PIPER NIGRUM: PHYTOCHEMICAL AND THERAPEUTIC POTENTIAL

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ABSTRACT

Medicinal plants are very popular in different traditional systems of medicines due to their diverse therapeutic potentials used in various food preparations. Piper nigrum L. (Family Piperaceae) is a well-known spice and piperine is a simple and pungent alkaloid found in the seeds of black piper (Piper nigrum). The biological properties of piperine have been studied, and shown an interesting range of pharmacological activities like anti-hypertensive, anti-platelet, anti-oxidant, anti-tumor, anti-asthmatics, analgesic, anti-inflammatory, anti-diarrheal, anti-spasmodic, anti-depressants, immunomodulatory, anti-convulsant, anti-thyroids, anti-bacterial, anti-fungal, hepato-protective, insecticidal and larvicidal activities etc. The current review article is aimed to provide updated information and cumulative views on phytochemistry and pharmacological potentials of Piper nigrum Linn.

KEYWORDS: Piper; piperine; bioavailability; phytochemicals; therapeutics.

INTRODUCTION

Piper nigrum (family Piperaceae) is a valuable medicinal and culinary plant. It is one of the most commonly used spices among various spices. Black piper (Piper nigrum) is a flowering vine cultivated for its dried fruit and used as a spice known as a pipercorn. When fresh and fully mature, it is approximately 5 mm in diameter and dark red, and contains a
single seed like all drupes. Pipercorns and the ground piper described as piper, or more precisely as black piper (cooked and dried unripe fruit), green piper (dried unripe fruit), and white piper (ripe fruit seeds). Hot and pungent pipercorns are obtained from Black piper which is the most famous and one of the commonly used spices throughout the world. Whole Pipercorn of Piper nigrum are being used in different types of food preparations and as medicines. Piper is used worldwide in different types of sauces and dishes like meat dishes. It contains major pungent alkaloid Piperine which is known to have many unique pharmacological actions. It is widely used in Ayurvedic and Unani medicines.\(^{[1,2]}\) Piperine exhibits diverse pharmacological activities like anti-hypertensive, anti-platelets, anti-oxidant, anti-tumor, anti-asthmatics, anti-pyretic, analgesic, anti-inflammatory, anti-diarrheal, anti-spasmodic, anxiolytic, anti-depressants, hepato-protective, immuno-modulatory, anti-bacterial, antifungal, anti-thyroids, anti-apoptotic, anti-metastatic, anti-mutagenic, anti-spermatogenic, anti-colon toxin, insecticidal and larvicidal activities\(^{[3-7]}\) etc.

**Taxonomy of Piper nigrum.**

<table>
<thead>
<tr>
<th>Kingdom: Plantae</th>
<th>Black piper from South India</th>
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</thead>
<tbody>
<tr>
<td>Class: Equisetopsida</td>
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<tr>
<td>Sub class: Magnoliidae</td>
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<tr>
<td>Super order: Magnolianae</td>
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<tr>
<td>Order: Piperales</td>
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<tr>
<td>Family: Piperaceae</td>
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<tr>
<td>Genus: Piper</td>
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<td>Species: nigrum</td>
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**Habitats of Piper nigrum**

The piper plant is a perennial woody vine growing up to 4 meters in height on supporting trees. It is a spreading vine, rooting readily where trailing stems touch the ground. The leaves are alternate, entire, 5 to 10 cm long and 3 to 6 cm across. The flowers are small, produced on pendulous spikes 4 to 8 cm long at the leaf nodes, the spikes lengthening up to 7 to 15 cm as the fruit matures. The fruit of the black piper is called a drupe and when dried is known as a pipercorn.\(^{[8]}\)

Piper nigrum is native to South Asia and Southeast Asia. It was grown in southern Thailand and in Malaysia; it’s most important source is India, particularly the Malabar Coast, in the state of Kerala.\(^{[8]}\)
Common names

<table>
<thead>
<tr>
<th>Language</th>
<th>Vernacular name</th>
<th>Language</th>
<th>Vernacular name</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Black Pepper</td>
<td>Tamil</td>
<td>Kurumilagu</td>
</tr>
<tr>
<td>Sankrit</td>
<td>Marich</td>
<td>Malayalam</td>
<td>Kurumulaku</td>
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<td>Hindi</td>
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<tr>
<td>Marathi</td>
<td>Kali miri</td>
<td>Gujarati</td>
<td>Kalomirich</td>
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</tbody>
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Phytochemical Composition of Piper nigrum

The phytochemical investigations of P. nigrum revealed that it contains variety of phytochemicals. Piperine was the first pharmacologically active compound isolated from different members of Piperaceae family. Many investigators isolated different types of compounds viz Phenolics, flavonoids, alkaloids, amides and steroids, lignans, neolignans, terpenes, chalcones etc and many other compounds. Some of the compounds are as piperidine, piperaimide, piperamine, piperettine, pipericide, piperne, piperolein B, sarmentine, sarmentosine and retrofractamide A. The different pharmacological activities were reported due to the presence of these phytochemicals. Piperine reported to have four isomers viz; Piperine, Isopiperine, Chavicine and Isochavicine. Among all isolated compounds isolated from P. nigrum. Piperine, pipene, piperaimide and piperamine were found to possess various potential pharmacological activities.[1,9]

Literature survey of pharmacology potentials of Piper nigrum


CONCLUSION

Literature search revealed that Black Piper possesses significant in vitro and in vivo pharmacological potential for the treatment of various ailments. Piperine enhance absorption of many drugs and nutrients. Therefore it was concluded that Black piper and its bioactive compound Piperine shown wide spectrum of therapeutic potential and also emerged as an excellent adjuvant to enhance the therapeutic efficacy of the concurrently administered drugs and nutrients.
REFERENCES


32. Chen CY, Li W, Qu KP, Chen CR. Piperine exerts anti-seizure effects via the TRPV1 receptor in mice. Eur J Pharmacol, 2013; 714: 288-294. 34. 34.
