Available online at *www.ujpronline.com*
Universal Journal of Pharmaceutical Research
An International Peer Reviewed Journal
ISSN: 2831-5235 (Print); 2456-8058 (Electronic)

RESEARCH ARTICLE

SUDANESE EXPERIENCE OF HERBAL FORMULAS USED DURING COVID-19 INFECTION

AzzaAbdelilah Ahmed Mohamed[1], Mai Abdalla Humaida[2], Ali Awadallah Saeed[3]
[1]*Directorate General of Pharmacy, Ministry of Health, Sudan.*
[2]*Pharmacy practice department, Faculty of clinical and industrial pharmacy, National University, Sudan.*
[3]*Pharmacology and therapeutics department, Pharmacy program, Napata college, Sudan.*

Article Info:

Article History:
Received: 4 August 2020
Reviewed: 13 September 2020
Accepted: 27 October 2020
Published: 15 November 2020

Cite this article:
Mohamed AAA, Humaida MA, Saeed AA. Sudanese experience of herbal formulas used during COVID -19 infection. Universal Journal of Pharmaceutical Research 2020; 5(5):39-42.
https://doi.org/10.22270/ujpr.v5i5.485

***Address for Correspondence:**
Ali Awadallah Saeed, Department of pharmacology and therapeutics, Pharmacy program, Napata college, Sudan, Tel: +249 0912320825, E-mail: *alimhsd@gmail.com*

Abstract

Objectives: Corona virus disease 2019 (COVID-19) outbreak is recent worldwide disaster which is considered by the WHO as Public Health Emergency of International Concern (PHEIC).
Method: A quick survey was done in Khartoum state for the commonly utilize herbs and the succeeded formulas, 652 people participated in this survey either they use these herbs for themselves or their relative use it during the symptoms of COVID-19.
Results: A 652 people participated in the quick survey for the commonly utilized herbs and the succeeded formulas either they use these herbs for themselves or their relative use it during the symptoms of COVID-19. Other products used as additives include (honey, vinegar, sesame oil, olive oil and salt).
Conclusion: Sudanese experience that various traditional herbs, usage and different route of administration can effectively alleviate primary symptoms e.g. fever, cough, fatigue and reduce probability of developing severe conditions.
Keywords: COVID-19, formula, herbs, Khartoum.

INTRODUCTION

The Novel corona virus disease 2019 (COVID-19) outbreak is the recent worldwide disaster which is considered by the WHO as Public Health Emergency of International Concern (PHEIC)[1.] First case was discovered in Wuhan City, China[2,3] and then after few weeks spread as a global pandemic[4,5].
The novel corona virus can live on hands, surfaces, objects, mucus membranes, body fluids, respiratory secretions, and spread through direct contact from person to person[6,7], which makes the most effective preventive measures are avoiding close contact with people, hand hygiene, clean and disinfect surfaces[8], as there is no specific treatment or vaccine for this virus until writing of this paper[8,10]. The first case of COVID -19 infection in Sudan was confirmed in 13th March 2020, but now the confirmed cases reached 11.496 case,with death 725 and 6001 recovered cases (29th July 2020 update), unfortunately there is about four thousand active cases. While worldwide totals cases reached 16.7m confirmed, 9.71 m recovered and about six thousand deaths (July 2020 update). There are four defined stages of COVID -19 infection in communities:
Stage 1: Imported cases in the community.
Stage 2: Local transmissions.
Stage 3: Transmissions among the community.
Stage 4: Epidemic and uncontrolled infections.
According to Sudan FMoH records and statistics we achieve stage 3 now.
Different people in different ways can be affected by COVID-19. Wide range of symptoms may be represented by infected people but they all declare that there are mild, moderate and severe symptoms. Mild and moderate symptoms appear generally after 2 to 14 days of exposure to virus and the symptoms like: cough, headache, fever or chills, runny nose or congestion, shortness of breath or difficult breathing, fatigue, muscle or body aches, new loss of taste or smell, nausea or vomiting, sore throat, diarrhea. Emergency signs and symptoms for COVID-19 includes: confusion, trouble breathing, persistent pain or pressure in chest, inability to arouse or stimulate, bluish lips or face.
Clinical manifestations demonstrate moreover three phases of patient infections:
Phase 1: Infection phase: (symptoms similar to cold and flu).

