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Siddha dietary and lifestyle pattern: A strong shield and weapon to win the Covid-19 pandemic battle

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Abstract

COVID-19 pandemic has imposed a new set of challenges for the individual to maintain a healthy lifestyle. Because what we eat does play a big role in one's health. Owing to the fastest mode of lifestyle, the time consuming nature of traditional home cooking custom has totally changed to fast food and ready meal culture. Totally unaware of the ill effects of these kinds of food is being given to diet and lifestyle pattern. Some westernised may lead to adaptive immunity impairment due to the presence of high amount of saturated fatty acids. A well-designed protocol with South Indian, traditional "Siddha medicine" intervention along with proper Siddha dietary and lifestyle is achieving a remarkable therapeutic effect in combating COVID-19. Several studies have revealed that the gut-brain connection plays an important role in physical and mental health and poor gut health can lead to the release of inflammatory molecules in the body. Among the possible areas of research related to COVID-19, it is important that the Siddha dietetics and life style interventions may be of great benefit to reduce COVID-19 related morbidity and mortality.

Keywords: COVID-19, Diet, SARS-CoV-2, siddha, traditional medicine

1. Introduction

COVID-19 presents with a spectrum of disease severity, ranging from mild and non-specific flu-like symptoms, to pneumonia, and life-threatening complications such as acute respiratory distress syndrome (ARDS) and multiple organ failure. While transmission of severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) is thought to occur mainly via respiratory droplets, the gut may also contribute towards the pathogenesis of COVID-19. SARS-CoV-2 RNA has been detected in the gastrointestinal tract and stool samples from patients and in sewage systems. Coronaviruses, including SARS-Cov-2 can invade enterocytes, thereby acting as a reservoir for the virus. Several clinical studies from China indicate that gastrointestinal (GIT) symptoms like diarrhoea, vomiting are common in COVID-19, and are associated with disease severity^[1]. Owing to GIT invasion of SARS-CoV-2 virus, it is the need of the hour to know and adopt healthy diet for one's gut health. Probiotics are live microorganisms which when administered in adequate amounts, confers a health benefit on the host. Clinical evidence shows that certain probiotic strains help to prevent bacterial and viral infections, including gastroenteritis, sepsis, and respiratory tract infections (RTIs)^[1].

People should be mindful of healthy eating habits to reduce susceptibility to and long-term complications from COVID-19. The Siddha way of lifestyle i.e practising routine daily regimen like waking up early in the morning, brushing of teeth, regular bowl habits, bathing, doing Asanams, Pranayamam, Dhyanam, etc.-*Nithiyaozhukkam*, seasonal regimens'. e. do's and don'ts related to food and deeds during the seasons such as *Kaar kaalam* (July15-Sep14), *Koothir kaalam* (Sep15-Nov14), *Munpani kaalam* (Nov15-Jan14), *Pin pani kaalam* (Jan15-Mar14), *Ilavenir kaalam* (Mar15-May14), *Mudhu venir kaalam* (May15-July14)-*Kaalaozhukkam* and *Thallakkanam* e. Individual daily regimen according to body constitution. Use of various simple Siddha disinfectant techniques play very important role in the maintenance of health and thus prevention of various communicable and non-communicable diseases^[2]. Thus, during this period of COVID-19 pandemic, it is important to take care of healthy balanced nutritional diet containing high amount of minerals, antioxidants, and vitamins and some physical activity to handle this kind of situation. Siddha simple dietary patterns and lifestyle patterns seem to be an effective and advanced preventive strategy to combat COVID-19 related illness.

2. Nutrition and Dietary Recommendations to Combat Viral Infections Including Covid-19: Food plays a major role in disease prevention. An adequate intake of iron, zinc, and vitamins A, C, E, B6, and B12 is predominantly vital for the maintenance of immune function.

Therefore, the key to maintaining an effective immune system is to avoid deficiencies of the nutrients that play an essential role in immune cell triggering, interaction, differentiation, or functional expression [3].

During quarantine the increased intake of macronutrients accompanied by micronutrients deficiency is commonly associated with impaired immune responses, particularly cell-mediated immunity, phagocyte function, cytokine production, secretory antibody response, antibody affinity, and the complement system, thus rendering us more susceptible to viral infections.

Everyone think that Zinc or other multivitamin tablets will keep them safe from Coronavirus infection. The majority of supplements available in the market today are synthetic. These include vitamins, antioxidants, minerals and amino acids. Synthetic nutrients are dietary supplements made artificially in a laboratory setting orion industry are inconsistent, weak in their effect. But natural nutrients found in whole grains are well absorbed and utilized by the body and prevent diseases. For example, studies show that natural vitamin E is absorbed twice as efficiently as synthetic vitamin E [4].

Several studies have reported that fruits and vegetables supplying micronutrients can boost immune function. This happens because some of these micronutrients such as Vitamin E, Vitamin Cand β -carotene are antioxidants.

Anti-oxidants increase the number of T-cell subsets, enhance lymphocyte response to mitogen, increased interleukin-2 production, potentiated natural killer cell activity and increased response to influenza virus vaccine compared with placebo.

B-carotene is most abundant in sweet potatoes, carrots, and green leafy vegetables while sources of vitamins C include red peppers, oranges, mangoes, lemons, and other fruits and vegetables. The major dietary sources of vitamin E are vegetable oils (soybean, sunflower, corn, wheat germ, and walnut), nuts, seeds, spinach, and broccoli.

Another essential trace element that is important for the maintenance of immune function is zinc. It has been reported that zinc inhibited severe acute respiratory syndrome (SARS) coronavirus RNA-dependent RNA polymerase (RdRp) template binding and elongation in Vero-E6 cells. The most common food to get zinc are represented from nuts, pumpkin seeds, sesame seeds, beans, and lentils.

In addition, quarantine could be associated with less time spent outdoor, less sun-exposure, and reduced production of vitamin D as a result of lower levels of 7-dehydrocholesterol in the skin. Several studies show that vitamin D deficiency in winter has been reported to be associated with viral epidemics. Further, vitamin D protects respiratory tract preserving tight junctions, killing enveloped viruses through induction of cathelicidin and defensins, and decreasing production of pro-inflammatory cytokines by the innate immune system, therefore reducing the risk of a cytokine storm leading to pneumonia in SARS-CoV-2. Since the time spent outdoor and consequently the sun exposure is limited, it is encouraged to get more vitamin D from diet. Foods containing vitamin D include milk, yogurt with added vitamin D [5].

