MEDICINAL USES OF ASAFOETIDA AND PIPER NIGRUM: A REVIEW

Sanyogita Shahi[1]*, Megha Turkane[2], Shirish Kumar Singh[3]

Article History: **Received:** 12.12.2022 **Revised:** 29.01.2023 **Accepted:** 15.03.2023

Abstract

Spices have been assuming an extraordinary part for reinforcing the monetary conditions since the old time span. Presently during this snapshot of modernization and innovative world, however the flavor exchange has changed in different limits and jumps then took the job significance actually exists something similar. Indian spices are loaded with smell and scent; consequently, the large Indian states like Punjab, Gujarat, utter Pradesh, Himachal Pradesh, Kerala, and so on are the greatest centers for the development and advancement of flavors. The worth and request of India spice doesn't restrict to India just, there is an immense interest of Indian flavours in unfamiliar nations also. That is the reason they are exceptionally traded to different nations. The point and object of the current work was to investigate the customary restorative utilization of basic Indian spices and to connect their noticed biological activities with the presence of bioactive constituents in them. This work reviews thirteen spices Asafoetida, Black pepper, Carom seed, Cinnamon, Clove, Coriander, Cumin, Fennel, Ginger, Small Cardamom, Star Anise, Tamarind and Turmeric common in the Indian kitchen and its aim at concisely highlighting the researches that have been done on the nutritional quality phytochemistry and medicinal properties of these spices. The particular plant parts contain dynamic mixtures present give customary remedial uses and pharmacological properties of the significant Indian spices have been surveyed.

Keywords: Spices, flavor, Antimicrobial etc.

[1*,2]Kalinga University, Raipur, Chhattisgarh, 492101
[3]Regional Science Centre, Saddu, Raipur, Chhattisgarh

Email: [1*]drsanyogitashahi@gmail.com

DOI: 10.31838/ecb/2023.12.s3.097

1. Introduction

Spices are utilized for flavor, shading, fragrance and conservation of food or drinks. It might be gotten from numerous pieces of the plant: bark, buds, blossoms, natural products, leaves, rhizomes, roots, seeds, marks of disgrace and styles or the whole plant tops is appeared in. The term 'spice' is utilized as a subset of flavor and alludes to plants with fragrant leaves. Flavors and food spices are just marginally extraordinary, and for the motivations behind this section no differentiation will be made. Spices fill in as one of the significant fixings in food arrangement and preparing all through the world. Preparing is an extensive term applied to sweet smelling fixings that improve the kind of food products. They are compounds, containing at least one flavors, or spice extractives, which when added to a food during its assembling, readiness or before it is served, improve the common kind of the food and increment its acknowledgment by purchasers. Spices incorporate flavors and different substances of vegetable beginning that are added during the cooking cycle.

The rich archive of bioactive mixtures like phenols, terpenoids, alkaloids, etc make them a significant wellspring of medication (sasidharan, chen, saravanan, sundram, and latha, 2011). For the most part, the utilization of home grown solutions for treating different illness conditions is more normal in provincial spots where the availability to the food sources and furthermore clinical benefits is restricted (bukar, dayom, and uguru, 2016). Individuals for the most part devour plants in various structures, to be specific, imbuement's, flavors, and restorative smoke. Likewise, a portion of the plants are utilized as preparing substances to add flavor to the food varieties give medical advantages (bagchi and srivastava, 2003).

Spices are worshipped for their potential wellbeing ascribes. They are accounted for to have constructive outcomes in the therapy of various illnesses, particularly ongoing ones like malignant growth, diabetes, and cardiovascular sicknesses (Kaefer and Milner, 2011). That nourishment and wellbeing are complicatedly connected is a grounded reality, and the capacity of sustenance (for this situation, supplements from flavors) to diminish the danger of sicknesses has drawn in the consideration of scientists and nutritionist the same in ongoing many years.

Literature Review

Asafoetida

Scientific name: Ferula Asafoetida Linn.
Common names:
Hindi: Heeng;
English: Asafoetida;
French: Asafoetide;
German: Asant Stinkasant.

