

NIGELLA SATIVAM: THYMOQUINON AN OPTIMISTIC OVER PANDEMIC

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Article Received on 26/06/2020

Article Revised on 16/07/2020

Article Accepted on 06/08/2020

ABSTRACT

The COVID-19 has been declared a pandemic while there is no specific medicine against its causative agent SARS-CoV-2. As a prophetic medicine *Nigella sativa* (black seed) which has far reaching possibilities can be used. These plants are tolerant annuals, growing in height from 8-24 inches and contains thymoquinone (TQ) one of the most important bioactive compound. *Nigella sativa* comprises fixed oils, volatile oils, proteins, saponin and essential oils. It has been reported that human-to-human transmissions of SARS-CoV occurs by the binding between the receptor-binding domain of virus spikes and angiotensin-converting enzyme 2 (ACE2) receptor. TQ intercepts the complex formation at ACE2 sites thus deter endocytosis during replication. TQ also helps in the significant reduction of systolic (SBP) and diastolic blood pressure (DBP) along with reduction in total cholesterol imprint its part in CVD. Anti histaminic and anti inflammatory property of TQ are also reported. This review paper describes how *N. sativa* could be useful as a compliment to covid-19 treatment.

KEYWORDS: COVID-19, SARS-CoV-2, Thymoquinone, *Nigella sativa*.

INTRODUCTION

Nigella sativa plant moulded far reaching possibilities at folk tales itself. Black cumin plants are tolerant annuals, growing in height from 8-24 inches. Their oils have been used in inflammation, asthma, bronchitis, lactation and menstrual problems. They contain copious thymoquinone, and their large portion of phytochemical compounds is quinines.^[1] Thymoquinone (TQ) one of the most important bioactive compound and have respective beneficial properties.^[2] *Nigella sativa* comprises fixed oils, volatile oils, proteins, saponin and essential oils. Forty – seven volatile compounds have been identified, for which 16 compounds were first noticed within this.^[3]

Chemical composition of *nigella sativa*

Nigella sativa seed contains fixed oil that ranges between 28-36% with antioxidant property.^[4] Chiefly made of unsaturated fatty acids such as arachidonic, eicosadienoic, linoleic and linolenic and saturated fatty acids that consist of palmitic, stearic and myristic. Oil consist of compounds such as cholesterol, campesterol, stigmasterol, β -sitosterol, α -spinasterol, (+)-citronellol, (+)-limonene, p-cymene, citronellyl acetate, carvone, nigellone, arachidic, linolenic, linoleic, myristic, oleic, palmitic, palmitoleic and stearic acids. Seed oil contains fixed oils like linoleic acid (55.6%), oleic acid (23.4%) and palmitic acid (12.5%) and volatile oils like trans-anethole (38.3%), p-cymene (14.8%), limonene (4.3%), and carvone (4.0%). Cumin seed have two forms of alkaloids: isoquinoline alkaloid that includes:

nigellicimine, nigellicimine n-oxide and pyrazol alkaloid that includes: nigellidine and nigellicine.^[5] The nutritional part includes vitamins, carbohydrates, mineral elements, fats and proteins that include eight or nine essential amino acids.

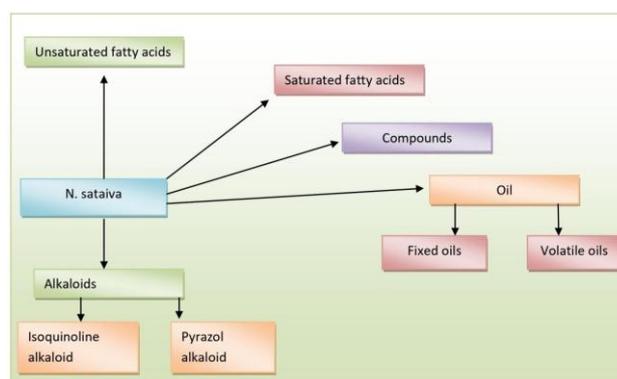


Fig 1 : Chemical constitution of *N. sativa*.

Patogenesis

Patients infected with COVID-19 showed higher leukocyte numbers, abnormal respiratory findings, and increased levels of plasma pro-inflammatory cytokines. One of the COVID-19 case reports showed a patient at 5 days of fever presented with a cough, coarse breathing sounds of both lungs, and a body temperature of 39.0 °C. The patient's sputum showed positive real-time polymerase chain reaction results that confirmed

COVID-19 infection.^[6] The laboratory studies showed leucopenia with leukocyte counts of 2.91×10^9 cells/L of which 70.0% were neutrophils. Additionally, a value of 16.16 mg/L of blood C-reactive protein was noted which is above the normal range (0–10 mg/L). High erythrocyte sedimentation rate and D-dimer were also observed. The main pathogenesis of COVID-19 infection as a respiratory system targeting virus was severe pneumonia, RNAemia, combined with the incidence of ground-glass opacities, and acute cardiac injury.^[7] Significantly high blood levels of cytokines and chemokines were noted in patients with COVID-19 infection that included IL1- β , IL1RA, IL7, IL8, IL9, IL10, basic FGF2, GCSF, GMCSF, IFN γ , IP10, MCP1, MIP1 α , MIP1 β , PDGFB, TNF α , and VEGFA. Some of the severe cases that were admitted to the intensive care unit showed high levels of pro-inflammatory cytokines including IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1 α , and TNF α that are reasoned to promote disease severity.

