. The fully developed fruits are dull red in shading and roughly 5 mm in measurement. The fruit contains a solitary seed. The plants bear fruits from fourth or fifth year, and keep on bearing fruits as long as seven years. A solitary stem contains 20-30 spikes of fruits. The gathered spikes are sun dried to isolate the peppercorns from the spikes. The new reaped unripe green fruits may freeze-dry to make green pepper. The new reaped unripe

green natural products may sun-dried to make dark pepper. The red skin of the mature fruits is taken out and the stony seeds are sun-dried to make white pepper. [9]

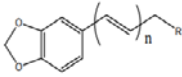
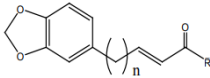
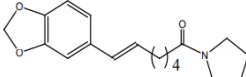
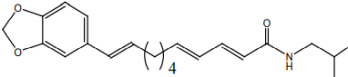
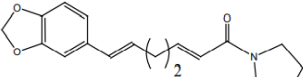
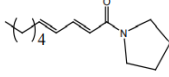
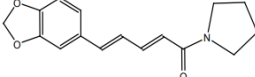
**Distribution:** Black pepper (*Piper nigrum*) is indigenous to India and the tropical evergreen woodland of the Malabar locale of southern India. [10] Black Piper is also found in Malaysia, Indonesia, Shrilanka. It is cultivated in hot and moist areas. In India it is cultivated in Tamilnadu, kerala, karnatka, and in some areas of Assam. Malabar and Telicheri are two most famous places for Black Piper business. [11]

### Phytochemical of *Piper nigrum*:

The phytochemical examinations of *P. nigrum* uncovered that it contains variety of phytochemicals. Piperine was the first pharmacologically active compound detached from various individuals of Piperaceae family. Numerous specialists separated various kinds of chemical compound viz Phenolics, flavonoids, alkaloids, amides and steroids, lignans, neolignans, terpenes, chalcones and many other compounds. Some of the chemicals are Brachyamide B, Dihydro-pipericide, (2E,4E)- N-Eicosadienoyl-pereridine, N-trans-Feruloyltryamine, N-Formylpiperidine, Guineensine, pentadienoyl as piperidine, (2E,4E)-Nisobuty-ldecadienamid, isobutyl-eicosadienamide, Tricholein, Trichostachine, isobutyl-eicosatrienamide, Isobutyl-octadienamide, Piperamide, Piperamine, Piperettine, Pipericide, Piperine, Piperolein B, Sarmentine, Sarmentosine, Retrofractamide. The diverse pharmacological activities were accounted because of the presence of these phytochemicals. Piperine answered to have four isomers viz; Piperine, Isopiperine, Chavicine and Isochavicine. Among all separated from *P. nigrum*. Piperine, pipene, piperamide and piperamine were found to have assorted pharmacological activities. [12]

*P. nigrum* having huge variety of fragrant and volatile compound and it has different potential for cosmetic, perfumery, medicine, and kitchen spices. [13,14] Some of the main categorized aromatic and volatile principles are in this plant which are:

Monoterpenes	Sesquiterpenes	Others
1. Sabinene	Caryophyllene oxide	Cinnamic acid
2. Limonene	$\alpha$ -Cis-Bergamotene	Benzaldehyde
3. Camphene	$\alpha$ -TransBergamotene	Eugenol
4. Myrcene	$\alpha$ -Copaene	Methyleugenol Myristicin
5. Cis-Ocimene Terpinolene	$\alpha$ -Selinenes	m-Methyl acetophenone
6. 1,8-Cineole	$\beta$ -Bisabolene	n-Butyrophenone
7. $\alpha$ -Thujene	$\beta$ -Caryophyllene	Piperonic acid
8. $\alpha$ -Pinene	$\beta$ -Cubebene	Piperonal
9. $\alpha$ -Phellandrene	$\beta$ -Elmenes	Phenyl acetic acid
10. $\alpha$ -Terpinolene	$\gamma$ -Cadinene	P-Methyl acetophenone

<b>Important chemical constituents of <i>P. nigrum</i> [15]</b>	
1-Piperine	 <p>1-Piperine</p>
2-Piperamine	 <p>2-Piperamine</p>
3-Piperamide	 <p>3-Piperamide</p>
4-Pipericide	 <p>4-Pipericide</p>
5-Sarmentosine	 <p>5-Sarmentosine</p>
6-Sarmentine	 <p>6-Sarmentine</p>
7-Trichosta	 <p>7-Trichosta</p>