Ferula asafoetida linn: asafoetida, the gum resin valued as a topping in India and Iran is acquired chiefly from plant ferula asafoetida. The Latin name ferula signifies "transporter" or "vehicle". Ferula asafoetida is an herbaceous, monoecious, perpetual plant of the umbellifereae family. Asafoetida is local to Asia, eastern Iran to Afghanistan, and today it is developed chiefly in Iran and Afghanistan, from where it is traded to the remainder of the world. Customarily in India, asafoetida has been held in extraordinary regard among mnative medications from the most punctual occasions in India. It is rumored as a medication which removes wind from the stomach

and balances any uncontrollable issues. It is likewise a nervine energizer, stomach related specialist and a narcotic. Asafoetida is an oleo-gum-gum got from the exudates of the underlying foundations of the Iranian endemic therapeutic plant, f. Asafoetida. It is utilized generally everywhere on the world as a flavoring zest in an assortment of food sources. Customarily it is utilized for the treatment of different illnesses, like asthma, epilepsy, stomach-hurt, flatulence, intestinal parasites, powerless absorption and influenza. Ongoing investigations including pharmacological and natural have additionally shown that asafoetida have a few exercises, like cell reinforcement, antiviral, antifungal, disease chemo preventive, antidiabetic, antispasmodic, hypotensive and molluscicidal. Asafoetida has extraordinary therapeutic significance, nitty gritty investigations of asafoetida is needed before clinical preliminary.

Chemicalconstituents

Asafoetida contains volatile oil (4–20%), and gum (25%), resin (40–65%). The garlic-like smell of the oil is because of the presence of sulfur compounds. The fundamental constituent of the oil is isobutyl propanyl disulphide (c6h1 6s2). The three sulfur compounds, for example, 1 - methylpropyl-1 -propenyl disulphide, l-(methylthio)- propyl-1 -favorable to phenyl disulphide, and l-methyl-propyl 3-(methylthio)- 2-propenyl disulphide have likewise been confined from the tar; the last two have pesticidal properties. The flavor is generally because of r-2-butyl-l-propenyl disulphide and 2-butyl-3-methylthioallyl disulphide (both as combinations of diastereoisomers). The medication additionally contains an unpredictable combination of sesquiterpene
umbelliferyl ethers generally with a monocyclic or bicyclic terpenoid moiety. Sap comprises of ester of asaresinotannol and ferulic corrosive, pinene, vanillin and free ferulic corrosive. On treatment of ferulic corrosive with hydrochloric corrosive, it is changed over into umbelliferone (a coumarin) which gives blue fluorescence with alkali.

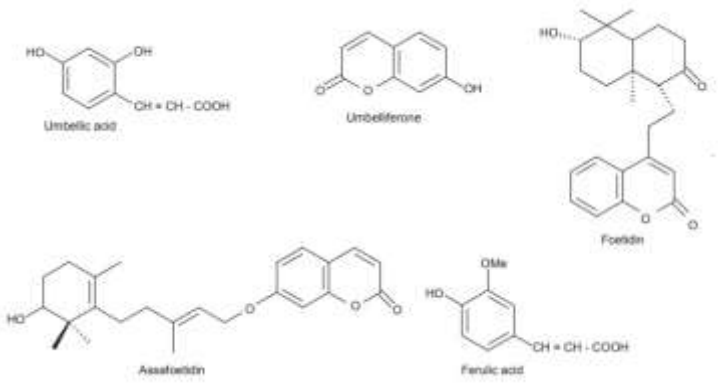

Fig 2.1 (c): Bioactive Components of Ferula Asafoetida Linn. (Asafoetida)

Asafoetida likewise contains phellandrene, sec-butylpropenyl disulphide, geranyl acetic acid derivation, bornyl acetic acid derivation, α-terpineol, myristic corrosive, camphene, myrcene, limonene, fenchone, eugenol, linalool, geraniol, isoborneol, borneol, guaiacol, cadinol, farnesol, asafoetidin, foetidin, and so forth.

Biological activity

Ferula Asafoetida furnishes with a number of activities such as the anticholesterolemic, Anticoagulant, antifertility, antifungal, antihepatotoxic, antiinflammatory, antioxidant, Antiparasitic, smooth muscle relaxant activity, antidiabetic, antiulcerogenic and digestive Enzyme inhibition are some of them but the most significant them is the anticarcinogenic activity, anthelmintic activity and its antispasmodic activity

Antioxidant activity:

Nabavi et a. reported the antioxidant activity of aqueous-ethanol
extracts of the leaf, steam and flower by evaluating the DPPH, H2O2, the nitric oxide scavenging activity, haemoglobin induced linoleic acid peroxidation and

Fe2+ chelating ability. Cheng et al. and Pradeep et al. reported that ferulic acid and umbelliferone responsible for antioxidant activity.

Antimicrobial activity

Antimicrobial activity of spices depends upon the several factors. It is used as herbal medicine to treat against various fungi and bacteria. The antimicrobial action of asafetida is successful against different bacterial and parasitic strains. Asafoetida has critical antimicrobial movement because of quality of different phytoconstituents and it very well may be a wellspring of new anti-microbial mixtures.