Phase 2: **Pulmonary phase:** (immune system strongly infected causing respiratory symptoms including low oxygen levels and formation of blood clots).
Phase 3: Hyper inflammatory phase: (causing injury to vital organs, cytokine storm where body attacks its own tissue)[6,7].

SUBJECTS AND METHODS

According to this pandemic infection many medicines were used wide world but unfortunately no definite treatment was subscribed till now, and only symptomatic treatments were used. Though many people seek for experienced herbs used to overcome the first signs of infection. A quick survey was done in Khartoum state for the commonly utilize herbs and the succeeded formulas, 652 people participated in this survey either they use these herbs for themselves or their relative use it during the symptoms of COVID-19. In the following databases: PubMed, Science direct and google scholar up to date search was made (August 2020) with the key words: *Acacia nilotica, Nigella sativa, Zingiber officinale, Syzygium aromaticum, Boswellia carterii, Hisbiscus sabdariffa, Citrus aurantiifolia, Camellia sinensis, Allium sativum, Adansonia digitata, Pimpinella anisum, Citrus aurantiifolia* and/or 'Virus' and 'Anti-virus effect' to investigate the anti-viral effects of these herbs.

RESULTS

A 652 people participated in the quick survey for the commonly utilized herbs and the succeeded formulas either they use these herbs for themselves or used by their relative during the symptoms of COVID-19. The Table 1 represents the herbs used for relieving COVID-19 symptoms as stated by people participated in the survey and the formula used. Other products used as additives include (honey, vinegar, sesame oil, olive oil and salt).

Literature review about pharmacological effect of herbs on viruses:

1. *Acacia nilotica:* *A. nilotica* belonging to family fabaceae, distributed mainly in tropical and subtropical region of the world, having ~1300 species worldwide.

Table 1: Herbs used for relieving COVID-19 symptoms.

S.N.	Herbs	Formula	Usage
1	*Acacia nilotica*	- Acacia Seeds - Acacia Powder +olive oil or sesame oil - Acacia Powder + warm salted water - Macerated Acacia seeds water - Acacia Powder +Nigella powder+ steam water	- Smoke, Lozenges - Paste applied at throat & or chest - Gargle - Antiseptic wash, - Inhaler
2	*Nigella sativa*	- Nigella Powder+ Acacia powder + tea+ salt+ sesame oil - Nigella Powder+ acacia powder+ steam water	- Paste applied at throat & or chest - Inhaler
3	*Zingiber officinale*	- Zinger powder + warm water - Zinger powder + honey - Zinger powder + lemon +warm water	- Tea - Tea spoon (Oral) - Tea
4	*Citrus aurantiifolia*	- lemon drops +vinegar drops +salt +warm water	- Gargle
5	*Syzygium aromaticum*	- Macerated Syzygium water - Syzygium steamed water	- Gargle - Inhaler
6	*Hisbiscus sabdariffa*	- Macerated Hisbiscus flower hot/cold	-Tea/ drink
7	*Adansonia digitata*	- Macerated Adansonia fruit	- cold drink
8	*Camellia sinensis*	- Tea + lemon drops - tea + salt + vinegar + sesame oil	- drink - Paste applied at throat & or chest
9	*Artemisia absinthium*	- tea spoon of Artemisia + tea spoon of nigella	- orally
10	*Allium sativum*	- Garlic clove	- orally
11	*Pimpinella anisum*	- Anise tea	- drink
12	*Boswellia carterii*	- frankins. excudate	- lozenges

A. nilotica is a species native to Africa and the Indian subcontinent. Different parts (leaves, root, bark, pods, seeds, flowers)of *A. nilotica* have been recommended for treatment of cancer, congestion, colds, coughs, diarrhea, dysentery, gallbladder, fever, hemorrhage, hemorrhoids, leucorrhea, small box, ophthalmia, sclerosis, tuberculosis and leprosy.[7]In addition it also possess anti-diabetic, anti-scorbutic, astringent, anticancer, antioxidant and antimicrobial properties[11]. Mona and *et al.*, found that *Acacia nilotica* has anti-influenza-virus activity and the extract inhibit viral replication and attachment[12].

