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Meticulous Endorsement of Black Seed and Jambolana: A Scientific Review

Nikhat Farhana

Abstract

The repository of traditional, historical and cultural heritage of natural prophylactic medicine to treat different disease, disorder and its ailment is limitless and time-immemorial. As per the hadith narrated by Ibn Abbas (RA), Prophet Muhammed (ﷺ) specifically mentioned about Sulayman (AS) recorded the name and use of many herbal medicinal remedies after construction of his castle (Ibn Asakri's Mukhtasar Tareekh Dimashq 3.393), in addition to it, Prophet Muhammed (ﷺ) use to recommend 65 different herbal prophylactic medicines which are scientifically proved to be highly effective against almost all types of ailments, among this repository of 65, while prescribing the NS Prophet Muhammed (ﷺ) narrated "use this black seeds regularly it is having the properties to cure all disease (ailment) except death (An authentic hadith narrated by Abu Hurayrah (RA) and recorded by Bukhari, Muslim Ahmad Ibn Majah). This in-depth review specially articulated to elaborate phytochemical, pharmacological and mechanistic approach to bring out the properties of not only NS but in addition, it focusing on the important properties of EJ. Preliminarily to say NS claim to have anti-inflammatory, analgesic, hepato-protective, neuro-protective, gastro-protective and other useful activity are due to two important constituents Thymoquinone (TQ) and NS oil (NSO). TQ has interaction with human serum albumin. Seeds containing volatile oils mainly Melanthin showed toxicity at larger doses. Whereas, EJ simultaneously proved its effectiveness underutilized fruit, crops are nutritious bearing wide range of pharmaceuticals properties. EJ fruit is highly perishable and is mainly used for the diabetes patients, it is well known as a traditional medicinal plant having essential bioactive compounds which are present in all parts of the plant. The major bioactive compounds present in the EJ roots are phytosterols, flavonoids, carotenoids, myricetin, oxalic acid, gallic acid, citronellol, cyanidin diglucoside, hotrienol, and polyphenols as well as micronutrients having many health benefits. It is also a good source of anthocyanin and effective against numerous health problems and act as chemo-preventive, radioprotective and demonstrating antineoplastic properties. The ripe fruits are pleasant, astringent taste and are eaten either raw or processed into different products mainly vinegar, jam, jellies and squash. The jambolana seed contains alkaloid, jambosine, and glycoside jambolin or antimellin. To be concluded, NS and EJ both bearing similar therapeutic and pharmacological endorsement with different remarkable biological active molecule, which will become future reference to find out the natural way to cure untreatable disease and its disorder such as HIV-Aids, Cancer and recent outbreak, etc. according to narration made by Prophet Muhammed (ﷺ).

Keywords: Ranunculaceae, Myrtaceae, Thymoquinone, flavonoids, pharmaceutical, HIV-Aids, Cancer

1. Introduction

Historical evidences indicates that, herbs and spices have beneficial consequences as medicine to treat different disease and its ailments, primarily they are having food value, apart from this the composition comprised in different herbs and spices to get rid from major and minor disorder associated with the complex organic physiological system, demonstrating benefits as food by scientific mean is challenging, specially, when standards applied to assess the pharmaceutical agents. Pharmaceutical agents are special molecules which were isolated and purified in concentrated forms, whereas food is having in combination, literally in large quantity [1]. The real challenge not here to prove whether herbs and spices as food have healthy benefits but rather figuring out, one of the greatest saying by *Abu Huraira (R.A)*, may Allah be pleased with him, narrated that the *Prophet, Muhammed Sallallaahu alaihi wa sallam* (May Allah exalt his mention), said: “use this black seed regularly, because it is a cure for every disease except death” [Al-Bukhari and Muslim] [2], secondly we encounter the another black herbs called Jambolana (Black Plum) [3].

2. *Nigella sativa* (black seeds)

NS belonging to the family *Ranunculaceae* is prominent miraculous and remarkable herb with holistic, historical and religious authenticated endorsement. NS stands apart with holds promising phytochemical and wide range of therapeutic potential among the botanical repository of medicinal plants in the world, NS is popularly known by the name of black seed. NS is native to Southern Europe, North Africa and Southwest Asia and is grown in many countries around the world, including the Middle East Mediterranean region, Southern Europe, India, Pakistan, Syria, Turkey and Saudi Arabia [4].

2.1 Botanical description

NS plant germinate, flower, set seed and die all in one. Ultimately reproduce themselves to set of seeds. Grow up to height of 20–30 cm (7.10–11.9 inches) with linear lanceolate leaves. The flowers are very much dedicated bearing 10 to 5 petals with remarkable white, yellow, pale blue. Pink, pale violet in colors. NS plants fruits are large & inflated capsules bearing with 3 to 7 united follicles having enormous number of seeds, whereas seeds containing black color with flattened, angular oblong with 0.2 cm long and 0.1 cm wide funnel shaped [5].

2.1.1 NS flower taxonomy

- Domine: Plantae
- Sub-domine: Tracheobionta
- Division: Spermatophyta
- Phylum: Magnoliophyta

- Class Magnoliopsida
- Order: Ranunculales
- Family: Ranunculaceae
- Genus: Nigella
- Species: Sativa

2.1.2 Common names

Wild onion seeds, Funnel flower, Black cumin, Nutmeg flower, Black caraway, black seeds, Devil in the bush, Roman coriander, Roman coriander, Damascene etc.

