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# Anti-oxidant Potential of Potable Alkaline Water Against Viral Infections (COVID-19): A Review

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**Abstract:** *Coronavirus disease 19 (COVID-19) is an actively transmittable and pathogenic viral contamination that results in an intense acute respiration syndrome. It emerged in Wuhan, China, and has spread throughout the world. The genomic analysis has discovered that it is phylogenetically connected with severe acute breathing syndrome-like. By consequence, bats have been the feasible primary reservoir and human to human transmission has been confirmed broadly. Currently, there have been cases of no approved antiviral drug or vaccine clinically. Under the nature of this review, the summary, emergence, and pathogenicity of COVID-19 contagion have been outlined with reference to alkaline water therapy as a potential systemic pH suppressant that could inhibit the activities of the virus.*

**Keywords:** Coronavirus, pH, alkaline water, Wuhan-china, anti-oxidant.

## 1.0 INTRODUCTION

Coronaviruses belong to the Coronaviridae's family within the nidovirales order. It is characteristic of the crown-like spikes on the outer boundary; hence the name coronavirus. Coronaviruses are minute in size (65–125nm diameter) with the incorporation of an isolated-stranded RNA as a nucleic entity, size starting from 26 to 32kbs in length. The subgroups of coronaviruses circle are alpha (a), beta (b), gamma (c), and delta (d) coronavirus [1]. The intense respiratory syndrome coronavirus (SARS-CoV), H5N1 influenza A, H1N1 2009, and center east respiratory syndrome coronavirus (MERS-CoV) induce acute lung injury and respiratory distress syndrome (ARDS) which ends up as a pulmonary failure with fatality[1]. Those viruses were concept to infect animals until the world witnessed a severe respiratory syndrome (SARS) outbreak resulting from SARS-CoV, 2002 in Guangdong, China [3]. Over the years, new highly pathogenic coronavirus, branded as middle east respiratory syndrome coronavirus (MERS-CoV) prompted a virus in middle eastern international locations [4]. Recently, towards the end of 2019, Wuhan a rising commercial hub of China skilled an outbreak of a unique coronavirus that killed extra than eighteen hundred and infected over seventy thousand individuals in the first fifty days of the epidemic [1]. The unconventional virus was renamed as Wuhan coronavirus or twenty nineteen unique coronaviruses (2019-nCoV) by the Chinese researchers [1]. The global committee on taxonomy of viruses (ICTV) named the virus as SARS-CoV-2 and the sickness as COVID-19 [4]. According to records, SRAS-CoV (2003) infected 8,098 individuals with a mortality rate of 9%, across 26 countries in the world, then

again, novel coronavirus (2019) infected one hundred twenty thousand individuals with a mortality rate of 2.9%, across 109 nations [1]. It shows that the transmission rate with SARS-CoV-2 is greater than SRAS-CoV which might due to the genetic recombination at S protein inside the RBD area with SARS-CoV-2.

The supply of origination and transmission is critical to be defined to increase preventive strategies to incorporate the infection. The case of SARS-Cov induced researchers to target on raccoon dogs and palm civets as the major and primary agent of infection. Meanwhile, the simplest of the remoted samples showed delightful results for viral RNA detection, suggesting that the civet palm is probably the secondary hosts [1]. In 2001, samples were remoted from healthy individuals in Hongkong and the molecular assessment showed a 25% magnitude of antibodies closer to sars coronavirus. These indications cautioned that SARS-coronavirus can be circulated before the outbreak in 2003 [1]. Subsequently, rhinolophus bats had been found to have anti-SARS-CoV antibodies suggesting bats as a supply of viral replication [1]. The middle east respiratory syndrome (MERS) coronavirus first emerged in 2012 in Saudi Arabia [4]. MERS-coronavirus also pertains to beta-coronavirus and having camels as a zoonotic supply and number one host [1]. MERS-coronavirus become additionally detected in Pipistrellus and Perimyotis bats, proffering that bats are the key host and transmitting medium of the virus [1]. To begin with, a set of researchers recommended snakes as the feasible host, however, after the genomic similarity of novel coronavirus with SARS-like bat viruses supported the assertion that now not snakes but bats as the primary host