In Siddha system of medicine sun bath is mentioned as *Kaanthi suttigai* which is a unique external therapy helping to regulate the natural rhythms of our body and disease-fighting properties. *Kaanthi* is defined as an application of adequate exposure of our body to sunlight (Sun bath) - whole body except head to induce perspiration. *Suttigai* means "heat application". Thus the low amount of heat is received from the sunlight to the body surface. Siddhar Theraiyar states that the evening rays of sun is more beneficial than the morning rays and used to treat some illnesses and to improve the health status [6]. The sunlight provides Vitamin D and it is recognized to act as a major immuno-modulator and its production have consequences for the control of viral infections [7].

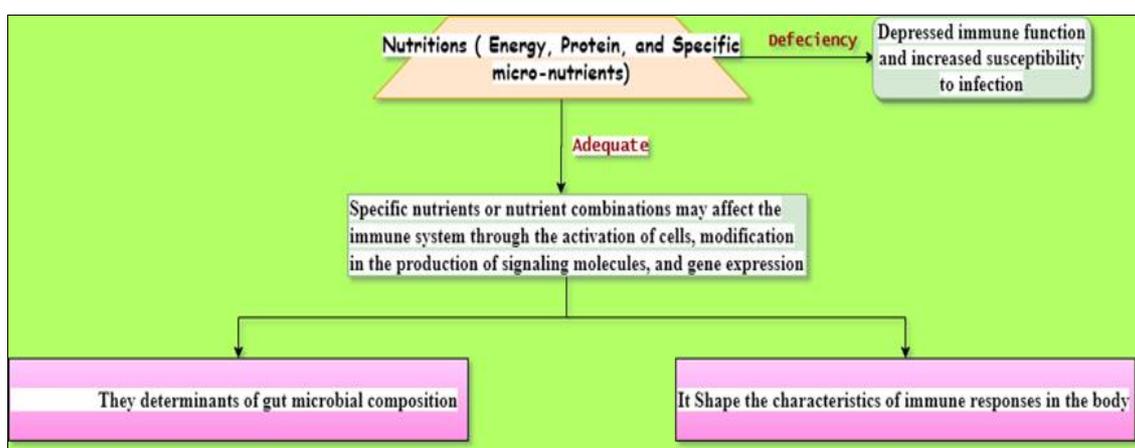


Fig 1: Effect of diet on immune system and disease susceptibility [3].

3. Siddha Dietary Regimen-A Unique Nutraceutical Supplement

Our body is made up of *Pancha boothangal* namely *Prithvi* (earth), *Appu* (water), *Theyu* (fire), *Vaayu* (air) and *Aakayam* (space). The three vital humours *Vatham*, *Pitham* and *Kabam* functionally linked to *Vayu*, *Theyu* and *Appue* lements respectively are seen in different ratios in a human being. Every individual is born with their own basic physical and mental constitution termed as *Udalor Thogai Ilakkanam*. *Vatha Thegi*, *Pitha Thegai* and *Kaba Thegi* are called *Thooya*

Dalinar and combination of *Mukkutra Thegi* are called *Kalappuor Thonthaudalinar*. Siddhars explain about dietary regimen which helps to prevent diseases that are susceptible for a particular *Thegi* [8]. These kinds of diet mostly have loads of fruits and vegetables which are recommended not only for their nutritional value, but also because they are good natural internal cleansers.

Multiple studies have indicated that a higher intake of vegetables is associated with a reduction of cardiovascular diseases (CVDs) and possibly with a reduction of obesity,

type 2 diabetes, chronic respiratory diseases, and some types of cancer. The benefits of vegetables in the prevention of non-communicable diseases (NCDs) may be explained by their relatively high content of micronutrients, antioxidant

compounds, polyphenols, and fibres, which may each counteract the biochemical processes that cause CVDs and other NCDs [9].

Table 1: *Thegi*– Diet Pattern [10]