2.1.3 Synonyms

- **English:** Black seeds, Love-in-a-mist, nutmeg flower, Roman coriander, funnel flower black cumin
- **Arabic:** Habatut Barakha, Shooneez, Habba Sauda, Al-barka
- **Sanskrit:** Krishana-jiraka, Upakunchik
- **German:** schwarzkummel

2.1.4 NS seeds and oil

- Chinese: Pei hei zhong cao
- French: Cheveux de Vénus, Nigelle
- Hindi: Kalonji.
- Marathi: Kalonji Jire
- Persian: Siah Dana
- Punjabi: Kalvanji
- Urdu: Kalonji

Moreover, the NS meticulously endorsed by above mentioned taxonomical and botanical descriptions. Indeed, much uncertainty about particular name of NS seed. NS seed is called black cumin, black caraway and black onion seed in particular regions of the continent, such as Central Asia and Northern India, with different botanical and taxonomical description, NS seed or any such seed, apparently, are often the part of the stock, that is commercially available and used as adulterants [6].

2.1.5 Cultivation and collection

NS herb mostly grown during the winter season. It is annually grown on light and heavy soil. The scattering period of seeds is between October–November

and get harvest in between April and May. The yield is about 350 kg/acre to 450 kg/acre.

The germination processes of the plant would be delay, if scattering of seeds on upper soil or deep inside but it should be optimal. It need not be irrigated frequently. When the fruit / capsule turns yellowish, the crop is harvested.

It can be threshed by trampling with a tractor or proper thresher after harvesting and proper drying. The seeds are stored properly in bags or containers after threshing [6].

2.2 Phytochemical description of NS

As mentioned in above point-2, NS bearing ultimately important and valuable amount of phytoconstituent which were extracted, separated, identified and reported and updated up to the limit of extent but still needs to be explored, where in contemplation to retrieve the relevant documentary evidence leads to figure out the following valuable constituents, such TQ (48%) in 25 gm, thymoquinone, dithymoquinone, p-cymene (15%), carvacrol (12%), 4-terpineol (7%), tanethol (5%), sesquiterpene longifolene (1 to 8%), thymol & α -pinene etc. Seeds contain dual different types of alkaloids called iso-quinoline alkaloids (indazole ring bearing alkaloids are nigellicinine, nigellicimine-N-Oxide & pyrazole alkaloids). NS seeds are also contain α -hederin which is water soluble pentacyclic triterpene and saponin (potential anticancer agent). The potential pharmacological activity of NS seeds is mainly due to Quinine constituents, whereas thymoquinone is most abundant one. NS seeds also contains micro & macromolecules that are, carbohydrates-28%, protines 27%, fats-25%, crude fibers-9%, total ash-5%, Vitamins & minerals like Cu, P, Zn and Fe^{++} etc.: **unsaturated fatty acids** like linolic acid-60%, olic acid-20%, eicodadienoic acid-4% & dihomolinoleic acid-10%; saturated fatty acids are present nearly about less than 30% (palmitic & stearic acid), apart from this NS also embedded with Other constituents such as α -sitosterol 44 to 54% of total sterols, Tunisian stigmasterol 6.8 to 20.92% of total sterols, the above mentioned constituents were reported apart from this some structural analysis also documented in the literatures these structures mentioned in **Figure 1** [7].

2.2.1 Reported constituent and its structures of NS

Some important steroidal monomers also reported from NS seed are nigelone, avenasterol-5-ene, avenasterol-7-ene, campesterol, cholesterol, sitrostadienol, obtusifoliol, lophenol, stigasterol, stigmasterol-7-ene, β -amirn, butyrospermol, cycloartenol, 24-methylene-cycloartenol, taraxerol, tirucallol, 3-O-[β -D-xylopyranosyl(1 \rightarrow 3)- α -L-rhamnopyranosyl(1 \rightarrow 2)- α -L-arabinopyranosyl]-28-O-[α -L-rhamnopyranosyl(1 \rightarrow 4)- β -D-glucopyranosyl(1 \rightarrow 6)- β -D-glucopyranosyl]-hedera- genin, up to 1.6%-Volatile oil, fatty oil-41.6%, olic acid,

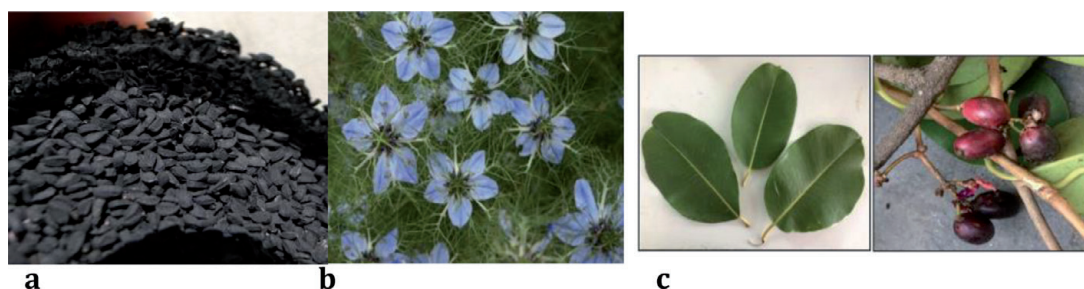


Figure 1.

a- NS seeds b- NS flowers c- EJ leaves and fruits.