2. *Nigella sativa:* Dicotyledon of the Ranunculaceae family, employed as a spice, food preservative, protective, curative for numerous disorders and have many medicinal properties in traditional medicine. In

review article conducted by Shamim Moolla *et al.*, seeds have wide therapeutic effects and have significant effects against many ailments such as skin diseases, asthma, jaundice, gastrointestinal problems, hypertension, anorexia, conjunctivitis, headache, dyspepsia, rheumatism, cough, intrinsic hemorrhage, diabetes, paralysis, bronchitis, amenorrhea, anorexia, influenza, fever and eczema. Most active constituent is Thymoquinone (TQ). Different extracts of N. sativa as well as TQ, have a broad antimicrobial spectrum, including Gram-negative, Gram-positive bacteria, viruses, parasites, schist soma and fungi[13]

3. *Zingiber officinale*: By blocking viral attachment and internalization Jung San Chang and *et al*., found fresh, but not dried, ginger is effective against human respiratory syncytial virus (HRSV)-induced plaque formation on airway epithelium[14].

4. *Citrus aurantiifolia:* Limon had the most antiviral activity and could reduce viral pathogenicity as 100 fold as stated by Seyedeh, three out of four of these extracts were found effective.[15]

5. *Syzygium aromaticum:* Clove (*Syzygium aromaticum*, *Myrtaceae*) oil contains eugenol which oily liquid proven as analgesic and antiseptic. Viral envelopes of freshly formed virons can be damaged by eugenol which cause inhibition of viral replication at the initial stage, active against Herpes simplex virus and demonstrated synergistic action with acyclovir. Herpes virus induced keratitis in mouse suppressed by eugenol[16]. The antiviral activity against HSV-1 and HSV-2 viruses were 25.6 µg/mL and 16.2 µg/mL for HSV-1 and HSV-2, respectively which are 50% inhibitory concentration values[3,8].

6. *Hisbiscus sabdariffa*

Anthocyanins, polyphenols, organic acids, and flavonoids bioactive compounds found in Hibiscus tea. The pH of hibiscus tea extract is acidic *in vitro*, and its rapid and potent antiviral activity[17].

7. *Adansonia digitata*

Symptoms of infectious diseases can be treated by Adansoniadigitata (Baobab) which is a traditional African medicinal plant.

Commercial standardized preparations of leaves, fruit-pulp and seeds of *Adansonia digitata* were acquired and extracted with three different solvents, water, methanol and DMSO. The leaf extracts had the most potent antiviral properties, especially the DMSO extracts and influenza virus was the most susceptible virus. Pulp and seed extracts were less active but significant when the extracts compared quantitatively for antiviral MIC (100) (minimal inhibitory concentration) values against influenza virus, herpes simplex virus and respiratory syncytial virus and for their effects on cytokine secretion (IL-6 and IL-8) in human epithelial cell cultures[18].

8. *Camellia sinensis:* Green tea is made from leaves of the *Camellia sinensis* plant with antibacterial and antiviral effects which attributed to polyphenols known as catechins which act by interfering with its replication cycle and formed by several isomers including (-) - epigallocatechin gallate (EGCG), (-) - epigallocatechin, (-) – epicatechin gallate, (-) - epicatechin, and (+) - catechin[19]

9. *Artemisia absinthium:* Coronavirus infections during the Sars-CoV and Mers-CoV outbreaks *Artemisia absinthium* used as traditional Chinese medicine.