S. No	Diet	Vatha Thegi	Pitha Thegi	Kaba Thegi	Presence of Nutrients Which Prevent From Viral Infection
1.	Vegetables	<i>Kalyana Poosanai</i> [<i>Benincasahispida</i> (Thunb) Cogn], <i>Kaththari</i> [<i>Solanummelongena</i> . Linn], <i>Vazhuthulangai</i> [A variety of Solaum], <i>Kara Kaunai</i> , <i>Kaatu Karunaikizhangu</i> [<i>Amorphophalluspaeoniifolius</i> (Dennst.)], <i>Murungai Pinju</i> [<i>Moringaoleifera</i> Lam.], <i>VelAvarai</i> [<i>Dolichos lablab</i> (with white flower)], <i>Mithipagal Pinju</i> [<i>Momordicacharantia</i> , Linn]	<i>Vellari</i> [<i>Cucumissativus</i> . Linn], <i>Kombu Paagal</i> [A variety of Momordica], <i>Mithipaakal</i> [<i>Momordicacharantia</i> , Linn], <i>Pudalankkai</i> [<i>Trichosanthes cucumerina</i> . Linn] <i>Peercku</i> [<i>Luffa acutangula</i> L. Roxb], <i>Kalyanapoosanai</i> [<i>Benincasahispida</i> (Thunb) Cogn], <i>Kathiri</i> [<i>Solanummelongena</i> . Linn], <i>Murungai</i> [<i>Moringaoleifera</i> Lam.], <i>Aatru Mulli</i> , <i>Vallikizhangu</i> [<i>Dioscoreaesculenta</i> , Burkill], <i>Vengayam</i> [<i>Allium cepa</i> . Linn], <i>Poosani</i> [<i>Benincasahispida</i> (Thunb.) Cogn.] <i>Vaazhathandu</i> , <i>Vaazhai poo</i> [Stem & Root of <i>Musa paradisiaca</i> . Linn]	<i>Kaththari</i> [<i>Solanummelongena</i> . Linn], <i>Peipudal</i> [<i>Trichosanthes Cucumerina</i>], <i>Avarai</i> [<i>Lablab purpureus</i> , Linn.], <i>Kombu Paagal</i> [A variety of Momordica], <i>Mithi Paagal</i> [<i>Momordicacharantia</i> , Linn], <i>Kandamkathiri</i> [<i>Solanumsurrattense</i> , Burm, f], <i>Athikkai</i> [<i>Ficus carica</i> . Linn], <i>Vazhathandu & Poo</i> [Stem & Root of <i>Musa paradisiaca</i> . Linn], <i>Poosaniikkaai</i> [<i>Benincasahispida</i> (Thunb.) Cogn.], <i>Palaa</i> [<i>Artocarpusheterophyllus</i> Lam.], <i>Surai</i> [<i>Lagenaria Siceraria</i> Linn.], <i>peerkupinju</i> [<i>Luffa acutangula</i> L. Roxb], <i>Karunaikizhangu</i> [<i>Amorphophalluspaeoniifolius</i> (Dennst.)] <i>Kalaapoo</i> [Flower of <i>Carissa spinarum</i> Linn.], <i>Mullanki</i> [<i>Raphanus sativus</i> Linn.], <i>Mulmurungai</i> [<i>Erythrina variegata</i> Lam.], <i>Vengayam</i> [<i>Allium cepa</i> . Linn], <i>Vallikizhangu</i> [<i>Dioscoreaesculenta</i> , Burkill]	The major dietary source of anti-oxidants Vitamin A & C present in Vegetables and fruits
2.	SPINACH/GREENS	<i>Kuppaimeni</i> [<i>Acalypha indica</i> L. – Indian acalypha], <i>Munnai</i> [<i>Premnacorymosa</i> , Rottl], <i>Aarai</i> [<i>Marsileaquadrifolia</i>], <i>Nalvelai</i> [<i>Cleome viscosa</i> . Linn], <i>Manathakkaali</i> [<i>Solanumnigrum</i> . Linn] <i>Yaainerunjil</i> <i>Musumusukkai</i> [<i>Mukiamaderaspatana</i>], <i>Kovai</i> [<i>Cocciniagrandis</i>], <i>Mookirattai</i> [<i>Boerhaaviadiffusa</i> . Linn], <i>Vasalai</i> [<i>Portulacaquadrifida</i> . Linn]	<i>Puliyaarai</i> [<i>Oxalis corniculata</i> . Linn], <i>Kovai</i> [<i>Cocciniagrandis</i>], <i>Murungai</i> [<i>Moringaoleifera</i> Lam.], <i>Vasalai</i> [<i>Portulacaquadrifida</i> . Linn] <i>Ponmusuttai</i> [<i>Sidaacuta</i>], <i>Milagu</i> [<i>Piper nigrum</i> . Linn], <i>Appakkovai</i> [<i>Cocciniagrandis</i>], <i>Orithazhthamarai</i> [<i>Ionidium suffruticosam</i> , Ging] <i>Musumusukkai</i> [<i>Mukiamaderaspatana</i>], <i>Thoothuvalai</i> [<i>Solanumtrilobatum</i>], <i>Surai</i> [<i>Lagenaria Siceraria</i> Linn.], <i>Vallaarai</i> [<i>Centellaasiatica</i>] <i>Sirukeerai</i> [<i>Amaranthus Tricolor</i>], <i>Manathakkaali</i> [<i>Solanum Nigrum</i>]	<i>Kovai</i> [<i>Cocciniagrandis</i>], <i>Munnai</i> [<i>Premnacorymosa</i> , Rottl], <i>Sembai</i> [<i>Sesbaniasesban</i>], <i>Pei pudal</i> [<i>Trichosanthes Cucumerina</i>], <i>Bramiyavazhukkai</i> [<i>Bacopamonmieri</i> (Linn) Pennel], <i>Nerunjil</i> [<i>Tribulusterrestris</i> . Linn], <i>Neerarai</i> [<i>Marsileaquadrifolia</i>], <i>Puliyaarai</i> [<i>Oxalis corniculata</i> . Linn], <i>Kuppaimeni</i> [<i>Acalypha indica</i> . Linn], <i>Vallaarai</i> [<i>Centellaasiatica</i>], <i>Ponnaavarai</i> , <i>Musumusukkai</i> [<i>Mukiamaderaspatana</i>], <i>Murungai</i> [<i>Moringaoleifera</i> Lam.] <i>Thuyilivazhukkai</i> <i>Mulaikkeerai</i> [<i>Amaranthusblitum</i>] <i>Pinnaakkukeerai</i> [<i>Melochiacorchorifolia</i>] <i>Manalikkeerai</i> [<i>Gisekiapharanaceoides</i> . Linn] <i>Musuttai</i> [<i>Sidaacuta</i>] <i>Kaaramani</i> [<i>Vignaunguiculata</i> (Linn) Walp] <i>Kadalaipulippu Chukku</i> [Dried ginger] <i>Katrzhai</i> [<i>Aloe barbadensis</i>], <i>Vasalai</i> [<i>Portulacaquadrifida</i> . Linn]	Beta-carotene and Vitamin E abundantly present in green leafy vegetables
3.	SOUPS	<i>Vellaichaaradai</i> [<i>Trianthemadecandra</i>] <i>Murungai</i> [<i>Moringaoleifera</i> Lam.] <i>Paagal</i> [<i>Momordicacharantia</i>], <i>Mulikeerai</i> [<i>Amaranthusspinoss</i> . Linn], <i>Thoothuvalai</i> [<i>Solanumtrilobatum</i>], <i>Ponnanganni</i> [<i>Alternantherasessilis</i>]	<i>Koththu Vasalai</i> [<i>Portulacaquadrifida</i>], <i>Kodivasalai</i> [<i>Basella alba</i>], <i>Thaivelai</i> [<i>Gynandopsisgynandra</i> (Linn) Briquet], <i>Bramiyavazhukkai</i> [<i>Bacopamonmieri</i> (Linn) Pennel], <i>Agaththi</i> [<i>Sesbania grandiflora</i>], <i>Tharakkeerai</i> [<i>Fumariaparviflora</i> . Lam]	<i>Omam</i> [<i>Trachyspermumammi</i> .Linn], <i>Kadugu</i> [<i>Brassica nigra</i> . Linn] <i>Sathakuppai</i> [<i>Anethumgraveolene</i> . Linn], <i>Venthayam</i> [<i>Trigonellafoenum-graecum</i> . Linn], <i>Kothumalli</i> [<i>Coriandrum sativum</i> . Linn] <i>Chukku</i> [Dried ginger], <i>Paagal</i> [<i>Momordicacharantia</i>], <i>Thumbai</i> [<i>Leucasaspera</i> (Willd.)], <i>Agathi</i> [<i>Sesbania grandiflora</i>]	Soup is an effective way to get needed water-soluble vitamins and minerals. Extremely soluble in water are Vitamin C and thiamine; only slightly soluble are riboflavin and niacin, which are found in green vegetables
4.	Dried Vegetables	<i>Chundaikkai</i> [<i>Solanumtorvum</i> . Swartz], <i>Peippudal</i> [<i>Trichosanthes Cucumerina</i>], <i>Thoothuvalamkaai</i> [<i>Solanumtrilobatum</i>], <i>Nellikai</i> [<i>Phyllanthusemblica</i> Linn], <i>Aathondai</i> [<i>Cappariszeylancia</i>]	<i>Venmulli</i> , <i>Peipudal</i> [<i>Trichosanthes Cucumerina</i>], <i>Chundai</i> [<i>Solanumtorvum</i> .Swartz], <i>Kandamkathiri</i> [<i>Solanumsurrattense</i>], <i>Manathakkaali</i> [<i>Solanum Nigrum</i>], <i>Vallarai</i> [<i>Centellaasiatica</i>], <i>Thoothulam</i> [<i>Solanumtrilobatum</i>], <i>Payatrangaai</i> [<i>Vigna mungo</i> , Linn. Hepper], <i>Thamarai</i> [<i>Nelumbonucifera</i> , Gaertn],	<i>Chundai Manaththakkali Pirandai</i> <i>Mulikeerai</i> <i>Peippudal</i> [<i>Trichosanthes Cucumerina</i>] <i>Kandang Kaththari</i> , <i>Nelli</i> , <i>Avarai</i> , <i>Thoothulam</i> [<i>Solanumtrilobatum</i>] <i>Pirandai</i> , <i>Aathondai</i> <i>Naaratham</i> [<i>Citrus medica</i> Linn.]	A unique preparation to increase shelf life and preserve nutrient quality of vegetables.