Antidiabetic activity:

Abuzaiton et al. revealed the antidiabetic movement of fluid concentrate of asafoetida against pancreatic β cells harmed from alloxan actuated diabetes in rodents. Asafoetida prompted a huge decrease in blood glucose level and an increment in serum insulin level. The mechanism of asafetida action involves the regularization of blood glucose.

Hepatoprotective activity:

Dandagi et al. studied the hepatoprotective activity of various extracts such as those of Ferula asafoetida, Momordica charantialinn and Nardostachys jatamansi against experimental hepatotoxicity. The test information proposed that polyherbal suspension of the concentrates showed promising action against the carbon tetrachloride prompted hepatotoxicity (Kareparamban et al.201 2).

Antiviral activity

Chang and Wu et al. reported the antiviral activity against Influenza A (H1 N1) virus. For detailing the action, the methanolic concentrate of asafoetida was arranged and afterward the rough concentrate apportioned between n-hexane-methanol (1:1) and the methanolic separate along these lines got was parceled between chloroform-water (1:1) which yielded a chloroform remove. The concentrate was found to force's huge antiviral movement against Influenza A (H1 N1). As of late, in vitro antiviral action of asafetida was considered in contrast to some human rhinovirus (HRV) serotypes.

Antispasmodic activity:

Antispasmodics are utilized in diminishing and treating stomach cramps in 2004, Fatehi et al, shown that F. Asafoetida gumextricate was viable in lessening circulatory strain in anesthetized normotensive rodents. The relaxant mixtures in F. Asafoetida gum separate meddle with an assortment of histaminic receptor and muscarinic adrenergic exercises or with the assembly of calcium particles needed for smooth muscle withdrawal vaguely. Gholamnezhad et al. Detailed that the relaxant impact of asafoetida was because of the intense inhibitory impact of the asafetida separate on the muscarinic receptor and furthermore because of the fractional inhibitory property of the spice on the histamine (H1) receptor.

Digestive enzyme activity

The digestive stimulating action of the spices is most likely through a stimulation of activities of enzymatic participating in digestion. spices have been considered to fortify salivary stream and gastric juice discharge and backing in absorption. Asafoetida conspicuously improved pancreatic lipase action and furthermore animated pancreatic amylase.

Black pepper

Scientific name: Piper nigrum

Common name: Black pepper, kali mirch, peppercorn.

Fig 2.2(a): Fresh black pepper

Fig 2.2(b): Drupe of black pepper

Black pepper (piper nigrum) is a valuable medicinal plant. It is one of the most commonly used spices and considered as 'the king of spices'' among various spices. It belongs to the family piperaceae. Black pepper, nicknamed as 'black gold' and the 'king of spices', is the most significant and generally burned-through zest on the planet. Dark pepper is gotten from the little dried berries of the plant flute player nigrum. A dried drupe is known as a peppercorn. Black pepper is local to malabar, a tropical district on the western shoreline of southern India. Basically filled in Vietnam, Indonesia, Brazil, India, and Malaysia. It is esteemed for its trademark sharp and stinging characteristics credited to the alkaloid piperine. Dark pepper is utilized as therapeutic specialist, an additive, and in perfumery. It contains major pungent alkaloid piperine which is known to possess many pharmacological actions. Traditionally it is used in systems of medicine like ayurvedic and unani, a traditional system of medicines. The bioactive component piperine poses many pharmacological activities such as anti-inflammatory, antihypertensive, antiplatelets, antioxidant, antitumor, antiasthmatics, antipyretic, analgesic, anti-diarrheal, antispasmodic, anxiolytic, antidepressants, hepato-protective, immuno-modulatory, antibacterial, antifungal, anti-thyroids etc.

Chemical constituents

Piperene is the major bioactive compound in black pepper. The spiciness and distinct sharp and stinging qualities, is due to the presence of alkaloid compound piperine. It also contains flavonoids, alkaloids, important odor-contributing terpenes including pinene, sabinene, limonene, caryophyllene, and linalool, amides and steroids, lignans, neolignans, chalcones. Piperamide, piperamine, piperolein b, sarmentine, sarmentosine etc. The different pharmacological activities were reported due to the presence of these phytochemicals.