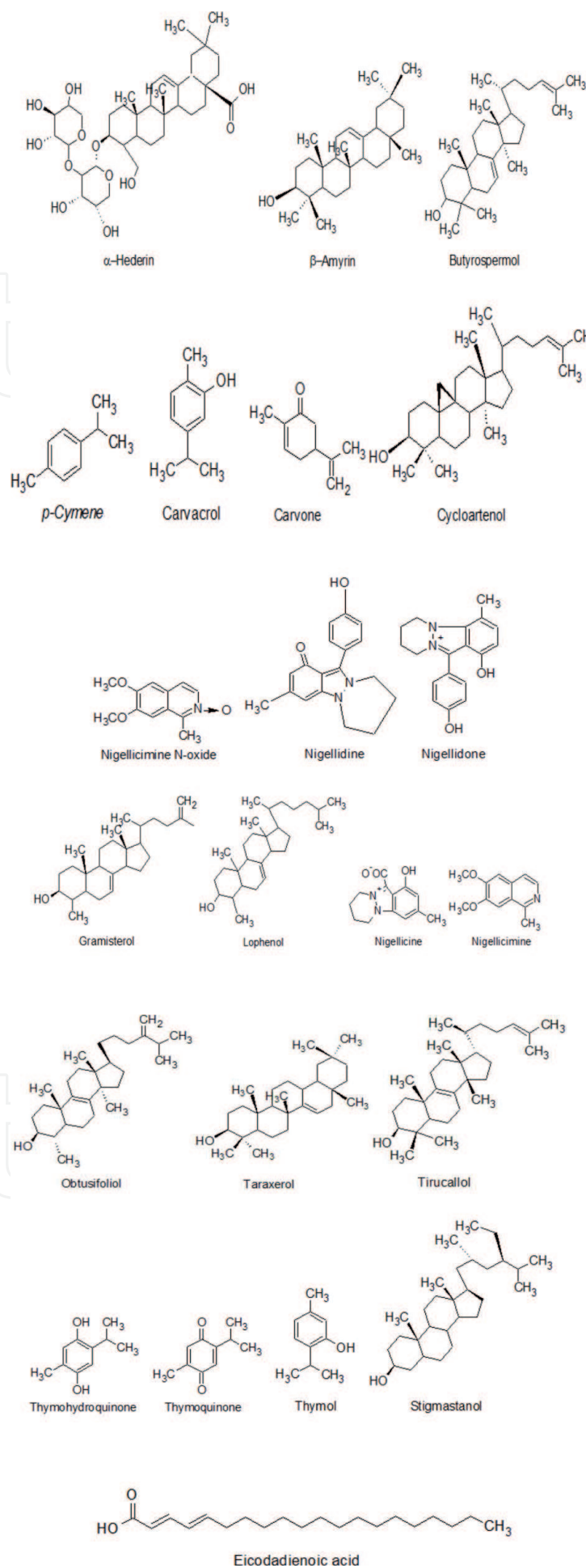


Figure 2.
Reported bioactive components of NS.

C15 esters of unsaturated fatty acid with higher terpenoids,, esters of dehydrosteric-acid & linolic acid, aliphatic alcohols like melanthin, melanthigenin etc, moreover to endorsed it also contain bitter constituents with tannin, resin, protein, reducing sugars like saponine, 3-O- $[\beta$ -D-xylopyranosyl, (1 \rightarrow 2)- α -L-rhambopyranosyl, (1 \rightarrow 2)- β -D-glucopyranosyl]-11-methoxy-16, 23-dihydroxy-28-methyl-olean-12-enoate, stigma-5, 22-diene-3- β -D-glucopyranoside, cycloart-23-methyl-7,20,22-triene-3 β , 25-diol, negellidine-4-O-sulfite, N-amines A3, A4, A5, C & A1, A2, B1 & B2 were found in seeds of NS. Hence it was assumed that, because of presence of above-mentioned bioactive constituents, NS stands apart with special category of medicinal specie, with infinite number of medicinal properties to manage bronchitis, diarrhea, rheumatism, asthma, skin disorders, it also acts as liver tonic, anti-diarrheal, appetite stimulant, digestive disorders. It also beneficial to increase milk production in nursing mothers, it also utilized to fight with parasitic infections, immunity system will be strengthened by regular utilization of NS seeds. In addition to above NS seeds are also used in food as additives, especially flavoring agent in bread and pickles coz low level of toxicity value. The NS seeds and oil also preferred in treatment of worm infestation, skin eruption, antiseptic, eternal anesthetics & roasted seeds of NS given internally to stop vomiting (**Figure 2**) [8].

3. *Eugenia jambolana* (black plum)

Next to NS another herbs which is bearing identical pharmacological properties with extra ordinary source of natural remedies and therapeutic application to treat different disease and its aliment, mid-nineteenth century was the era, which came up, with its first scientific evidence, as antidiabetic properties, apart from this the medicinal values endorsed in the ayurvedic, Unani, siddha and other folklore system of medicine [9].

3.1 Botanical and taxonomical description

Eugenia jambolana (EJ) or *Syzygium cumini* (L) Skeel was evergreen plant which grows up to 25 meters which is estimated up to 80 feet tall, it having grayish white steam with coarse & discolored lower bark, leaves are simple, elliptic, opposite to oblong, glossy smooth and somewhat leathery, midrib of the leaves is prominent yellowish, with 5 to 15 cm long and 2 to 8 cm broad, the base of the leaves are cuneate or round; apex is short, rounded or obtuse; edges are toothed; stalk is slender light yellow; veins are fine, close together parallel and gland are dotted. The petals adhere and fall together as a small disk. The stamens are many and almost the same length as calyx. The fruits are ovoid, 1-seeded berry, with a length of 2 centimeters (0.8 inch), dark purple red, shiny, with white to lavender flesh, fruit are oval to elliptic, length from 1.5 to 3.5 cm, dark purple to black in color, taste of the fruit is the combination of sweet, mildly sour with astringent flavor, it tends to color the tongue purple. Because of the dark violet color of the fruit it resembles to the olive tree fruits both shape and weight [10].

3.1.1 Taxonomical description

Kingdom: Plantae.
Subkingdom: Viridaplantae.
Infrakingdom: Streptophyta.

