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Introd ction

Spices are natural food additives which contribute immensely to the taste of our foods. From ancient times they have been used to enliven our foods. Spices possess medicinal as well as nutritional based properties. ey have been e ectively used as a one of the most important constituents in the medical eld worldwide. ey have bene cial in uence on lipid metabolism e cacy as anti-diabetics. ey have ability to stimulate digestion and; have antioxidant (Table 1) and anti-in ammatory (i.e., reduces painful swelling caused by tissue injury) potential [1]. Keeping in mind the potency of spices for medicinal and nutritional uses black pepper was selected and reviewed for its nutritional and medicinal value. e Table 2 shows the scienti c classi cation of black pepper classi cation system.

improves appetite, cures cold, cough, diseases of the throat, intermittent fever, colic, dysentery, worms and piles (Table 5). It stimulates circulatory system. It possesses a broad spectrum antimicrobial activity. Analgesic (alleviate pain), antipyretic (reduces fever) and anti-inflammatory actions are described, with piperine having been shown

e ects of the extracts. e volatile oil and its constituents suppress the formation of DNA adducts with a atoxin B1. Two minor constituents of pepper, safrole and tannic acid, are attributed with minor carcinogenic activity. In a tissue culture study using V-79 lung broblast cell lines, reported that piperine treated cell lines showed increased DNA damage compared to untreated ones. Piperine treatment lowered the activities of the enzymes glutathione-s-transferase and uridine diphosphate glucuronyl transferase indicating the cytotoxic potential. e in vivo formation of n-nitroso compounds from naturally occurring amines and amides contribute to the carcinogenic potential of certain foods and food additives. Piperine and other phenolic amides present in pepper are also known for their conversion to n-nitroso compounds in acidic conditions and hence treated as carcinogenic but it can be inferred that the presence of conjugated unsaturated system in the phenolic amide prevents the oxidation of the amide nitrogen to n-nitroso compounds to a large extent. Moreover, the essential oil constituents of pepper also contribute to its anti-carcinogenic potential preventing DNA damage. Investigations reveal both carcinogenic and anti-carcinogenic nature. However, pepper as such exhibited anti-mutagenic and anti-carcinogenic e ects.

Nat ral Antio idant

Antioxidant compounds in food items play important roles as health-protecting factors. Black pepper is a source of e ective antioxidants [5]. Black pepper actually maintains and enhances the levels and e cacy of important antioxidant compounds. It contains several powerful antioxidants and is thus one of the most important spices for preventing and curtailing oxidative stress. In addition to their direct antioxidant properties, several of these compounds work indirectly by enhancing the action of other antioxidants. Black pepper minimizes oxidative stress caused by saturated fats in the food. e high levels of cholesterol and triglycerides associated with oxidative stress inhibit the e cacy of important antioxidants (eg. glutathione, superoxide dismutase, catalase, glutathione peroxidase, vitamin C and E). Oxidation is a leading cause for quality deterioration during processing and storage of muscle foods. When stored at refrigerated temperatures, lipids in meat oxidize and unsaturated fatty acids form hydroperoxides that are subsequently decomposed to secondary products, including malonaldehyde (MDA) and other carbonyl compounds that cause o -flavours [7]. e best way to overcome this problem is to use natural antioxidant (Table 1) which is obtained from plant origin because synthetic antioxidant has many side e ects. Black pepper may be one of the best natural anti-oxidant to be used to prevent oxidation and o avor in meat and its products. Suhaj [8] study showed the some of the major anti-oxidant of the black pepper.

e free radical scavenging activity of the di erent fractions of pet ether extract of piper nigrem was observed in an increased manner in a concentration dependent manner [9].

Black Pepper as an Anti-In ammator Dr g

In ammation is complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells, or irritants and anit-in ammatory means something which reduces the human body in ammation and black pepper is one of such substance. Anti-in ammatory drugs make up about half of analgesics, remedying pain by reducing in ammation. It is found that piperine signi cantly inhibited the production of two important proin ammatory mediators, IL6 and PGE_2, in IL1β-stimulated human FLS. e inhibition of PGE_2 production is important due to its central role in triggering pain. In addition, MMP1 and MMP13 collagenases play dominant roles in RA and osteoarthritis because they are the rate-limiting components of the collagen degradation process. e signi cant inhibition of MMP13 expression is particularly important because it degrades a wide range of collagenous and non-collagenous extracellular matrix macromolecules and is remarkably active against collagen type II, the predominant collagen in cartilage. Piperine inhibits the expression of MMP13 in IL1β-stimulated FLSs. [5]. Piperine showed a signi cant inhibition of increase in oedema volume in a carragenin induced test. Piperine acted signi cantly on early acute changes in in ammatory process [10].