Transmission

Based on the large number of infected people that were exposed to the wet animal market in Wuhan City where live animals are routinely sold, it is suggested that this is the likely zoonotic origin of the COVID-19. Efforts have been made to search for a reservoir host or intermediate carriers from which the infection may have spread to humans. Initial reports identified two species of snakes that could be a possible reservoir of the COVID-19. However, to date, there has been no consistent evidence of coronavirus reservoirs other than mammals and birds.^{[8][9]} Genomic sequence analysis of COVID-19 showed 88% identity with two bat-derived severe acute respiratory syndrome (SARS)-like coronaviruses,^{[10][11]} indicating that mammals are the most likely link between COVID-19 and humans. Several reports have suggested that person-to-person transmission is a likely route for spreading COVID-19 infection. This is supported by cases that occurred within families and among people who did not visit the wet animal market in Wuhan.^{[12][13]} Person-to-person transmission occurs primarily via direct contact or through droplets spread by coughing or sneezing from an infected individual. In a small study conducted on women in their third trimester who were confirmed to be infected with the coronavirus, there was no evidence that there is transmission from mother to child. However, all pregnant mothers underwent caesarean sections, so it remains unclear whether transmission can occur during vaginal birth. This is important because pregnant mothers are relatively more susceptible to infection by respiratory pathogens and severe pneumonia. The binding of a receptor expressed by host cells is the first step of viral infection followed by fusion with the cell membrane. It is reasoned that the lung epithelial cells are the primary target of the virus. Thus, it has been reported that human-to-human transmissions of SARS-CoV occurs by the binding between the receptor-binding domain of virus spikes and the cellular receptor which has been identified as angiotensin-converting enzyme 2 (ACE2) receptor.^{[11][14]}

Importantly, the sequence of the receptor-binding domain of COVID-19 spikes is similar to that of SARS-CoV. This data strongly suggests that entry into the host cells is most likely via the ACE2 receptor.^[11]

Biological effects of black cumin

The break through M^{pro} protease structural elements in COVID 19 offers a unique opportunity to spot potential pharmacotherapy recruits. Nigellidine moored into 6LU7 active sites brings energy approximately -6.29734373 kcal/mol which is similar to chloroquine.^[15] Certain studies shows significant reduction of virulence, slash the pathogenesis of H9N2 avian influenza virus akin SARS CoV2 in chicken.^[16] TQ intercepts the complex formation at ACE2 sites thus deter endocytosis during replication.^{[17][18]} Dithymoquinone (DTQ) seems to have a particular fondness to the layer of SARS CoV2. Through hydrophilic and hydrophobic bonding ACE2 interaction takes place making DTQ high soluble, absorbable vital spur for real world studies.^[19]

Cure with cumin

1. Diabetes and CVD

Thymoquinone antioxidant properties consequently enhancing pancreatic islets immune reaction, while raising serum insulin levels and mitigating diabetic dyslipidemia.^[20] A study conducted on 24 rat's with autoimmune disease of type 1 diabetic mellitus reveals declined immunological parameters along with concurrent ascent in serum insulin level.^[21] Significant reduction in systolic (SBP) and diastolic blood pressure (DBP) along with reduction in total cholesterol imprint its part in CVD.^[22] The posit mechanism consist of centrally resolved cardiovascular depression culminates drastic deduction of 8.17 and 12.46% in SBP more over DPB on an individual bias.^[23] Upcoming studies are justifying the antiviral property of the drug which exposes probability in management of comorbid condition.

2. Anti-inflammatory action

Ethanol extract from *N.sativa* has an antihistaminic property no toxic effects on mast cell pays new way for asthma therapy.^[24] Tracheal muscle responsiveness and lung inflammation in sulphur mustard exposed guinea pigs showed a protective effect by marked decreased in neutrophils and monocytes in contrast to that of control group.^[25] Controlled randomized studies conducted among asthma groups receiving the drug at a range of 1 and 2 g/day inhaled supplementation maintained asthma. Significant improvement in peak expiratory flow (PEF) with a marked decline in fractional exhaled nitric oxide (FeNO) and serum IgE.^[26] Cumin promotes inhibitory action on 5-lipoxygenase along with antitussive and anticholinergic.^[27] There are studies pointing out the therapeutic effects of this plant in obstructive pulmonary disease and other respiratory disease.^[28] These magic drugs even pay way to pulmonary fibrosis in early stages.^[29] Upcoming studies on this seed as a natural supplement against SARS CoV2 are in progress.^[30]

CONCLUSION

Nigella Sativa may be an upcoming promising plant that may pay way to many of communicable plight. With a verity of active compounds such as thymoquinon, this herbal medicine may provide a number of benefits in COVID 19 therapy. Natural products with immune response and antiviral activity yields positive progress in the consequence of infection is quite appreciable.

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