		<i>Linn.</i>] <i>Manathakkaali</i> [<i>Solanum Nigrum</i>], Vel <i>Avarai</i> [<i>Dolichos lablab</i> (with white flower)], <i>Mullikkai Kaatu Pirandai</i> [<i>Cissusquadrangularis</i> Linn]				
5.	Pickle	<i>Naarathai</i> [<i>Citrus medica</i> Linn.] <i>Thantri</i> [<i>Terminalia bellirica</i> (Gaertn.) Roxb.] <i>Kadukai</i> [<i>Terminalia chebula</i> Retz.] <i>Thetran</i> [<i>Strychnospotatorum</i>] <i>Inji</i> [<i>Zingiberofficinale</i> Roscoe.] <i>Kalakkai</i> [<i>Carissa spinarum</i> Linn.],	<i>Pachai Milagu</i> [<i>Piper nigrum</i> Linn.], <i>Inji</i> [<i>Zingiberofficinale</i> Roscoe.], <i>Thoothuvalai</i> [<i>Solanumtrilobatum</i>], <i>Thamaratham Kamai</i> [<i>Averrhoa Carambola</i> . Linn], <i>Punnai</i> [<i>Calophylluminophyllum</i> . Linn], <i>Kozhunji</i> [<i>Glycosmisorborea</i> (Roxb) DC] <i>Elumichai, Thiripala</i> [Three myrobalans], <i>Naarathamkkai</i> [<i>Citrus medica</i> Linn.] <i>Maampinju</i> [<i>Mangifera Indica</i> Linn.] <i>Maravalli Kizhangu</i> [<i>Dioscoreaesculenta</i> , Burkill], <i>Thetran</i> [<i>Strychnospotatorum</i>]	<i>Manjal</i> [<i>Curcuma longa</i> Linn], <i>Milagu</i> [<i>Piper nigrum</i> Linn.] <i>Chundai</i> [<i>Solanum torvum</i> . Swartz] <i>Vazhathandu Athipinju, Maampinju</i> [<i>Mangiferaindica</i> Linn.] <i>Mithi Paakalpinju</i> [<i>Momordicacacharantia</i> , Linn], <i>Thoothulam</i> [<i>Solanumtrilobatum</i>]		Fermented pickles are full of good bacteria called probiotics, which are important for gut health
6.	Salt	<i>Kalluppu</i>	<i>Kadalluppu</i>	<i>Indhuppu</i> [Rock salt]	Researchers say salt may work by boosting cells' antiviral defence that kicks in when they are affected by a cold [11].	

4. Potential Interaction between Western Diet Consumption and Covid-19 on Adaptive Immunity Impairment

Western Diet significantly impairs adaptive immunity while ramping up innate immunity, leading to chronic inflammation

and severely impairing host defence against viral pathogens. T and B cell counts were significantly lower in patients with severe COVID-19. Consumption of unhealthy diets by these groups could pose an amplified risk to severe COVID-19 pathology [12].