Cholesterol Lo ering and Imm ne Enhancer

Pepper doesn't have cholesterol. It enhances digestion process by helping faster break down of larger fat molecules into easily digestible simple molecules and prevents the accumulation of fat in body. Black pepper exhibits immunomodulatory e ect on human body. It is able of boost and supports the number and the e ciency of white cells and assists the body to raise a powerful defense against invading microbes and cancer cells. Lianzhong et al. [11] found that the analysis of component PN-IIa showed a di erent monosaccharide composition, which contained a signi cant proportion of galactose, arabinose, galacturonic acid and rhamnose; and PN-IIa did react with β-glucosyl Yariv reagent, which indicated that PN-IIa might be an arabinogalactan; and puri ed anti-complementary polysaccharides from *Piper nigrum* [12] is suggested as a supplement for immune enhancement.

Anti-p retic

Ayurvedic, Yunani, Siddha and folklore medicines in India used pepper and pepper containing preparations for the treatment of intermittent fever, neuritis, cold, pains and diseases of throat are practiced in Pepper is also used as an anti-periodic in malarial fever and therefore it is claimed having analgesic and antipyretic properties. Analgesic and antipyretic actions of piperine have been experimented on rabbit and mice and found strong antipyretic e ect on typhoid vaccinated rabbits at a dose of 30 mg/kg body weight. Singh et al. [10] reported that piperine gave a strong activity with an ED50 of 3.7 mg/kg on writhing method and 104.7 mg/kg on tail clip method.

Anti-Periodic and R befacient

It helps in get rid of frequent fever such as a malaria. It acts as stimulant. If we apply powder of pepper on our skin it get stimulated and become red. e berries are used externally as rubefacient in baldness and skin diseases. e berries are decocted and the solution is used as a mouthwash for toothache.

Black Pepper Impro es Digestion and Promotes Intestinal Health

It has been found that piperine can increase absorption of selenium, vitamin B, beta-carotene and curcumin. It can improve digestion and stimulate the secretion from the taste buds and taste bud stimulation is a feedback loop for digestion process. It sends impulses to the stomach to increase digestive juices secretion (eg. Hydrochloric acid). ese juices break down the protein in the stomach, improving ability for further digestion in the duodenum. Bile acids are important for fat digestion and absorption and pepper constituents stimulate bile acid production by the liver and its secretion into bile [1]. When the body's production of hydrochloric acid is insu cient, food may retains in the stomach for an extended period of time, leading to heartburn or indigestion, or it may pass into the intestines, where it can be used as a food source for unfriendly gut bacteria, whose activities produce gas,

irritation, or diarrhea or constipation. In addition, it has diaphoretic (promotes sweating) and diuretic (promotes urination) properties.

is wonderful seasoning promotes the health of the digestive tract and not only does help to derive the most bene t from food, the outer layer of the peppercorn stimulates the breakdown of fat cells, keeping human slim while giving energy to work [13,14].

Processing Problem and Preser ation of the Fla or Content

Black pepper mainly available in two di erent forms: a). Whole pepper b). Powder. While buying peppers, ensure that the variety purchasing is organically grown and not exposed to any form of radiations. Radiations causes decrease in the level of the vitamin C. e ideal way of storing peppers is keeping them in a tightly sealed container in a cool, dark and dry place. In this way, whole peppercorns can be kept for long period, while the fresh ones can be kept for a maximum of three months. It can also be stored by freezing it, but this will cause a substantial decrease in the avor. While grinding care should be taken because its ne dust may cause nose burning, sneezing and coughing. Cryogenic grinding is a novel approach to grind the black pepper at low temperature so that its avor, aroma, odor and natural taste can be retained. Excessive topical EMC m3(topical)-103(EMC m3(uxcessiv0)]TEcesuil)-12]Tay topvr taste can