Division: Tracheophyta.
Subdivision: Spermatophytina.
Infradivision: Angiospermae.
Class: Magnliopsida.
Superorder: Rosanae.
Order: Myrtales.
Family: Myrtaceae.
Genus: Syzygium.
Species: Cumini.
Scientific Name: Syzigium cumini (L) Skeel.

3.1.2 Common names

Hindi: Jamuna, Sanskrit: Mahajambu, Ksudrajambu, Assam: Jam, Bengali: Jaam, Kalajam, English: Jambul tree, Gujarat: Gambu Jamun,Tamil: Naval, Urdu: Jamun, Telegu: Neredu [11].

3.1.3 Synonyms

Brazil - Azeitona,Pakistan – Jaman, West Indies-Jambol, Nepal-Java plum, Thailand – Lukwa, Japan - Madan Madagascar – Rotra.

3.1.4 Cultivation and collection of EJ

EJ was tropical & subtropical plant grows up to 2,000 meters in the region where annual day time temperature ranges from 20 to 32°C & it tolerate 12 to 48°C, mature growth of the plant will be affected at -2°C lower, whilst youngest growth is affected at -1°C. The plant grows well at annual rainfall in the range 1500 to 6,000 mm but tolerates 800–9900 mm. EJ can withstand a dry season of up to 7 months, where it prefers a sunny position, the pH prefer to range 5.5 to 7. The plants are moderately shade-tolerant, especially when young [12]. The

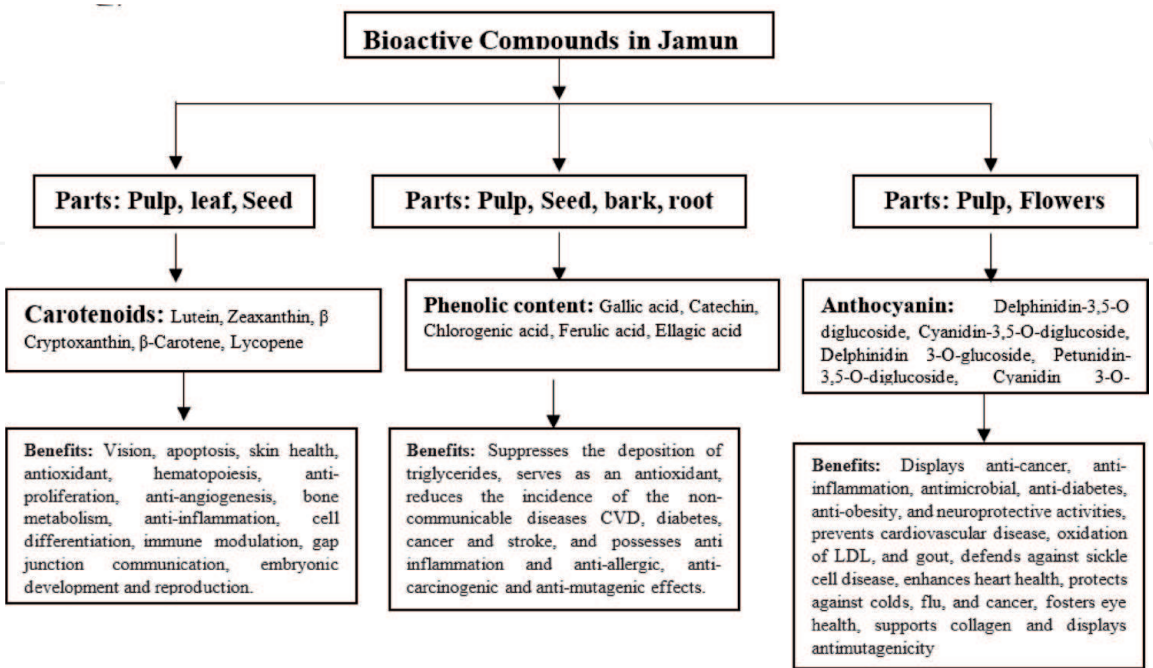


Figure 3.
Major bioactive constituents of jamun and its benefits.

versatile plant will grow on wide range of soils, even in shallow rocky soils where provided rainfall is maximum to tolerate prolonged flooding, once established, it tolerates drought in dry sites, the plant confine itself to the vicinity of water-courses & it tolerates quite strong winds, it sow-self freely and become serious pests in pasture.

In Florida EJ plant is listed as undesirable fast-growing plant, seedlings may reach up to 4 meter in 2 Years. This tree coppices remarkably well, with vigorous shoots, in large number, with minor and major stumps alike, the coppice which were stands in streams, will grew up to 4.6 meter in 4 years, and the raw material of the plant can be collected in rainy seasons to get good amount of bioactive constituents [13].

