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Preventive measures to fight with COVID-19 through environmental parameters with the help of Ayurveda: A literary research article

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Abstract--COVID-19 is an emerging virus of now-a-days which causes severe lung infection. This mutated virus is very contagious in nature. Ayurveda since ancient times is serving humanity in a positive way. Rasa Shastra (pharmaceutics) is the branch of Ayurveda which deals with the manufacturing of different types of Aushadhies (medicines). By the process of Shodhana (purification), Marana (incineration) and Moorchhna (manufacturing) along with the help of cow dung cakes, many medicines are prepared. There are a lots of complicated and untreatable diseases which are possible to treat with the help of Rasa Shastra a branch of Ayurveda. There are many more processes by which diseases are treated indirectly by killing microorganisms outside the body of the host. This article is an attempt in a same way for dealing with the present threat of pandemic. According to the popular proverb “Diamond Cuts Diamond”, this animal virus can be controlled by another animal antidote. In old sacred religious books importance of almost every animal is described. New generations must follow the instructions given by the ancient sages in all the said ways to stay healthy.

Keywords--Ayurveda, animal, cow dung cakes, COVID-19, rasa shastra, pandemic.

Introduction

Since man has broken the boundaries of ecosystem to disturb the life of animals, it has reverted back always. Now animals are disturbing human's ecosystem in return. Since the beginning of 21st century, three coronaviruses have attacked human beings time to time i.e. SARS-CoV, MERS-CoV and SARS-CoV-2. SARS-CoV2 also known as COVID-19 has emerged as an epidemic (now converted to pandemic) in Wuhan, Hubei Province Of China in December 2019.¹ These days scientists, researchers and scholars worldwide are working round the clock to get rid of this problem. Due to the unknown nature of this virus many new clinical trials, new diagnostic techniques, new preventive measures, new pathogenesis route estimation and new therapeutic strategies are being developed. This virus is round or elliptical, pleomorphic form with diameter of 60-140 nm. It is sensitive to UV rays and heat.

It is single stranded RNA genome containing 29891 nucleotides encoding for 9860 amino acids. This virus is said to be originated in bats. Bats are reservoir host for this virus. It enters into host cell by the transmembrane spike (S) glycoprotein that forms homotrimers protruding from the viral surface. S comprises two functional subunits responsible for binding to the host cell receptor (S₁ subunit) and fusion of the viral and cellular membranes (S₂ subunit).² COVID-19³ has

- Spike (S) protein.
- Envelope (E) protein.
- Membrane (M) protein.

COVID-19⁴ can be classified as beta- coronavirus genus. It has also enveloped virions that measure approximately 50-200nm in diameter with a single positive-sense RNA genome. Club shaped glycoprotein spikes in the envelope give the virus a crown-like or coronal appearance.

Pandemic

Infection⁵ has very quickly increased between 20 Jan 2020 and 25 Jan 2020 according to National Health Commission in Wuhan. It caused total 1975 infections & 56 deaths in 26 days. Mortality rate is 2.84%. It is very contagious with attack on lower respiratory tract. On January 30, 2020, WHO declared it as PHEIC (Public Health Emergency of International Concern). Moreover WHO declared on February 28, 2020 it as a "very high level epidemic". The potential for this virus as a pandemic worldwide seems to be a serious concern for public existence. This virus is associated with an ongoing outbreak of atypical pneumonia that has affected over 90000 people and killed more than 3000 of those affected in more than 60 countries as of March 3, 2020.

Effect of Environmental Parameters on COVID-19

- Temperature – Higher the temperature lesser are the chances of survival of Covid because it is lipid enveloped single stranded RNA virus that are ~ 100nm in diameter. So 37 °C can hinder this enveloped virus survival. Low temperatures of 5-11°C (41-51°F) are best for their growth.
- Humidity – Similarly 85% of relative humidity also hinders flu viral survival.

Low Relative Humidity is favourable for virus survival.⁶

- Hypoxia – Hypoxia causes suppression of influenza virus replication.⁷

Composition of air⁸

- Nitrogen -78%
- Oxygen-21%
- Argon- 93%
- Carbon dioxide – 0.04%
- Traces – Neon , Helium, Methane, Krypton, Hydrogen, Water vapours.

Emerging Fact

Viruses with lipid envelopes will tend to survive longer at lower (20-30%) relative humidity. Aerosolized influenza virus survived longer at lower (15-40%) than higher (50-90%) relative humidity. Relative humidity describes the amount of water vapour held in the air at a specific temperature at any time, relative to the maximum amount of water vapour that air, at that temperature could possibly hold. At higher temperatures, air can hold more water vapours than at lower temperatures. Surprisingly viral survival was lowest in mid range (40-60%) of relative humidity at a temperature of 21 °C . Viral survival is highest at low (20-30%) relative humidity and moderate at a high (60-80%) relative humidity.