### Traditional view on Kali Mirch

The utilization of Black pepper has just been known for a long time to treat various kinds of medical conditions, including irregular fever, flu, pain, and headache in China and India. [16] Generally, it has been utilized in numerous Asian nations for treating acid problems related to digestion, asthma, pain, respiratory tract infections and contaminations, and rheumatoid joint pain, also used as stomachic, stimulant, aromatic and hepatoprotective. Besides, breathing in *P. nigrum* oil was powerful in decreasing smoking withdrawal effects including cigarette craving and uneasiness. [17,18,19]

### Kali Mirch in Ayurveda:

In Ayurveda pepper *nigrum* is called as Marich or Maricha. Maricha is an herb which reduces vata and kapha and increases pitta.

## Rasa Panchak of Kala Mirch [20]

Hindi/ Sanskrit	
Virya	Ushana
Vipak	katu
Guna	Laghu, Tikshan
Rasa	Katu

English	
Potency	Hot
Metabolic Property	Pungent
Physical Property	Little , Minutes, piercing
Taste	Pungent

### Effect on Tridosha: Balance vata and Kapha Dosha

Kali Mirch is whole plant is extensively used in Ayurvedic System Medicine for various disorders. It is excellent in deep digestion and liver related disorders. It is also useful for cold and respiratory disorder. Also beneficial for cold fever. It also increases bioavailability due to alkaloid called piperine. Its lepa effectively provides relief when applied on acne and pimples. It is a great rejuvenator.

### Some significant properties of Kali Mirch in Ayurveda

Deepana: It advances the appetite but does not help in processing undigested food.

Kahpara: It calms down the kapha dosha.

Pittakar: Activates Pitta.

Medohar: diminishes obesity.

Ruchikarak: Enhance taste

Shirovirechana: Eradicates Doshas of head.

Jantughna: Vanish parasites.

Chedan: Excrete from the body adherent phlegm or other humours.

### Modern view on Kali Mirch:

In the early upgrading of allopathy medication, generally effective constituents from higher plants have assumed a key role in giving prescriptions to endure discomfort and heal diseases. From most recent twenty years, there has been another format in the arranging and promoting of medications dependent on therapeutic plants. These arrangements, marked organic medications or phytomedicines, that are single plant concentrates or parts thereof and are specific from the unadulterated chemical elements of molecular medications. These new plant-inferred items are attentively normalized/regulated, yet they go through some processes like different different of extraction, isolation, formulations which may produce some adverse effects to the body. The phytochemicals perceived from restorative plants are speaking to a stimulating open entry way for the improvement of new sorts of therapeutics. Researchers around the whole world are working comprehensively in examining Kali mirch and its properties to detail new medication. Kali mirch has assorted potential for beautifying agents, perfumery, medicines and kitchen flavors [21,22]