[1]. All coronaviruses include unique genes that translate proteins for viral replication, nucleocapsid, and spikes establishment [1]. The glycoprotein spikes on the outer surface of coronaviruses are chargeable for the connection and entrance of the virus with the host cells. The receptor-binding area (RBD) is loosely attached among viruses, consequently, with the virus infecting more than one host [1]. Other coronaviruses primarily recognize aminopeptidases or carbohydrates as a key receptor for entry to human cells while SARS-CoV and MERS-CoV apprehend exopeptidases [1]. The access mechanism of a coronavirus depends upon cellular proteases which consist of, human air route protease (HAT), cathepsins, and transmembrane protease serine 2 (TMPRSS2) split the spike protein and establish in addition penetration changes [1]. MERS-coronavirus employs dipeptidyl peptidase 4 (DPP4), at the same time as HCoV-NL63 and SARS-coronavirus require angiotensin-converting enzyme 2 (ACE2) as a key receptor [1].

But, there are few serums and vaccines for SARS-CoV-2 as research teams worldwide are occupied to analyze the key functions, pathogenesis, and remedy alternatives as it is deemed vital on healing alternatives and cross-resistance of different vaccines. Nevertheless, there are possibilities that vaccines for different diseases along with rubella or measles can create cross-resistance for SARS-CoV-2 [1]. This proclamation is based on the observations that kids in china were less at risk of infection in comparison to the elder population, whilst children are being in large part vaccinated for measles in China [1]. Delivery of the internal nucleocapsid of enveloped viruses into the host cellular calls for virus binding to mobile receptors accompanied by using the merging of viral and mobile membranes. Both of these events are mediated by viral surface glycoproteins [1]. For coronaviruses, these functions are supplied by an unattached glycoprotein termed S (spike). Following receptor binding, S mediates a pH-unbiased fusion reaction which initiates the delivery of infectious virion RNA to host cytosol [1]. This fusion reaction is likewise comfortably obtrusive overdue inside the infection cycle, while S expression at the cell surface affects the infusion of plasma membranes and formation of multinucleated syncytia [1]. Thus, S-mediated coronavirus fusion differs from the acid pH established fusion determined amongst a ramification of other enveloped RNA viruses, which include orthomyxo-, toga-, and rhabdoviruses [1]. Acid pH-based fusion happens simplest after internalization of the virus in acidic endosomes, where protonation of crucial residues on a viral envelope glycoprotein alters its conformation and exposes a hydrophobic "fusion peptide" area [1]. Viruses require acid publicity to activate fusion generate multinucleated syncytia simplest after deliberate reduction of extracellular pH.

#### **pH and man's health system.**

Body's way of reacting to foreign substances and xenobiotics via respiration, eating, and ingesting will harm the cells and immune mechanism over time. It is not always the bacteria or the viruses that produce the disorder, it is the byproducts of the microorganisms enactment with the malfunctioning of the cells that absolutely induces the ailment. If the body's general metabolism and pH are perfectly balanced, the risk of infection or sickness is significantly under control [5].

pH drastically affects man's state of health as between 7.35 to 7.45 is the quality level of pH in withstanding disorder and triggering the symptoms of the disease. Any point below 7.35 implies a serious state of disease [5]. When blood is acidic, acid waste is driven into the tissue cells, compromising them through the years causing cell corrosion and depletion.

Similarly, when tissue pH deviates towards the acidic line, general metabolism will be hampered and oxygen deprivation will occur. Acidity and lack of oxygen are suitable environmental circumstances for morbid microforms to flourish [5]. Acute or recurrent ailments and infections attempt to organize nutrients sediments from all parts of the body [5]. In other words, the body might also throw off acidic wastes via the skin, producing signs and symptoms like eczema, dermatitis, acne, and different skin issues.