The second most potent herbal medicine used on the 2005 Sars-CoV wasthe alcoholic extract of sweet wormwood (*Artemisia annua*)[20]

10. *Allium sativum:* Garlic has antiviral activity. Activity determined against herpes simplex virus type 1, herpes simplex virus type 2, parainfluenza virus type 3, vaccinia virus, vesicular stomatitis virus, and human rhinovirus type 2. Using direct pre-infection incubation assays found to have veridical effects for fresh garlic extract[21].

11. *Pimpinella anisum*: The oil obtained is Anisiaetheroleumby steam distillation and have pharmacological (antimicrobial, hepatoprotective, anticonvulsant, anti-inflammatory, antispasmodic, bronchodilator, estrogenic, expectorant and insecticidal) effects and clinical effects on nausea, constipation, menopausal period, virus, diabetes, obesity and sedative action[22].

12. *Boswellia carterii:* Boswellia resins which known as frankincense/olibanum obtained from trees of Boswellia. In laboratory *Boswellia serrata* gum resin showed antiviral activity against the mosquito-transmitted chikungunya virus (CHIKV) and vesicular stomatitis virus[23].

DISCUSSION

Fortunately, Sudanese experience that various traditional herbs usage and different route of administration effectively relieve fever, cough and fatigue which are primary symptoms and reduce the probability of developing severe conditions in the patients. Herbal therapy and herbal medicines are effective and preventive agents against Covid-19 which is supported by current pharmacological literature. Application of herbs and succeeded formulas has potential approaches to prevent infection and strength immunity revealing the Antiviral and Antimicrobial effects of many herbs against corona viruses. Different herbal extracts aligned with natural additives conclude effective herbal formulas assisting in reducing local transmission e.g. Herbal aerosols and herbal sanitizers.

The anti-influenza virus activity of essential oil vapors of Citrus, Anise Nigella, Eucalyptus and Syzygium have been confirmed by numerous studies. More social experienced investigate the effect of powdered dry herbs orally e.g. Hibiscus, Adansonia, Camellia and Artemsia, others like zinger and garlic are trailed fresh. Whereas other herbs administered in different forms gargle, smoke, lozenges and paste are shown in the table above.

CONCLUSION

Sudanese experience that various traditional herbs usage by different route of administration can relieve effectively fever, cough and fatigue primary symptoms and reduce probability of developing severe conditions in patients.

ACKNOWLEDGEMENTS

The authors extend their thanks and appreciation to the Napata college, Sudan to provide necessary facilities for this work.

AUTHOR'S CONTRIBUTION

Mohamed AAA: data curation, investigation, survey. **Humaida MA:** literature survey, data interpretation. **Saeed AA:** writing original draft, clinical work. All authors revised the article and approved the final version.

DATA AVAILABILITY

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

CONFLICT OF INTEREST

No conflict of interest associated with this work.