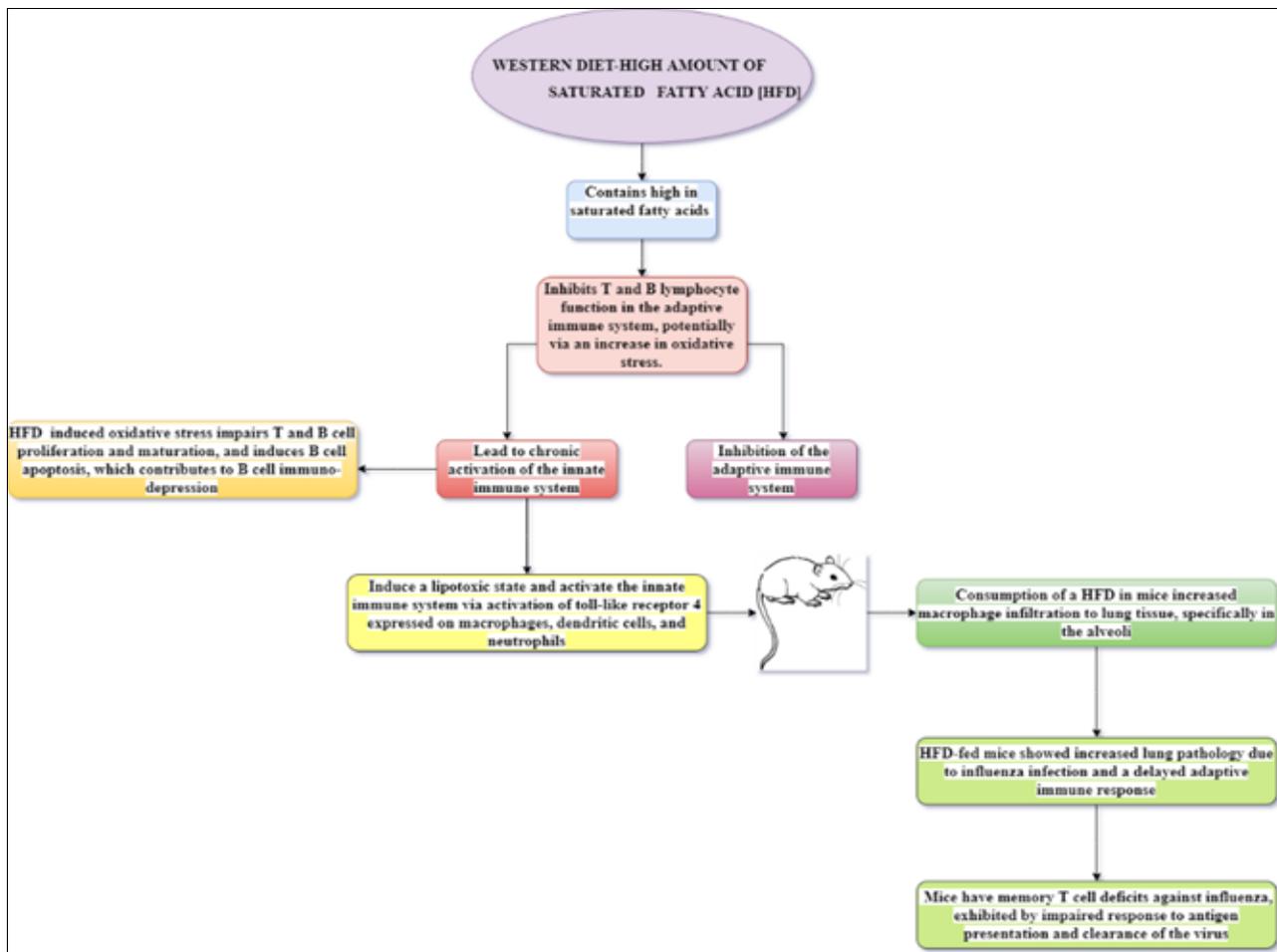


Fig 2: The Link between Western Diet and Immunity [12].

Western dietary pattern leads to obesity. Recent studies have demonstrated that the impaired immune response in the obese host leads to increased susceptibility to infection with a number of different pathogens such as community-acquired tuberculosis, influenza, Mycobacterium tuberculosis, coxsackie virus, Helicobacter pylori and encephalomyocarditis virus [13].

But an authentic ancient Tamil food contains a wealth of erudition on health sciences. Our ancestors believed that “Unavaemarunthu, Maruthaae unavu” meaning “Let food be thy medicine and medicine be thy food” which is a classical and extraordinary discovery of Siddha system of medicine.

Indian diet especially South Indian traditional foods like *Idli* [Fermented steamed rice pan cake contains high nutritional values-riboflavin(B2), thiamine(B1), folic acid(B9) and Vitamin C, Methionine (Essential amino acid)] [14].

Kezhvaragu Koozhu or *Keppai* or *Ragi Koozhu* (Porridge of finger Millet)-It contains 15% protein and high fibre, vitamin E, vitamin B complex, niacin, thiamine, riboflavin. It also contains essential amino acids such as methionine and lysine, rich minerals such as iron, magnesium, phosphorus and potassium.

Pazhan Choru (PazhayaChoru) [Fermented rice:-This traditional dish is rich in nutrition B6 and B12. It promotes the growth of healthful bacteria within the gut and maintains most of the common diseases at bay] [15].

These fermented authentic Tamil traditional foods possess enormous amount of probiotics. There is also evidence that probiotic strains modify the dynamic balance between pro-inflammatory and immune-regulatory cytokines that allow viral clearance while minimizing immune response-mediated damage to the lungs. This might be particularly relevant to prevent ARDS, a major complication of COVID-19. An RCT with *Lactobacillus plantarum* DR7 showed suppression of plasma pro-inflammatory cytokines (IFN- γ , TNF- α) in middle-aged adults, and enhancement of anti-inflammatory cytokines (IL-4, IL-10) in young adults, along with reduced plasma peroxidation and oxidative stress levels [1].

Rasamis one such gem of a dish and classic example of traditional functional food with all its ingredients medicinally claimed for various ailments. It is a traditionally prepared soup using tamarind juice as a base, with the addition of

Indian sesame oil, turmeric, tomato, chili pepper, pepper, garlic, cumin, curry leaves, mustard, coriander, asafoetida, sea salt and water. It is traditionally used for the treatment of fever, common cold [16].

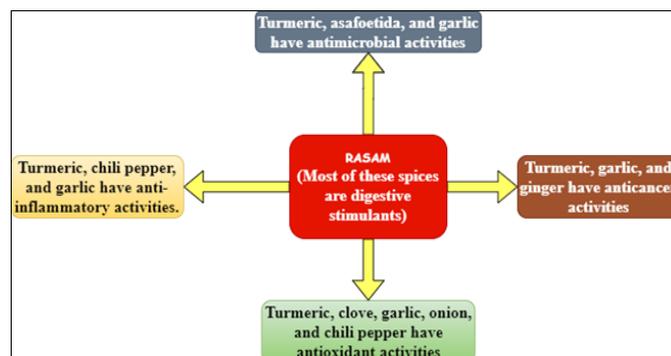


Fig 3: Rasam (A Soup of Spices) -Multiple Health Effects [16].

Inclusion of Milk, Curd, Buttermilk and Ghee plays an important role in Siddha daily dietary regimen. Especially *Therayarpiniyanugavidhi* which states that one should take diluted buttermilk and melted ghee, sufficient quantity of milk and milk products and should consume sour curd [10]. Sour curd and diluted buttermilk are rich in probiotics.

Milk products such as yogurt could also augment natural killer cell activity and reduce the risk of respiratory infections [17]. These kinds of traditional diet pattern play a major role in disease prevention. The South Indian traditional foods are based on Siddha system of medicine, which in natural way aims in achieving physical and mental wellness.