Moreover minimal survival for both lipid-enveloped & non-enveloped viruses occurs at an intermediate relative humidity of 40-70%. Viral⁹ survival decreases at moderate (20.5-24°C) then higher i.e. greater than 30°C temperature. Aerosol transmission is blocked at 30°C. Mid¹⁰ range of Relative Humidity i.e. approximately between 50-70% minimize survival of bacteria. On¹¹ experimental study on influenza virus there was decay rate when relative humidity was raised above 35%. At 50%, 65%,80% decay rate was approximately same.

Viability of air borne virus 0-23 hours after spraying

Temperature °C	Relative Humidity	Number of Tests	% age viable at given times (hours)						
			0	1/12	1/2	1	4	6	23
7.0-8.0	23-25	3	88	87	80	78	68	63	61
	51	3	66	49	75	61	39	42	19
	82	3	126	120	71	70	39	35	30
20.5-24.0	20-22	5	75	77	65	64	74	66	22
	34-36	3	86	93	58	59	66	53	14
	50-51	3	84	62	49	29	6.4	4.2	Trace
	64-65	3	77	45	29	15	6.6	3.2	N.D.
	81	4	67	55	22	13	6.4	5.0	Nil
32.0	20	3	87	70	56	45	18	17	1.3
	49-50	3	98	45	22	13	2.7	0.7	Nil
	81	3	91	50	15	6.6	Trace	Trace	Nil

N.D. – Not done.

Greenhouse Effect¹²

CO₂ causes about 20% of Earth's greenhouse effect. CO₂ molecules provide the initial greenhouse heating needed to maintain water vapour concentration. When CO₂ conc. drop, Earth cools so water vapour drops. When CO₂ conc. rise, air temp. goes up and more water vapours evaporate into the atmosphere which then amplifies greenhouse heating. CO₂ controls the amount of water vapours in the atmosphere & thus the size of the greenhouse effect.

Benefits

Due to this effect, ocean becomes acidic. Carbonic acid reacts with carbonate ions in water to form bicarbonates. Marine organisms need carbonate ions of water to form calcium carbonate shells. Therefore their shells will become more strong. Moreover more acidic water dissolves Calcium Carbonate. In the long run this reaction will allow ocean to soak up excess CO₂. An increase in CO₂ could increase growth by fertilizing those few species of phytoplanktons and ocean plants like sea grasses. With increased CO₂ plants will grow mostly called as carbon fertilization. Agriculture will grow more. Abandoned farm lands will revert to forests. So woody material builds up more for usage of humans.

Cow Dung Cakes¹³

- *Guna* (Quality) - *Laghu* (light).
- *Rasa* (Taste) - *Tikta* (bitter), *Kshaya* (astringent).
- *Vipaka* (Drug metabolism) - *Katu* (pungent).
- *Virya* (Potency) - *Ushna* (hot).
- *Prabhava* (Effect) - *Rakshoghna* (antimicrobial)
- *Doshghanata* (Functional energy) - *Kapha Shamaka* (suppresses mucus secretion)
- It is rich in Vit B12 , absorbs UV rays more and is antimicrobial.¹⁴

It¹⁵ is used as fumigating agent due to its quality of air purification, balancing atmospheric gases, destroying microbial growths in environment.

Laboratory Investigations

Cow Dung Sample of 250 gm was taken.

Test parameters

Proximate Analysis : Ash, volatile matter, fixed carbon, moisture .

Ultimate Analysis : CHNSO

Test Results¹⁶

Sr.No.	Parameters	Test Method	Unit	Results
Ultimate Analysis				
1	Carbon	CHNSO Analyser	%	35.45

2	Hydrogen	CHNSO Analyser	%	4.53
3	Nitrogen	CHNSO Analyser	%	0.82
4	Sulphur	CHNSO Analyser	%	0.16
5	Oxygen	By difference	%	37.47
Proximate Analysis				
1	Moisture	IS:1350(Part1)-1984(2 nd revision) Amendment-1 reaff 2013	%	20.90
2	Ash	IS:1350(Part1)-1984(2 nd revision) Amendment-1 reaff 2013	%	13.03
3	Volatile Matter	IS:1350(Part1)-1984(2 nd revision) Amendment-1 reaff 2013	%	51.21
4	Fixed Carbon	IS:1350(Part1)-1984(2 nd revision) Amendment-1 reaff 2013	%	14.86
5	Gross Calorific Value	IS:1350(Part1)-1984(2 nd revision) reaff 2017	Kcal/kg	3751

Conclusion

By giving fumigation with cow dung cakes help to increase atmospheric temperature, relative humidity and green house effect of required ratio with antimicrobial quality of air. Moreover due to UV ray's sensitivity of COVID-19 it can be destroyed more efficiently and effectively. Burning cow dung can help to destroy COVID-19 inside human being after inhalation of its fumes due to its qualities of Kapha Shamaka tendency . Moreover Cow is preferred for her Panchgavya i.e. milk, curd, ghee, urine and dung. According to our ancient sages every disease is curable with it . This effort can become a pillar of success for the scientists and researchers to fight with this deadly COVID-19 virus of this century.

Conflict of Interest

None.

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Indian Cows