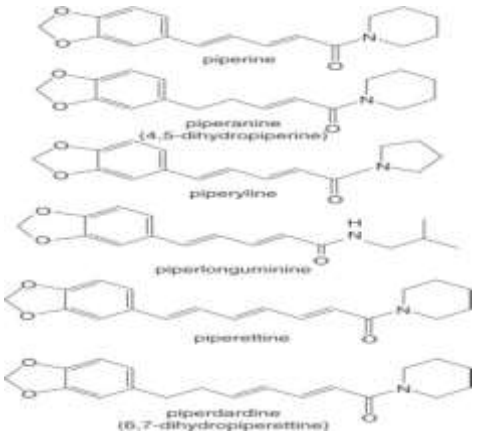

Fig 2.2(c). Active constituents of Piper nigrum (black pepper)

Biological activity

Piperine has a wide range of natural properties, a large number of them have been affirmed by in vivo and in vitro contemplates. Piperine contains significant moieties or locales in their design which are discovered to be liable for different bioactivities. Consequently, a short depiction of some pharmacological exercises is given.

Antioxidant activity

Antioxidants completely stop or delay the process of oxidation.

Piperine was distinguished to have a cell reinforcement potential. Some in vitro considers uncovered that piperine restrained free revolutionaries and receptive oxygen species, subsequently known to have defensive impacts against oxidative harm. Piperine is utilized for both treating just as forestalling the maturing interaction and its connected conditions.

Anti-inflammatory activity

Piperine was evaluated for the anti-inflammatory, anti-arthritic and analgesic activities. Piperine decreases liver marker enzymes activity, ethanolic and hexane extracts of black pepper have exposed a significant anti -inflammatory activity. Sergey shityakov in 201 9 assess that, the piperine calming potential had been explored at colorectal destinations, hindering the ffa-prompted tlr4 intervened irritation and acidic corrosive initiated ulcerative colitis.

Anti-cancer activity

Piperine was found to possess anticancer properties since it inhibits the mutagenicity of the three food mutagens. It also had been reported to inhibit tumors formation. The extract of peppercorn and piperine exhibited effective antitumor activities. Piperine is also reported to reduce the lung cancer by altering lipid peroxidation. Due to the reduction in the androgen dependent and independent growth of tumor by the use of piperine, it is nongenotoxic and found to possess anti-mutagenic and anti-tumor influences. The piperine possesses cytotoxic action against several types of cancer, including breast, lung, prostate, cervical, and other cancers.

Hepatoprotective activity

Piperine has been evaluated for its antihepatotoxic potential in order to validate its use in traditional therapeutic formulations. piper nigrum has potential hepato-defensive action because of the presence of piperine alkaloids and have extraordinary remedial potential in treatment of liver sicknesses. The methanolic concentrate of dark pepper has the hepatoprotective properties affirmed in wistar rodents with prompted hepatic harm brought about by ethanol-ccl4. L-ccl4 was utilized it was discovered that piperine hindered the expanded degree of serum gpt and got in portion subordinate way in a hepato-poisonousness model of mice brought about by d-galactosamine. The hepatoprotective action of methanolic concentrate of piper nigrum natural products was assessed in ethanolccl4 initiated hepatic harm in wistar rodents. Ethanoto initiate hepatotoxicity in the rodents. Prophylactic treatment with methanolic concentrate of piper nigrum at a portion of 1 00 and 200 mg/kg body weight, p.o. What's more, pre-treatment with piperine at a portion of 50 mg/kg. Body weight, p.o. For 1 5 days with ethanol-ccl4 treatment rodents appeared huge liver assurance as confirmed from the fatty substances levels, alanine transaminase, aspartate transaminase, basic phosphatase, bilirubin and superoxide dismutase, catalase, glutathione reductase also, lipid peroxidation levels to survey the liver capacities. In this study, organization of ethanol-ccl4 showed critical lift in fatty oils, alanine transaminase, aspartate transaminase, soluble phosphatase, and bilirubin levels while there was huge diminishing in the superoxide dismutase, catalase, and glutathione reductase levels which were reestablished to typical level after pre-treatment of methanolic concentrate of piper nigrum and piperine. Lipid peroxidations were

moreover fundamentally diminished after pretreatment with methanolic concentrate of flute player nigrum and piperine at given dosages. The outcomes were like that of reference standard-liv52 at a portion of 1 ml/kg, p.o. For 1 5 days. The morphological and histopathological examinations of liver were as well. Strong of the biochemical boundaries. Accordingly, it is presumed that flute player nigrum has potential hepato-defensive action due to the presence of piperine alkaloids and have incredible remedial potential in treatment of liver diseases.