Daily dietary consumption of *Thirithodasamaporuttkal* (Spices that balance the three vital humours *Vatham, Pitham* and *Kabam*)--Cardamom, Turmeric, Cumin Seeds, Asafoetida, Dried Ginger, Fenugreek, Garlic, Black Pepper said to possess anti-microbial, antiviral properties which are used in the South Indian kitchen [2].

Once or twice a week, consider trying a healthy dish from other parts of the world. If one cannot follow these kinds of Siddha dietary pattern routinely or regularly for some reason or the other, one can try to follow the below recipes at least during this kind of pandemic situation.

Table 2: Alternate for Modern Recipes-Traditional Recipes

S.no	Unhealthy foods which are today's daily routine	Simple alternate traditional Healthy diet pattern	Reasons for switch-over from modern diet to Siddhadietary pattern
1.	Hot beverages, strong coffee, strong tea, and especially caffeinated soft drinks	<i>Chukka Thaeneer</i> (Dried ginger tea), <i>Koththumalli Vithai Kudineer</i> (Coriander seed decoction/tea), <i>Elumichai Thaeneer</i> (Lemon tea), <i>Puthina Thaeneer</i> (Mint tea), <i>Seeraga Thaeneer</i> (Cumin seed tea), <i>Notchi Kudineer</i> (Vitexnegundo concoction), <i>Athimathura Kudineer</i> (Liquorice concoction). Any one of the above in alternate pattern in 50ml dose.	These kinds of concoctions, teas or drinks are suited to our physiology, formulated to correct a specific imbalance, can assist in bringing our humours into balance. Most of these herbs are rich in antioxidants and they are specifically formulated according to the ancient preparation methods and they have the balancing effect.
2.	Breakfast including Poori, Bread with cheese or jam, Noodles, Processed foods	<i>Milagu Pongal- Sambar</i> , <i>Idli- Sambar/ Koththumalli Chutney</i> , <i>Saamai Upma -Inji Chutney</i> , <i>Idiyappam-Paasi Payaru Thuvaiyal</i> , <i>Thinai Arisi Kanji-Puthina Thuvaiyal</i> , <i>Ragi Idli-Sambar /Inji Chutney</i> , <i>Sigappu Arisi Puttu</i>	According to Siddha, each meal should contain all the six tastes: <i>Inippu</i> (sweet), <i>Pulippu</i> (sour), <i>Uppu</i> (salty), <i>Kaippu</i> (bitter), <i>Kaarppu</i> (pungent) and <i>Thuvarrppu</i> (astringent) [18]. It is a common view that raw veggies may contain more vitamins and nutrients. But they can be harder for human bodies to metabolize. Whether steamed or sautéed vegetables, the ancient unique methods of preparations have been designed in such a way that the human enzymes penetrate the cellular structure facilitating easy digestion and absorption.
3.	Cold beverages like Carbonated drinks, Refrigerated drinks,	<i>Nellikai Charu</i> , <i>Pazhacharu</i> , <i>Nannari-Lemon Juice</i>	
4.	Lunch like Polished rice recipes	<i>Varagarisi Sadham-Milagu Rasam/ Nelli Pachadi</i> , <i>Pudhina Sadham</i> , <i>Veppam Poo Rasam</i> , <i>Thinai Sadham-Kollu Rasam/ Koththamalli Chutney/ Kaikari Kootu</i> , <i>Karuppu Ulunthu Soru-Elluthuvaial/ Thuthuvilai Rasam/ Surai Kootu</i> , <i>Milagu Saadham-Thakkali Milagu Rasam/ Karuveppilai Thuvaiyal</i> , <i>Kaakari Sadham-Manathakkali Kootu/ Poondur Rasam</i> ,	

		<i>Karuveppilai Saadham-udhina Thuvaial/ Sirukeerai Thuvaram Paruppu Kootu/ Milagu Rasam</i>
5.	Evening snacks including Bajji, Bonda, Pakkoda, Biscuit	<i>Kondai Kadalai Sundal, Masala Aval, Sprouts, Verikadalai Sundal, Kaezhvaragu Puttu</i>
6.	Dinner including Chappathi, Parotta	<i>Sivappu Aval Kichadi, Kariveppilai Adai/ Vengaya Chutney Or Poondu Chutney. Saamai Dosai/ Kothumalli Chutney, Kaezhvaragu Dosai / Vengaya Chutney, Musumusukai Adai/Inji Chutney, Idiyappam Veg Kurma</i>

5. Naal Ozhukkam (Daily Regimen) -A Simple and Potential Way to Prevent Diseases

Daily regimen is an important and unavoidable factor accepted in causation of diseases. It is responsible for the various changes which results in manifestation of diseases. According to Siddha system of medicine one should follow *Nithya Ozhukkam* in order to lead a healthy and disease free life, by establishing the balance of **mukkutram* (three humours) *Vatham, Pitham* and *Kabam* which help to regulate

a person's biological clock and synchronize us to nature's circadian rhythms. (*When *Vatham, Pitham* and *Kabam* are in a perfect state of equilibrium, they are called *Uyir Thatthukkal* i.e. vital life factors and when their equilibrium is disturbed resulting in disease they are called *Mukkutram* [24]. Whatever activities are completed by an individual from waking up in the morning till retiring to bed at night are called *Nithiyaozhukkam* [2].