#### **Acid related degenerative disease**

Morbid wastes and pollutants produce potent acidic by-products, which equally compromise pH level and create disruption with the body biosystems [5]. Toxic wastes build-up diseases from the interior as the acidic environment of the body catalyze the development and progression of all disease. Moreover, other contributing elements from external factors like trauma, airborne microforms, air pollutants, radiation, chemical compounds, and drugs all offer acidic impressions [5]

Toxic waste nature within the surroundings supports the morbid modifications of germs to microorganisms, bacteria to viruses, viruses to fungal forms, and fungal activities to most cancers cells [5].

#### **Basic homeostatic adaptation responses that contest to maintain pH balance in situ.**

1. pH bodily fluids including alkaline water,
2. Elimination of bicarbonate salts from the pancreas into the blood (an alkalizing agent)
3. Protein performing as buffers within the cells, neutralize, or binding acids throughout the body system.
4. Electrolytic buffers: sodium, calcium, and potassium activate the blood, lymph, extracellular and intracellular fluids to neutralizes acids.
5. Isolation of magnesium and calcium from skeletal bones and teeth to neutralize acids in the blood.
6. Filtration and removal of acidic residues through the skin, urinary tract, and respiration.

7. Pushing blood acid residues and gathered pollutants into outer extremities faraway from essential organs.[6]

### Selective indices of acidic pH

With the early degrees of acidic pH in the body's tissues, the warning signs include pores and skin eruptions, complications, allergies, colds, flu, and sinus complications. These signs are regularly dealt with by antibiotic drugs and suppressive medicines. With persisted suppression of the caution signals of an acidic and nutrient deficient surroundings, greater extreme signs arise as the ailment is pushed deeper. On account of bad perfusion and increased acid production, the extracellular pH of tumors as an example is typically acidic [7]. Notwithstanding, maximum in-vitro experiments are nonetheless accomplished on the noticeably alkaline pH of 7.4.[7].

### Concept of alkaline potable water

The pH level measures how acidic or alkaline a substance is on a scale of zero to fourteen. In different phrases, materials with a pH of 1.0 will be very acidic and 14 very alkaline. Alkaline water has a better pH level than normal drinkable water [8]. Due to this, a few advocates of alkaline water believe it may neutralize the acid level within the body. Regular drinking water generally has an impartial pH of 7[9]. Alkaline water commonly has a pH of 8 or 9 [9]. However, alkaline water should also include alkaline minerals and bad oxidation-reduction potential (ORP) which is the capability of water to act as an antioxidant [9]. In the meantime, there is research that suggests alkaline water to be probably beneficial for certain situations. A study in 2012 found that ingesting carbonated artesian-well alkaline water with a pH of 8.8 may additionally deactivate pepsin, the principal enzyme that causes acid reflux disease[10]. Another study suggested that drinking alkaline ionized water may have benefits for people with high blood pressure, diabetes, and high cholesterol [9].

A more recent study that included 100 people found a significant difference in whole blood viscosity after consuming high-pH water compared to regular water after a strenuous workout [9]. Viscosity is the direct measurement of how efficiently blood flows through the vessels. Those who consumed high-pH water reduced viscosity by 6.3 percent compared to 3.36 percent with standard purified drinking water [9]. This means blood flowed more efficiently with alkaline water and can increase oxygen delivery throughout the body. However, more research is necessary beyond these studies. In particular, research is needed to answer other claims made by alkaline water enthusiasts.

Despite the lack of proven scientific research, proponents of alkaline water still believe in its proposed health benefits that include: anti-aging properties, colon-cleansing properties, immune system support, hydration, skin health, detoxifying properties, weight loss and cancer resistance[9]. They also

argue that soft drinks, which are notoriously acidic, have very positive ORPs leading to many health problems, while properly ionized and alkalized waters have highly negative ORPs [9].

Water that is certainly alkaline occurs while water passes over rocks like springs and adhering with minerals that enhance its level of alkalinity. Meanwhile, selective individuals who drink alkaline water purchase the type that has been modified via a chemical technique called electrolysis [9]. This technique makes use of a product called an ionizer to elevate the pH of potable water. Makers of ionizers say that electric power is used to separate molecules with the water that are extra acidic or alkaline[10].