## List of some Modern products having Piper nigrum as an ingredient

### 1. Body wash / Black Pepper & Bergamot deodorant



### 4. Whiskey black pepper



### 2. skin science fabulous foaming body wash



### 5. Black pepper essential oil



### 3. Fast & Up Terra pepper cellulite oil



### 6. Mantra herbal haritaki and black pepper



<b>Uses of Piper nigrum (kali Mirch)</b>	
<b>1. Anti-Bacterial</b>	The bioactive constituents i.e piperine extracted from the black pepper is effective against both gram positive and gram negative bacteria. And the black pepper oil also possesses' anti-bacterial properties. [23]
<b>2. Antidiarrheal Effect:</b>	The carbohydrates and alkaloids of black pepper are very good anti-diarrhoeal agent. Aqueous black pepper extract are also known to possess anti-diarrhoeal effect.[24]
<b>3. Immuno-modulatory</b>	Ethanolic extract and piperine are known to have some immunomodulatory properties.
<b>4. Anti-tumor</b>	Ethanolic fractions of peppercorn and piperine indicated viable antitumor action. piperine is good anti-cancer agent against prostatic cancer and lung cancer. [25,26,27]
<b>5. Anti-depressant</b>	The methanolic fractions of Piper nigrum have some significant antidepressant and anxiolytic properties by depletion of oxidative stress. [28]
<b>6. Hepatoprotective Activity</b>	Black pepper fruit contains methanolic extract and piperine which are known to maintain the levels of TG, AST, ALT, ALP and bilirubin and thus provide protection against various liver damages. Also piperine promotes digestion by enhancing the activity of lipase, disaccharides the maltase and sucrose. It promotes the activity of salivary amylase, and boosts up gastric secretion, and decrease GI transit time.[29,30,31,32,33,34,35]
<b>7. Bronchodilator</b>	Peppercorn has been used from the ancient times as a remedy for asthma and other respiratory problems. It is globally utilized as a cough syrup due to its bronchodilator properties. Piperine is also utilized for suppressing the production of histamine, immunoglobulin E, interleukin 4 and interleukin 5 that ultimately suppress the hyper responsiveness, infiltration of eosinophils and inflammation. [36,37]
<b>8. Anti-obesity</b>	P. nigrum chemical constituents and piperine in 3T3-L1 preadipocytes both the Black pepper concentrates and piperine effectively hindered the adipocyte separation of 3T3-L1 cells, without influencing cytotoxicity. Piperine reduces the body weight, enhances the insulin and leptin sensitivity thus helps in regulating obesity[38,39,40]
<b>9. Anti-Oxidant</b>	The water extract (WEBP) and ethanol extract (EEBP) of black pepper exhibited strong total antioxidant activity.[41]
<b>10. Anti-Thyroid</b>	Piperine extracted from the black pepper fruit exhibits some anti-thyroidal properties. It lowers down the serum concentration of thyroid hormone. [42]
<b>11. Antihypertensive effect</b>	Piperine is associated with the anti-hypertensive activity. It lowers down the pressure in arteries when administered intravenously. [43]
<b>12. Anti-Inflammatory</b>	Piperine is known to have anti-inflammatory effects. It is associated with the reduction of pro-inflammatory cytokinin like GM-CSF, IL-6. [44]
<b>13. Anticonvulsant activity</b>	The piperine have ability to calm the brain which possibly mediated via GABAergic pathways. [45,46]
<b>14. Anti-Dibetic</b>	Black pepper is very effective in treating disorder like diabetics. Chemical constituent like piper, piperaceae,

	Piperales possess anti-diabetic properties [47]
<b>15. Anti-Fertility</b>	The utilization of plants as abortifacient and as contraceptive was notable to the physicians of India. Different restorative plant extracts have been tried for their antifertility action both in male and female models. Kali Mirach is known to suppress the fertility potential thus known as a good anti-fertility agent. Piperine is one of the most known active constituents of black pepper for its anti-fertility property [48,49,50]
<b>16. Anti- fungal</b>	The volatile oil of black pepper have some anti-fungal activities against many fungal growth like <i>Fusarium graminearum</i> ., <i>Aspergillus ochraceus</i> and <i>Penicillium viridicatum</i> . [51]
<b>17. Bioavailability Enhancer</b>	Piperine has demonstrated bioavailability enhancing activities for some restoratively significant medications and supplements. Piperine builds the retention of numerous medications and supplements from the gastrointestinal tract by different processes. [52,53]
<b>18. Anti-Allergic</b>	Piperine demonstrate remarkable anti-allergic activity in ovalbumin- induced allergic rhinitis in mice. It also provides relief from sneezing, rubbing and redness caused by the changes or processes induced by antigens and antibody reaction. [54]
<b>19. Vitiligo</b>	An Ayurvedic arrangement comprising of dried ginger, dark pepper, pippali and leadwort root matured in cow's pee was given twice every day prior to meal to vitiligo patients as a beverage. Following a half year of the treatment, just 40% of the patients demonstrated relief of symptoms. [55] Black pepper fruit extract is effective in vitiligo. [56]

### Conclusion:

Black pepper is an important remedial plant which makes holds an exceptionally great position in Ayurvedic system for anticipation and medications of various human diseases. As a consequence of nature of various kinds of phytochemicals in Black pepper, it has found applications in medication science on account of its hepatoprotective, immunomodulatory, anti-obesity, anti-microbial anti-tumor etc.

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