3.2 Phytochemical description of EJ

EJ is found to be rich in tannins, alkaloids, carbohydrates, flavonoids, sterols, glycosides, and among other phytoconstituents in different parts of the tree. There are many families of phytochemicals and they help the human body in a variety of ways. Phytochemicals can protect (Figure 3) human from diseases. Phytochemicals are nonnutritive plant chemicals that have protective or disease preventive properties. The fruits produce and determine the physical-chemical and sensory characteristics of light jambolan jelly. This fruit has intense purple color, which gave the jellies - both standard and light - a quite attractive visual aspect. The phytochemical analysis of ethanol extract of Jamun stem bark, leaf, seed and fruit pulp showed the presence of alkaloids, anthraquinone glycosides, flavonoids, tannins, saponins, phenols, cardiac glycosides, terpenoids, phytosterols, steroids and amino acids in all extracts. Terpenoids and phytosterols were absent in the leaf extract. The seeds are rich in protein and calcium. The seeds contain both micro & macromolecules as in NS. EJ also contains fats and oil such as tannins-19%, ellagic acid-2%, glycoside, jamboline, starch, myricyl alcohol in un-saponified fraction in small quantity that is 0.05% of pale yellow oil with specific gravity 20:0.926, $[\alpha]_D - 5.420$. The essential oils isolated from the freshly collected leaf (accounting for 82% of the oil), stem, seed, fruits contain α -Pinene, camphene, β -Pinene, myrcene, limonene, cis-ocimene, trans-ocimene, sterculic and vernolic acid, literature reported that huge quantity of malic acid present in fruits, i.e. thrice the weight of the fruit (0.59% wt of fruit), whereas oxalic acid present in minor amount but Gallic acid and tannin accountable for astringent taste of the fruit. The purple color of fruit is due to Cyanidin diglycosides, fruits are rich source of sugar-9%, non-reducing sugars-10%. The fruits also contain monomeric sugar units such as glucose, fructose, mannose, galactose & mineral constituents were also reported to be present (mg/100 g of edible pulp) are Ca, Mg, Fe, Na, K, and Cu,. The vitamins present (in 100 g. edible pulp) are vit. A, 80 IU; thiamine, 0.03 mg, riboflavin, 0.01 mg; nicotinic acid, 0.2 mg; vit. C, 18 mg; choline, 7 mg; folic acid, 3 μ g. The stem bark contains friedelin, kaempferol, ellagic acid, gallotannin, betulinic acid, β sitosterol, eugenin. The leaves contain phenolic content like ferullic acid, catechin, also, n-dotricontanol, myricetin, mycaminose, quercetin, annic acid, tocopherol and acetylated flavonol glycoside. The flowers contain oleanolic acid and other triterpenoids also acetyl oleanolin acid (0.3%) melting point (260–262°C), Eugenia- triterpenoid A (0.5%) and Eugenia triterpenoid B (0.3%). The roots contain myricetin 3-O-glucoside and myricetin 3-O-robinoside. Reported constituents (Figure 4) structures from different part of plant [14].

3.2.1 Reported constituent and its structure of EJ

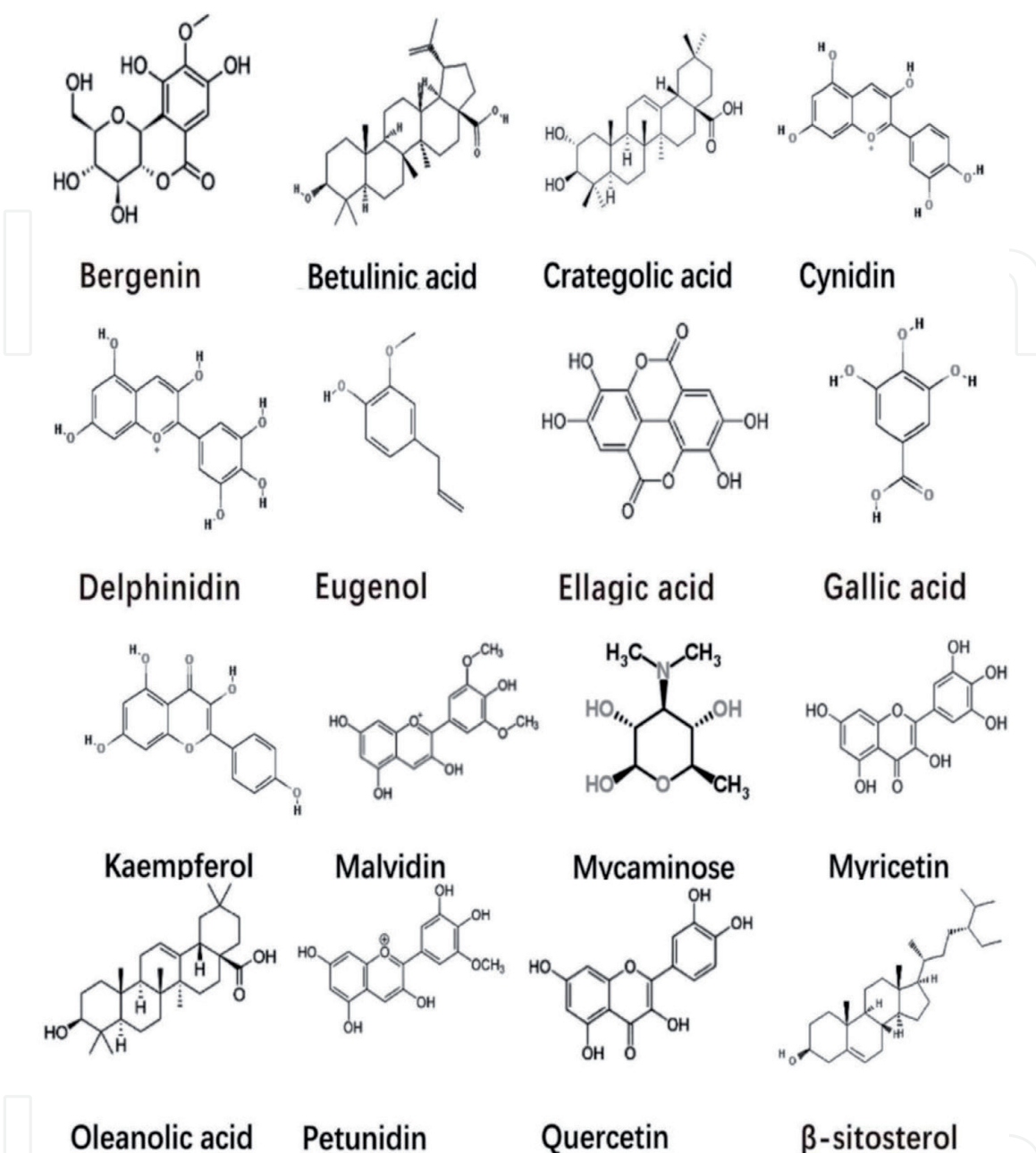


Figure 4.
 Constituents from *eugenia jambolana*.