### Alkaline Water as Anti-Oxidant

Oxidation-reduction potential (ORP) is a parameter that measures the antioxidants in water by means of checking out its electrical conductivities as unsafe radicals due to the beneficial antioxidants. Antioxidants resist diseases like cancer, cardiovascular disease, and immune disorder [11]. Generally, public water sources comprise chloride that kills microorganisms, but harmful in big portions. It combines with hydrocarbons to provide carcinogenic chlorinated hydrocarbons. Similarly, charcoal filters filter out chloride until all of the carbons are used up. Reverse Osmosis filters put off all treasured minerals. Deionized and distilled water is absolutely worthless. Treated smooth water replaced calcium with sodium ions with chloride and greater acidic radicals.

As well, 97 percent of our meals are carbon, nitrogen, hydrogen, and oxygen at the same time where the best 3 percent are alkaline minerals with acidic waste [12]. Selected and identified advantages of drinking alkaline water are ;

1. Supports and strengthens the immune device.
2. Supports and enhances essential mineral bio-availability.
- 3.. It improves strength and stamina.
4. Maintain adequate hydration.
5. Attacks free radicals [9].

Although alkaline potable water is considered safe and as well may additionally result in terrible side consequences barely such as lowering of acceptable stomach acidity, which helps kill bacteria and expel other undesirable pathogens from the bloodstream [9]. Moreover, usual extra alkalinity within the body may additionally cause gastrointestinal issues and skin irritations as immoderate alkalinity might also agitate the body's everyday pH, leading to metabolic alkalosis, a condition which can produce the subsequent signs and symptoms of nausea, vomiting, hand tremors, muscle twitching, tingling in the extremities or face and confusion [9].

Alkaline water can be offered in many grocery or health meals stores. It could additionally be located on-line as water ionizers are offered in many shops. Even though lemon and lime juices are acidic, they include minerals that could create

alkaline byproducts once digested and metabolized. Adding a squeeze of lemon or lime to a glass of water could make your water extra alkaline as your body digests it. The addition of pH droplets and sodium bicarbonate are easy alternatives approach to the production of alkaline water. If

water is well filtered to get rid of contaminants, ionized and re-mineralized, or bought from a fine source, there's no proof to indicate a limitation on how a good deal alkaline water may be consumed every day [13].


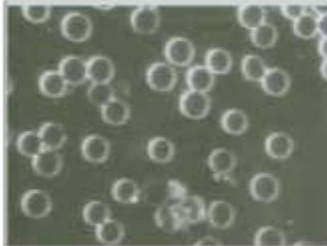
Dehydration	Alkaline water (25minutes)
	
Platelet aggregation	Controlled platelet aggregation
Acidic blood system	Alkalize blood system
Diabetes, Inflammation, infections, Cancer, flu etc.	Improved and purified blood circulation

Figure 1. Effects of dehydrated and alkaline water conditions on man in situ. [14]