Antidepressant activity

Several research evaluates that the impact of piperine and its conceivable systems was assessed in corticosterone-instigated model of sorrow in mice. Misery like conduct in mice was created following 3 weeks' corticosterone infusions. The downturn was uncovered by the huge decrease in sucrose use and expansion in fixed status time in the constrained swim test and tail suspension test. Further, the mind inferred neurotrophic factor protein and mRNA levels in the hippocampus were additionally altogether diminished in corticosterone-treated mice. Corticosterone initiated the conduct and biochemical changes were fundamentally reduced after treatment to creatures with piperine. These outcomes showed that piperine creates a stimulant like impact in corticosterone-actuated model of despondency.

Digestive activity

Numerous flavors are known for their stomach related energizer activity. Dietary piperine improves processing by incitement of the pancreatic compounds what's more, impressively diminishes the food travel season of gastrointestinal parcel. Piperine has been accounted for to builds the salivation creation furthermore, gastric discharges, and builds the creation and initiation of salivary amylase. The orally organization of piperine or p. Nigrum animate the liver to the discharge bile acids which thusly assume key part in the assimilation and absorption of fats. The oral organization of dynamic mixtures like piperine, pipene, piperamines and piperamides Fundamentally builds the exercises of proteins like pancreatic amylase action, protease action, lipase movement and chymotrypsin initiation.

S

2. Conclusion

Asafoetida is an oleo gum resin which is obtained from the root of the ferula asafoetida. It has been used for many past years as a flavoring spice in foods throughout the world. It has a great medicinal value and effective against respiratory, gastrointestinal, neurological and reproductive disorders due to the presence of bioactive components. This spice is used as digestive aid and in modern herbalism treatment of many diseases. Piperine is the primary compound present in black pepper, and is the transporter of its particular sharp taste, which is liable for quite a long time of human dietary usage and around the world prominence as a food fixing. Alongside the application as a food fixing and food additive, it is utilized in conventional medication for some reasons, which has much of the time been supported by current logical examinations on its organic impacts. It has been affirmed that piperine has numerous bioactive impacts, like antimicrobial activity, just as numerous physiological impacts that can add to general human wellbeing, including immunomodulatory, hepatoprotective, cell reinforcement, antidepressant, antitumor, and numerous different exercises. A few Clinical investigations exhibited wonderful cancer prevention agent, antitumor, and drug accessibility improving attributes of this compound along with immunomodulatory potential. Every one of these realities highlight the remedial capability of piperine and the need to fuse this compound into general wellbeing improving clinical plans, just as into those that would be utilized as adjunctive treatment to improve the bioavailability of different (chemo)therapeutic drugs.

3. References

Bhatnager richa, reena rani, amita suneja dang, "antibacterial activity of ferula asafoetida: a comparison of red and white type" journal of applied biology & biotechnology vol. 3 (02), pp. 01 8-021,

march-april, 201 5 available online at http://www.jabonline.in doi: 1 0.7324/jabb.201 5.3204.

Bhawna chopra, ashwani kumar dhingra1 ,2, ram prakash kapoor1 and deo nandan prasad3," piperine and its various physicochemical and biological aspects: a review", 201 6.

Daljeet kaur, ramica sharma*," an update on pharmacological properties of cumin", ijrps 201 2, 2(4),1 4-27.

D. Mal and s.k gharde, "medicinal uses of cardamom: a review", 2019.

G lal, ss meena. Medicinal and therapeutic potential of seed spices. Biomed j 72 sci&tech res 5(4)- 201 8.bjstr. Ms.id.001 242. Doi: 1 0.2671 7/ bjstr.201 8.05.001 240.

J. Agric. Food Chem. 2006, 54, 1 7, 6303–6307Publication Date: July 28, 2006

Krishnapura srinivasan, "black pepper (piper nigrum) and its bioactive compound, piperine", 201 9.

Mahendra poonam, shradha bisht, "ferula asafoetida: traditional uses and pharmacological activity ", 201 5.

Sanyogita Shahi, Shirish Kumar Singh, Medicinal Plants in Chhattisgarh State, Journal of Pharmaceutical Negative Reports, Vol. 13, Special Issue 5, 2022.

Sudaldeep Sahoo, Sanyogita Shahi, Bioactive Carbohydrates: Review, 2021, Natural Volatiles and Essential Oils, Vol. 8, Issue 6.

Sanyogita Shahi, H. K. Singh, C. S. Shukla, Desh Deepak, Shirish Kumar Singh, Anti-Fungal Bioactivity of Gaddi Sheep's Milk Oligosaccharide International Journal of Advanced Sciences and Technology, 2020, Vol. 29 (11s),