4. Endorsed pharmacological descriptions of ns and EJ

4.1 Pharmacological properties of NS seeds and oil

NS seeds and oil has been broadly utilized to cure different disease & its ailments associated with, leaving physiological system, which was proved by adopting modern scientific methodology. The collected research repository from different sources with regardless of time, focusing the activity done on NS, worldwide form the centuries NS seeds and oil traditionally utilized as therapeutic medicine, in Indian system of medicine (Unani & ayurvedic) the pharmacological applications are endorsed [15], further more to say our Prophet Muhammed (ﷺ) advocated the importance in one of his saying that “NS seeds is

remedy for all disease except death” on this hadith NS considered as greatest healing medicine available in the form of Herbs and species, further recommendation of use was endorsed in Tibb-e-Nabwi (Prophetic Medicine). NS bearing wide range of therapeutic & pharmacological activity such as diuretic, antidiabetic, anti-hypertensive, analgesic, immunomodulatory, antimicrobial, anthelmintic, anti-inflammatory, spasmolytic, fever, influenza, eczema, cough, headache, paralysis, hemorrhage, amenoria, anorexia, bronchodilator, GIT protective, Hepatoprotective, renal treatment and antioxidant, skin disease [16], the activity of the NS seed is due to the presence of thymoquinone (TQ) which is major bioactive component NS oil. As already mentioned NS seeds are having food value hence it does not shows any adverse effect, TQ having potent anti-microbial properties including Gram +Ve and Gram -Ve bacteria [17], it also effective in viruses, parasites schistosomes and fungal infections.

The efficacy of NS seeds and TQ are variable and depend on target species. And other study reported the use of seeds and oil to control the symptoms of COVID-19 in combination with crude extract of EJ [18].

4.2 Pharmacological properties EJ

The second herbs which is having similar pharmacological properties was *Eugenia jambolana* (EJ), which is excellently prominent herb which utilized by ancient people of different continent to combat with the deficiency's associated with physiological system apart from this the importance of this plant is endorsed in the ancient scriptures like Siddha, Ayurveda and Unani medication for its therapeutic potentials [19].

The entire plant is used in various traditional system of medicine in India and other parts of the continent around the globe. However, the leaves and bark are regarded as most significant part. In Ayurveda, the bark is acrid, sweet, digestive and astringent to the bowels, anti-helminths. Besides it is used to cure sore throat, bronchitis, asthma, thirst, biliousness, dysentery, blood purifier in ulcer treatment. In Unani system of medicine EJ Leaf ash is used to strengthen teeth gums, EJ seeds are used as astringent, diuretic and also used to stop urinary discharges. The bark of EJ having strong antidiabetic properties. The siddha system of Indian medicine utilizes Jambolana seeds for hematinic, thermo-regulate, the traditional medicine of Madagascar's the Jambolana seeds are utilized to regenerate the β -cells of pancreas and leaves are used by women to contract vagina after delivery, reduce mucus and odors [20].

5. Comparative pharmacological properties

The uniform resemblances of pharmacological application both the species have been extensively analyzed with regardless of time, and tabulated in **Table 1**, the aim of the study, to put the researcher to focus on the beneficiary effect of bioactive constituents present in both the medicinal plants.

6. Conclusions

In a nutshell, both the species having identical pharmacological properties, bearing with different and rich source of phytoconstituents, currently, today's era getting conscious about the utilization of herbal medicaments, hence it was the preliminary choice of consumer world-wide. Otherwise, the traditional medicines

S.N	<i>Nigella sativa</i> (black seed)		Uniform resemblances of both species		<i>Eugenia jambolana</i> (black plum)	
	Parts of BS	Composition of constituent	Activity	Chechanism	Parts of BP	Composition of constituent
1.	Seeds	α -Hedrin, Steryl-glucosides, Acetylsteryl-glucoside	Anti-inflammatory	Anti-inflammatory activity is attributed to inhibition of cytokine, eicosanoids generation and measure lipid peroxidation through inhibition of cyclo-oxygenase and 5-lipoxygenase pathway of archidonate metabolism. In addition, T cell- and natural killer cell-mediated immune responses are also accountable to its immune-modulatory activity.	Leaves	Ellagic acid, gallotannin betullinic acid, β sitosterol, eugenin, kaempferol triterpenoids, saponins and tannins phenolic compounds and flavonoids
2.	Oil	Nigellicimine, Nigellidine, Nigellimine-N-oxide	Cardiovascular actions	Cardiovascular depressant effects are mediated centrally via indirect and direct mechanisms that involved both 5-hydroxytryptaminergic and muscarinic mechanisms. Direct mechanism is virtue of volatile oil (TQ) which processes potent antihypertensive potential.	Seeds	Flavonoids, phenolic content-caffeic acid, ellagic acid, ferulic acid, tannins, terpenes
3.	Seeds	Arginine, Glutamic acid, Leucine, Lysine, Methionine, Tyrosine, Proline And Threonine	Anti-hyperlipidemic	Anti-hyperlipidemic effect is owing to significant reduction in hepatic HMG-COA reductase activity. In addition, this effect is attributed to blockage of the ex-vivo basal and in-vitro maximal formation of conjugated diene and malondialdehyde, and lengthened the lag times of low density lipoprotein, small dense low density lipoprotein and large buoyant low density lipoprotein. Methanolic extract possessing ω -6 linoleic acid along with palmitic acid is more effective than volatile extract containing thymol and isothymol phenolic antioxidant compounds. Thymoquinone has anti-hyperlipidemic as well as antioxidant activity	Plant pulp Seed	Triton X-100 induced hyperlipidemia
4.	Seeds	Palmitic acid (12.5%), Stearic and Myristic acid (30%).	Hypoglycemic effects	<i>N. sativa</i> and <i>Eugenia jambolana</i> has non-insulin-mediated mechanism for the demonstration of hypoglycemic activity. However, petroleum ether extract exerts an insulin-sensitizing action by enhancing the activity of the two major intracellular signal transduction pathways of the hormones receptor	Leave	Vit. C, gallic acid, tannins, anthocyanins including cyanidin, petunidin, Lupeol, β -sitosterol