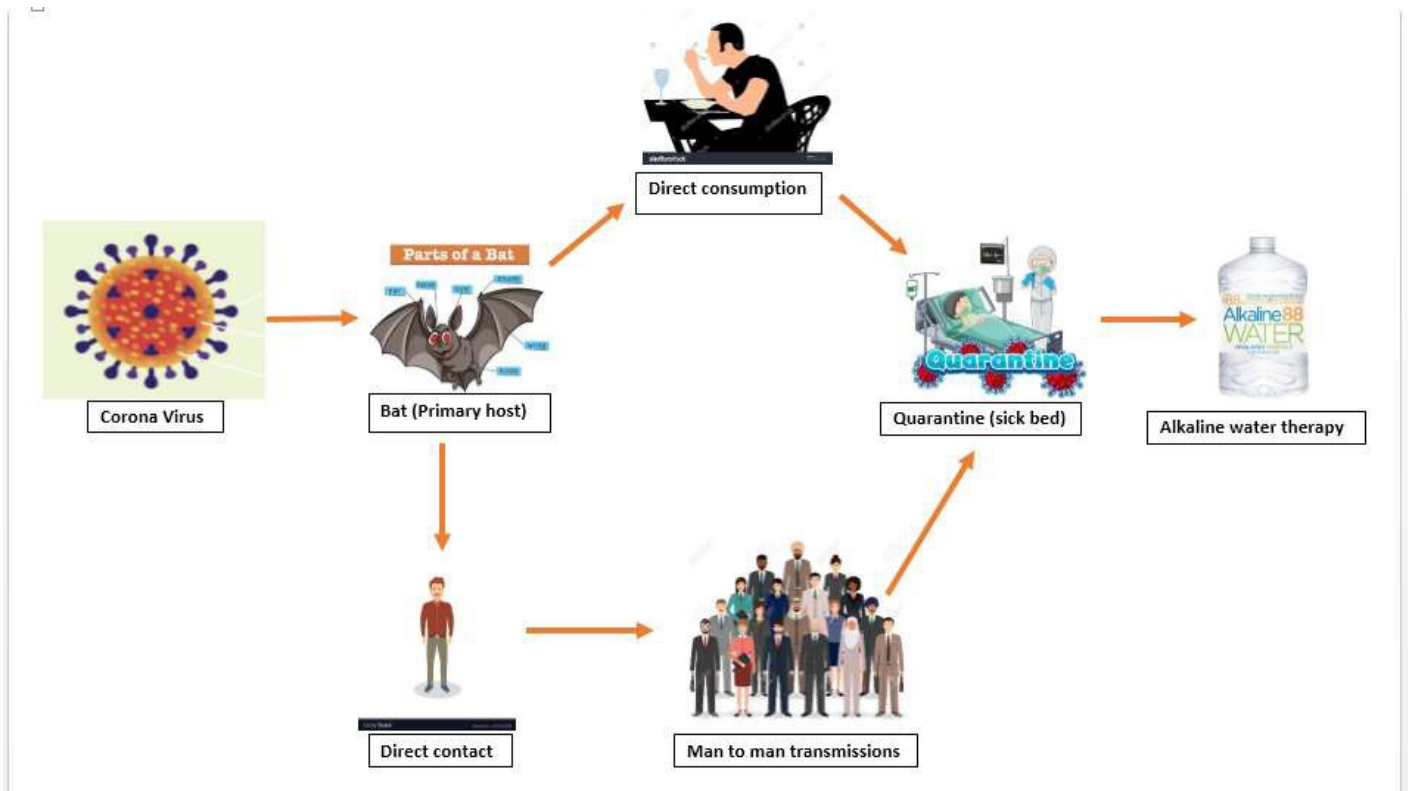


Figure 2. Schematic diagram of the cycle of infection with possible alkaline water therapy

## 2.0 CONCLUSION

The novel coronavirus originated from the human seafood market at Wuhan, China where bats, snakes, raccoon dogs, palm civets, and other animals are offered. Until now, no promising scientific remedies or prevention techniques have been innovated. However, scientists and researchers are running to broaden efficient treatment strategies to cope with the novel coronaviruses.

Our modern-day world essentially feeds on acid-producing foods that immediately or silently preserve chemical pesticide residues and many chemical additives. Almost all toxic wastes that get into man's body system contribute to a shift in the pH levels.

Three major factors that aid infections with men have been identified as oxidation, acidification, and dehydration.

Ionized and alkaline water has been identified as a panacea to most human diseases.

## 3.0 RECOMMENDATIONS

Man's ultimate task is to manage and preserve his health, the following recommendations have been observed:

- There need to be a whole ban on utilizing wild animals and birds as a source of meals
- Avoiding processed and fried foods, smooth liquids and strength beverages
- Restrict or avoid alcohol
- Avoid smoking
- Less intake of meat (20%) extra end result and vegetables (80%)
- Routine intake of ionized and alkaline water

As these have a higher probability of significantly managing and perhaps controlling the manifested indicators of COVID-19 [9].

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