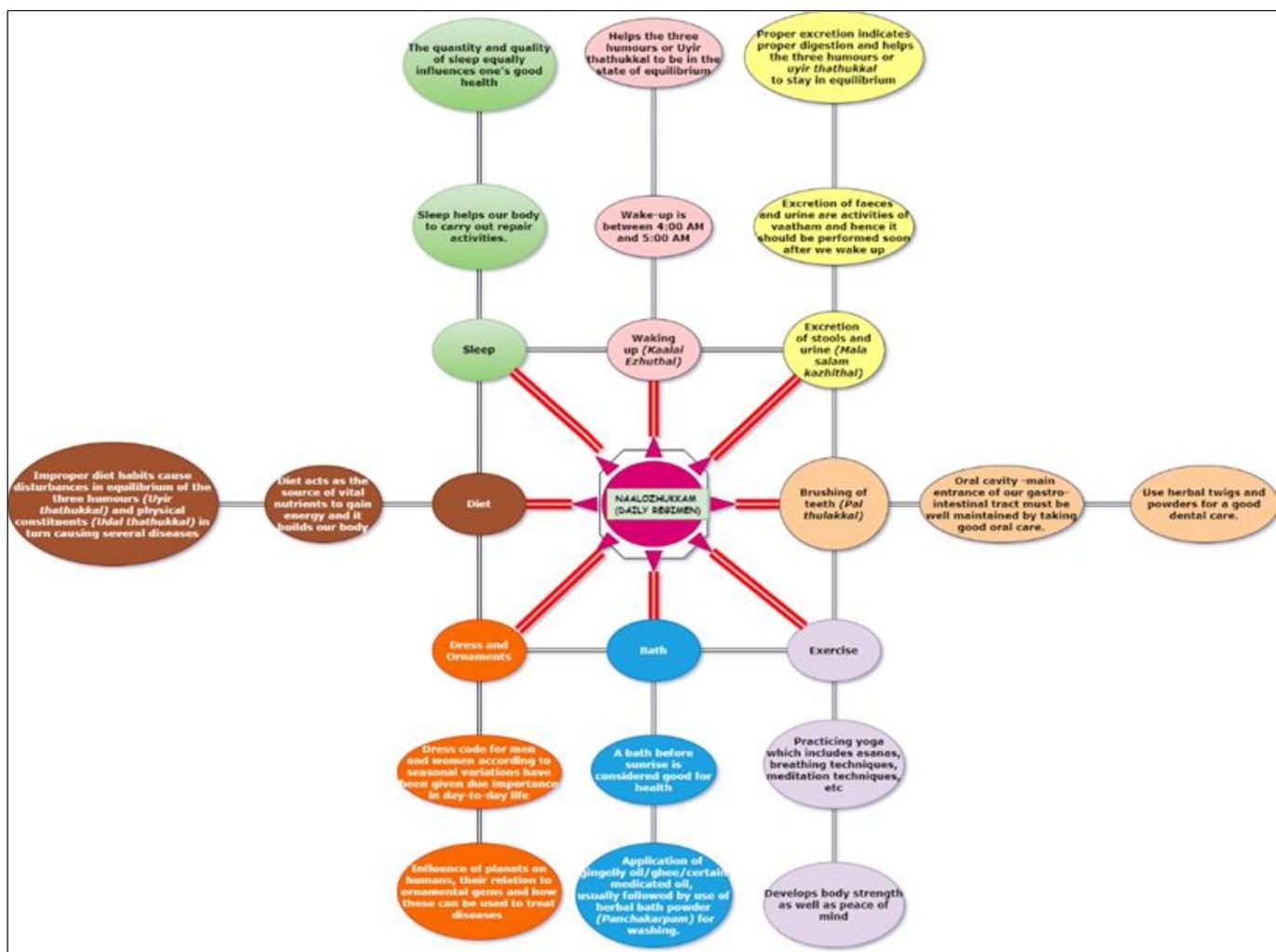


Fig 3: Naal Ozhukkam (Daily Regimen) [2].

6. Kayakarpam

Kayakarpam a unique treatment procedure in Siddha system of medicine has been recommended for normal individuals to boost their immunity, to promote general health, for prevention of diseases. Herbal, herbo-mineral and mineral preparations and preparations using animal products are used as *Kaaya Karpam*. In our daily routine, morning-(*Inji*) Ginger, afternoon-Dried ginger (*Chukku*) and in the evening Myrobalan (*Kadukkai*) should be consumed regularly for 48 days. This practice strengthens our immune system and these

drugs have immense value in various conditions. One should follow this *kayakarpam* methods to keep the body healthy. Among those herbs, mentioned above, the role of *Kadukkai* is supreme [19].

6.1. Kadukkai (Chebulic Myrobalan)

Particularly, *Kadukkai (Terminalia chebula Retz.)* has the capacity to keep our body, mind and soul immaculate. It relieves constipation, removes phlegm and accumulated toxins from our body. That's why it was called more than a

motherin *Agathiyar Gunavagadam* [20]. Several articles have shown that it possess antioxidant and free radical scavenging activity, anti-inflammatory, adaptogenic and anti-anaphylactic activity, gastrointestinal motility improving activity, immune modulatory activity and antiviral activity

1. Retroviral reverse transcriptase inhibitory activity
2. Protects epithelial cells against influenza A virus
3. Effective in inhibiting the replication of human cytomagalo virus *in vitro*
4. Herpes simplex virus both *in vitro* and *in vivo* [21].

The effects of seasons on the incidence of diseases have been defined and further, seasonal conduct has been advised to prevent these diseases. A single humour (Tamil: Uyirdhathu) dominates over the other two in a particular season and during any specific period of a day, and hence the food habits and other lifestyles must be tuned in accordingly for healthy living. The effects of seasons on the incidence of diseases have been defined and further, seasonal conduct has been advised to prevent these diseases. A single humour (Tamil: Uyirdhathu)

dominates over the other two in a particular season and during any specific period of a day, and hence the food habits and other lifestyles must be tuned in accordingly for healthy living. The effects of seasons on the incidence of diseases have been defined and further, seasonal conduct has been advised to prevent these diseases. A single humour (Tamil: Uyirdhathu) dominates over the other two in a particular season and during any specific period of a day, and hence the food habits and other lifestyles must be tuned in accordingly for healthy living. In our Siddha literature, the effect of seasons in the incidence of diseases have been defined and seasonal dietary guidelines and life style modifications have been followed by our ancestors to prevent diseases. A single vital humour dominates over the other two in a particular season and hence the food habits and lifestyle must be tuned accordingly for healthy living.

An easy and simple preparation method of *Kadukkai* serves as a wonder drug in curing and preventing diseases successfully in the respective seasons which has been shown in figure [22].

An easy and simple preparation method of *Kadukkai* serves as a wonder drug in curing and preventing diseases successfully in the respective seasons which has been shown in figure [22].