S.N	<i>Nigella sativa</i> (black seed)		Uniform resemblances of both species		<i>Eugenia jambolana</i> (black plum)	
	Parts of BS	Composition of constituent	Activity	Chechanism	Parts of BP	Composition of constituent
5.	Seeds	Esters Of Linoleic1 5a Caindd, N Tiann Ngilny,C	Antinociceptive effects	Antinociceptive effects of <i>N. sativa</i> oil and <i>Eugenia jambolana</i> having Flavonoids, phenolic and thymoquinone <i>N. sativa</i> of are mediated by indirect activation of the supraspinal μ 1- and k-opioid receptor subtypes.	Seeds	Flavonoids, alkaloids, steroids
6.	Seeds	Enoate, Stigma-5, 22-Dien- 3-B-D-Gluco.	Anti-oxytotic potential	The volatile oil of <i>Nigella sativa</i> seeds inhibits the spontaneous uterine smooth muscle contractions induced by oxytocin stimulation. These effects are concentration-dependent and reversible by tissue washing.	Roots	Flavonoids, alkaloids, steroids
7.	Seeds	6-Methoxy-Coumarin, Hydroxy-Coumarin, 7-Oxy-Coumarin	Gastro-protective effects	<i>N. sativa</i> cause significant reduction in acidity and glutathione level while it produced a significant increase in mucosal histamine content	Leaves	Amylase
8.	Seeds	Cycloeucalenol, Cycloartenol, Sterol Esters	Neuroprotective action	Neuro-protective action of NSO is correlated to its ability to inhibit not only excessive reactive oxygen species (ROS) formation but also seizure generation	Seeds	Anthocyanins, volatile oils, terpenes
9.	Seeds	Arginine, Glutamic Lysine, Methionine, Nephro-protective effect	NSO acts in the kidney as a potent scavenger of free radicals	Crude extract	Flavonoids, glycosides	
10.	Seeds	Almitoleic acid, β -Sitosterol, α 1Sitosterols (44–54%),	Anti-schistosomiasis	TQ were considered as protective agents against the chromosomal aberrations induced as a result of schistosomiasis	Crude extract of pulp	phenolic content and acetylated flavonol glycosides
11.	Seeds	Tyrosine, Proline and Threonine	Anxiolytic effect	<i>N. Sativa</i> oil increased brain levels of 5-HT but the levels of brain 5-HIAA decreased significantly. Brain and plasma levels of tryptophan also increased significantly following oral repeated administration of <i>N. sativa</i> oil. Based on this, it may be suggested that <i>N. sativa</i> oil is a useful choice for the treatment of anxiety.	Seeds	Flavonoids, alkaloids, steroids

S.N	<i>Nigella sativa</i> (black seed)		Uniform resemblances of both species		<i>Eugenia jambolana</i> (black plum)	
	Parts of BS	Composition of constituent	Activity	Chechanism	Parts of BP	Composition of constituent
12.	Seeds	Almitoleic acid, β -Sitosterol, α 1Sitosterols (44–54%), Cycloartenol, Sterol	Anti-malarial Effects	N. sativa oil can possibly be utilized as both supplements and as adjuvant. It has great importance when combine with chloroquine because the rate of loss and failure becomes less that's why it is safer for utilization. This will lessen the side effects of CQ. Total charge of treatment of malaria through chloroquine being the least expensive and mostly accessible	Methanolic extract of leaves	Polyphenols including Flavonoids, alkaloids, glycosides & phenolic compound, fatty oils
13.	Seeds	Almitoleic acid, β -Sitosterol, α 1Sitosterols (44–54%), Cycloeucalenol,	Anti-parastic Effects	<i>Nigella sativa</i> oil serves to counter infection by tapeworms and also used in the treatment or control of nematode infestations. It was demonstrated that oil have the ability to lessen the quantity of <i>Schistosoma mansonii</i> worms and ova that are produced in both the liver and in the intestinal tract. It has ability to expel parasitic worms such as nodular worms, tapeworms, hookworms, earthworms and nodular worms. Displayed great properties to attack the tapeworms and earthworms.	Leaves	glycosides & phenolic compound, fatty oils
14.	Seeds	Cycloartenol, Sterol Esters and Sterol Glucosides	Influence on blood	In an ongoing report it was seen that menthol dissolvable parts of <i>Nigella sativa</i> oil Counting thymol and carvacol Had extremely solid inhibitory impact on aggregated platelets that are induced by arachidonic acid	Seeds	glycosides & phenolic compound, fatty oils
15.	Seeds	Cycloeucalenol, Cycloartenol, Sterol Esters and Sterol Glucosides	Treatment of Acne	The <i>Nigella sativa</i> oil moisturizer has demonstrated its adequacy as an effective treatment for skin break out by acne vulgaris A new common plant extricates, which does not have any consequences. One of its constituents α -pipene had in vitro impact against <i>Propionibacterium acnes</i> , That is one of the main considerations involve in the advancement of skin inflammation.	Leaves and fruit pulp extract	Triterpenoids, Resin, Resin, Phytosterol