REFERENCES

1. Euro surveillance Editorial Team, note from the editors: World Health Organization declares novel coronavirus (2019-nCoV) sixth public health emergency of international concern, Euro Surveill, 2020 Feb;25 (5): pii= 200131e, *https://doi.org/10.2807/1560-7917. ES.2020.25.5.200131e.*
2. Zhu H, Li W, Niu P. The novel coronavirus outbreak in Wuhan, China. Global Health Res Pol 2020; 5:6: 1-3. *https://doi.org/10.1186/s41256-020-00135-6*
3. Jean-claude Perez, Wuhan Covid-19 Synthetic Origins and Evolution. Int J Res Granthaalayah 2020; 8(2): 285-324. *https://doi.org/10.5281/zenodo.3724003*
4. Anjorin AA. The coronavirus disease 2019 (COVID-19) pandemic: A review and an update on cases in Africa. Asian Pac J Trop Med 2020; 13(4):1-5.
5. Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK –seventh update, 25 March 2020, European center for disease prevention and control, 2020; 1-5. *https://doi.org/10.2807/1560-7917.ES.2020.25.12.2003261*
6. Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. J Dent Res 2020; 99(5):481-487. *https://doi.org/10.1177/0022034520914246*
7. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci 2020; 3; 12(1):1-6. *https://doi.org/10.1038/s41368-020-0075-9*
8. How to protect yourself and others, Centers of Disease Control and Prevention Coronavirus disease (COVID-2-19).
9. Beigel JH, Tomashek KM, Dodd LE, *et al*. Remdesivir for the treatment of Covid-19 preliminary report. The New England J Med 2020; 383:992-994. *https://doi.org/10.1056/NEJMc2022236*
10. Centers for disease control and prevention, information for clinicians on investigational therapeutics for patients with COVID-19.
11. Gupta D, Goel A, Bhatia AK. Studies of anti viral property of *Acacia nilotica*. J Environ Res Dev 2010; 5(1):141- 152.
12. Liu G, Xiong S, Xiang YF. *et al*. Antiviral activity and possible mechanisms of action of pentagalloylglucose (PGG) against influenza A virus. Arch Virol 2011; 156, 1359–1369. *https://doi.org/10.1007/s00705-011-0989-9*
13. Molla S, Azad MAK, Al Hasib MAA, *et al*. A review on antiviral effects of *Nigella sativa* L. Pharmacol Online 2019; 2:47- 53.
14. Chang JS, Wang KC, Yeh CF, *et al*. Fresh ginger (*Zingiber officinale*) has anti-viral activity against human respiratory syncytial virus in human respiratory tract cell lines. J Ethinopharmacol 2013; 145(1):146-51. *https://doi.org/10.1016/j.jep.2012.10.043*
15. Reza E, Tofighi, Ebrahimian M, *et al*. Antiviral activity of *Citrus Limon, Matricaria recutita* L., *Allium ascalonicum* L., and *Rosa damascene* against Newcastle Disease Virus, November 2014
16. Kannissery P, Shahid HA, Ali J. Eugenol: a natural compound with versatile pharmacological actions. Nat Prod Comm 2010; 5(12):1999- 2006. *https://doi.org/10.1177/1934578X1000501236*
17. Takeda Y, Yuko O, Hiroto N, *et al*. Antiviral activities of *Hibiscus sabdariffa* L. tea extract against human Influenza A virus rely largely on acidic ph but partially on a low-ph-independent mechanism. Food Env Virol 2020; 12: 9–19. *https://doi.org/10.1007/s12560-019-09408-x*
18. Selvarami V. Multiple inflammatory and antiviral activities in *Adansonia digitata* (Baobab) leaves, fruits and seeds. J Med Plant Res 2009;3(8): 576- 582.
19. Mahmood MS, Mártinez JL, Aslam A, *et al*. Antiviral effects of green tea (*Camellia sinensis*) against pathogenic viruses in human and animals (a mini-review). African J Trad Comp Alt Med 13(2):176. *https://doi.org/10.4314/ajtcam.v13i2.21*
20. Peter H. Seeberger, Artemisia annua to be tested against coronavirus, Max- Planck- GESELLSCHAFT, April 18 2020
21. Weber ND, Andersen DO, North JA, *et al*. *In vitro* virucidal effects of *Allium sativum* (Garlic) extract and compounds. Planta Med 1992; 58(5): 417-423. *https://doi.org/10.1055/s-2006-961504*
22. Khaled Mohamed Mohamed Koriem. Approach to pharmacological and clinical applications of *Anisi aetheroleum*. Asian Pac J Tropl Biomed 2015; 5(1): 60-67. *https://doi.org/10.1016/S2221-1691(15)30172-6*
23. Rhein CV, Weidner T, Martin J, *et al*. Curcumin and *Boswellia serrata* gum resin extract inhibit chikungunya and vesicular stomatitis virus infections *in vitro*. Antiviral Res 2015; 125. *https://doi.org/10.1016/j.antiviral.2015.11.007*