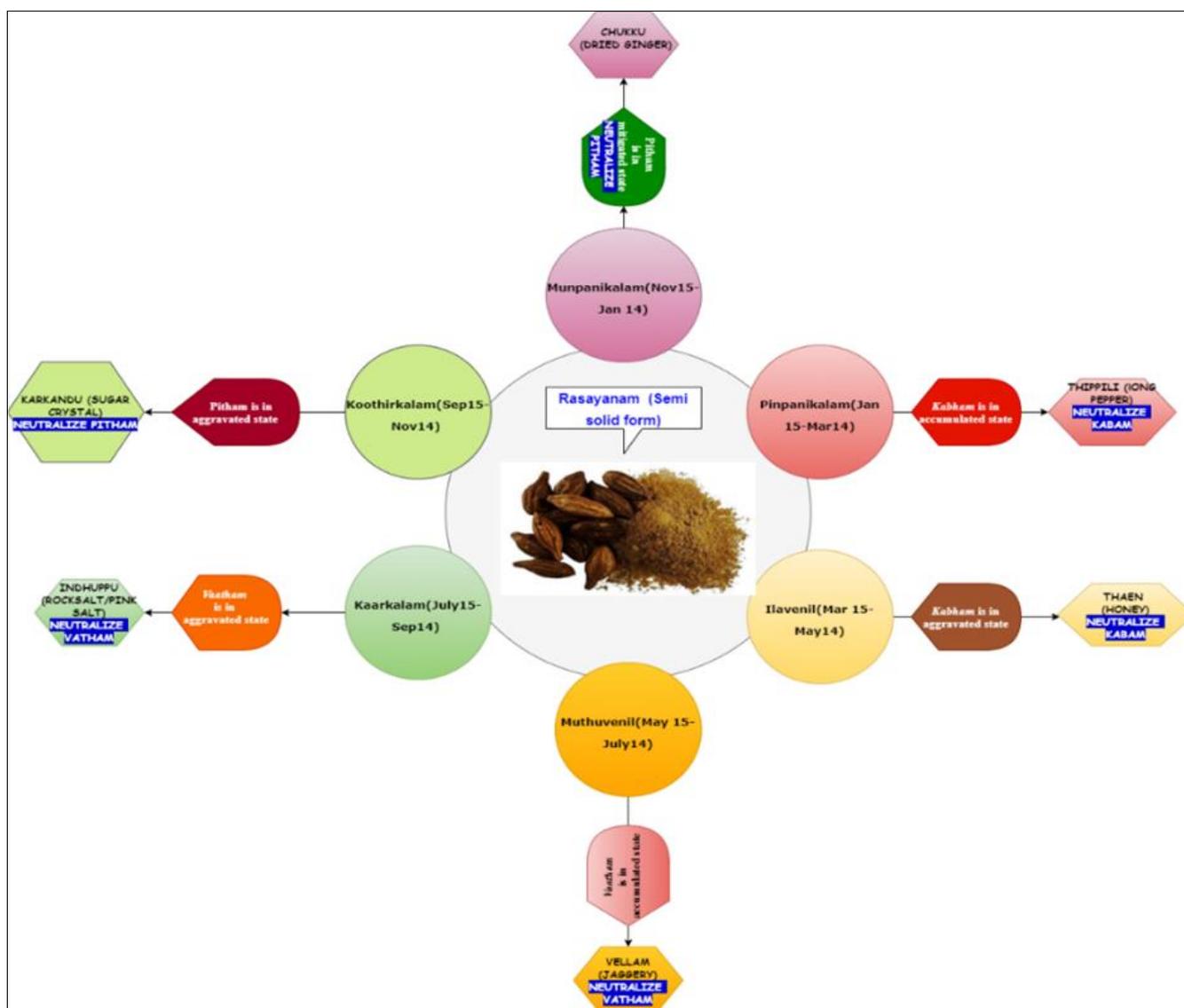


Fig 4: *Kadukkai* (Chebulic Myrobalan)-In Respective Seasons [22].

The human to human spreading of the virus occurs due to close contact with an infected person, exposed to coughing, sneezing, respiratory droplets or aerosols. These aerosols can penetrate the human body (lungs) via inhalation through the nose or mouth [23]. In Siddha classics several preventive

measures as detailed below have been given: *Vaanthi* (emetic medication)-once in six months, *Bedhi* (Purgative medication)- once every four months in a year, *Mai/ Kalikkam* (Collyrium-eye medications)- once in three days, *Nasiyam* (Liquid nasal application)-once in 45 days [2],

which block these entry portals and may help to improve the innate immunologic response of the mucus membranes and may thus inhibit the virus transmission to the lungs and these measures may hence function as physiological masks, prevent the viral invasion.

7. Discussion and Conclusion

Siddha science which visualizes man as a microcosm explains that planetary changes and natural rhythms which occur in six periods/day (*Siru Pozhuthu*) and six seasons/year (*Perum Pozhuthu*) also produce corresponding physiological changes in all the creatures living in macrocosm, viz., the Universe.

“*Andathilullathae Pindam, Pindathil Ullathe Andam...*”--*Satta Muni Gnanam*

This verse means that the environment is the same within and outside of an individual human being which indicates that the body physiology must be tuned according to the habitat and the prevailing season as an adaptive and preventive measure for maintaining one's health.

As three-quarters of the products sold by grocery stores in the popular cities in India (Delhi, Chennai, Mumbai and other cities) contain genetically-modified ingredients (many of the chemicals and pesticides), or synthetic (non-food) ingredients, they have been linked to numerous health issues. According to Siddha science and as per *Satta Muni Gnanam*, our human physiology is a reflection of the laws of the universe, and our lives are more in tune with nature. Every individual body possesses the natural intelligence to process the foods that are closest to nature, such as fresh whole grains and organically-grown fruits, greens and vegetables. This makes sense when we consider that we have evolved as a species over millions of years eating whole, natural foods. It is just in the last few hundred years that artificial ingredients and toxic pesticides have been introduced into the food chain.

It is critical to consider the impact of lifestyle habits, such as consumption of unhealthy diets, on the susceptibility to COVID-19 and recovery. Furthermore, the large number of people who will recover from COVID-19 may lead to a spike in chronic medical conditions that could be further exacerbated by unhealthy diets and lifestyle pattern.

In another side many companies (like Bharat Biotech and Sinopharm) around the world are working for the development of effective SARS-CoV-2 vaccines and antiviral drugs for Human coronaviruses. Till date there is no clinically approved antiviral drug or vaccine available to be used against COVID-19. Although vaccines are considered to be medicines with anti-infective activity that prevents diseases and designed to protect us from disease can also cause side effects ranging from mild fever and rash to seizure or life-threatening allergic reaction. Every epidemic, endemic or pandemic diseases end up with these kinds of treatment modalities. But through Siddha way of life we can lead a healthy life and protect us from these kinds of communicable and non-communicable diseases. A simple and effective dietary and lifestyle pattern on the basis of Siddha might be wise to adopt prophylactic and therapeutic strategies. A change in lifestyle pattern could also have long-term benefits on disease prevention, including COVID-19.

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