S.N	<i>Nigella sativa</i> (black seed)		Uniform resemblances of both species		<i>Eugenia jambolana</i> (black plum)	
	Parts of BS	Composition of constituent	Activity	Chechanism	Parts of BP	Composition of constituent
17.	Seeds and oil	Almitoleic acid β -Sitosterol, α 1Sitosterols (44–54%)	Effect on reproductive system	The uptake of 1 ml/kg/day of black cumin oil enhances the release of sexual hormones that stimulated the increase protein production of liver enzymes, platelets number and in the blood it diminishing the level of cholesterol present in serum. <i>Nigella sativa</i> oil possess anti-oxidative activities to neutralize the damage in the epididymal sperm characters brought about by hydrogen peroxide (H ₂ O ₂) treatment. Crude extract	Flavonoids, phenolic content – caffeic acid, ellagic acid, ferulic acid, tannins, terpenes	
18.	Seeds	Almitoleic acid, β -Sitosterol, α 1Sitosterols (44–54%)	Effect on respiratory system	In Saudi Arab and neighboring nations Kalonji seeds and oils are commonly utilized for the cure o asthma. Carbonyl polymer of thymoquinone (nigellone) ends up being an incredible preventive agent for both bronchial asthma and asthmatic bronchitis. Essential oil can be utilized as probable respiratory energizer if thymoquinone is eliminated	Seeds	glycosides & phenolic compound, fatty oils
19.	Seeds	Sterol Esters and Sterol Glucosides	Anti-bacterial Activity	<i>Nigella sativa</i> oil have shown great properties against bacterial specie that are producing wound infections. The oil provided great preventing impacts on <i>Staphylococcus Aureus</i> and Streptococcus species. Thymohydroquinone was separated from the essential oil known to possess higher actions against gram+ive bacteria.	Crude extract of leaves and bark	Phenols and flavonoids
20.	Seeds and oil	Cycloartenol	Anti-fungal Effects	The essential oil of Kalnoji of various backgrounds has accounted for to have adequate inhibitory activity against disease causing strains of: yeasts, dermatophytes and Non-dermatophytic filamentous parasites alongside aflatoxin-creating organisms.	Roots	Flavonoids, phenolic content – caffeic acid, ellagic acid, ferulic acid, tannins, terpenes
21.	Seeds and oil	Cycloeucalenol, Cycloartenol Sterol	Antiallergic effect	Act on H1 and H2 receptors	Crude Extract	Flavonoids, alkaloids, steroids

S.N	<i>Nigella sativa</i> (black seed)		Uniform resemblances of both species		<i>Eugenia jambolana</i> (black plum)	
	Parts of BS	Composition of constituent	Activity	Chechanism	Parts of BP	Composition of constituent
22.	Seeds and oil	Thymoquinone, dithmoquinone, thymohydroquinone, nigellone, thymol	Anti-cancer	Act to dissolve the unwanted cells in the body by dissolving them and have significant cytotoxic effect against the majority of tumor cell lines	Crude extracts of roots	Phenols and flavonoids
23.	Seeds	Thymoquinone, dithmoquinone, thymohydroquinone nigellone,	COVID-19 pandemic	Both the species exhibit to act on respiratory illness associated with type-II cells and secondary pathway of epithelial regeneration will be triggered	Water extract of roots	Flavonoids, phenolic content-caffeic acid, ellagic acid, tannins, terpenes Anthocyanins, volatile oils, terpenes

Table 1.
Glimpse of phytochemical and pharmacological endorsement of both the species.

are still occupying remedy-kingdom in particular area of research. Inherent and varied activities with meticulously indorsed phytoconstituents from both the species is triggering zone to the drug research, whereas this chapter is entirely dedicated to bring out the best from research crafted by different scholars. NS is one of the most important medicinal herbs with considerable commercial value, the valuable Phytoconstituents bearing by these herbs is commendable and also the gap in research to fucose on, merely the principal constituents responsible for activity are the derivatives of thymoquinone (TQ), as evident by various scientific studies support its safe use for the long-term traditional food and medicinal purposes.

To date, number of studies showed that, EJ is evergreen tree, having food value, which provide remarkably diversified therapeutic application, to treat different disease and its disorder associated with physiological system. The studies suggested that the major constituents responsible for the activity are flavonoids, anthocyanins, carotenoids, essential oil, terpenes, tannins and phenolic compounds.

To jot down, NS and EJ having wider safety margin and praiseworthy therapeutic activity, against sustainably cure to different bacteria and virus, this era of treatment require the molecules isolated from natural sources, whereas the worldwide ban of antibiotic, steroidal hormones and outbreak of covid-19, this candidate will prove its effectiveness.

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Acronyms and abbreviations

NS	<i>Nigella sativa</i>
EJ	<i>Eugenia jambolana</i>
TQ	Thymoquinone
NSO	<i>Nigella sativa</i> oil
DPPH	2,2-diphenyl- 1-picrylhydrazyl hydrate
LOO	lipid peroxyl radicals
FRAP	Ferric reducing antioxidant power
GAE	Gallic acid equivalent
CE	Catechin equivalent
TAE	Tannic acid equivalent

AGEs	Acute gastroenteritis
CVD	Cardio Vascular Disease
AMD	Age Related Macular Degeneration

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