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The Right Watery Solution Concentrations for Disinfecting Environment from COVID19.

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ABSTRACT— In this experimental study, we focused on methods of infection control through traditional disinfectant, in an attempt to contain the spread of the disease, which is increasing around the world. Previous studies focused on the different versions of the Coronavirus that appeared from 2003, and the results were similar in terms of prevalence and ways to resist infection on contaminated surfaces, so we assume that these conclusions apply to the new version of the virus because it belongs to the same family of Corona. The study conducted on different disinfection solutions have shown that antiseptics contain The Sodium Hypochlorite of concentration (0.1%) is a magic way for killing covid19 or Coronavirus, this concentration was done by mixing different quantity of bleach and water to reach the right concentration of (0.1%) of Sodium Hypochlorite; of a mix (100 ml) of bleach bottle of (1%) with (900 ml) of water, mix (50ml) of bleach bottle of (2%) with (950 ml) of water, mix (33 ml) of bleach bottle of (3%) with (967 ml) of water, mix (25 ml) of bleach bottle of (4%) with (975 ml) of water, and mix (20 ml) of bleach bottle of (5%) with (980 ml) of water. The (concentration 0.1%) effective against coronaviruses. According to various studies, if infected contaminated surfaces and areas are cleared with appropriate concentrations of these disinfectants, they reduce the number of infectious coronaviruses particles to only a few within one minute. So it is very easy to eliminate them with disinfectants of any type affect this virus and reduce its focus on surfaces, but It is preferable to be in suitable concentrations, to eliminate the virus.

KEYWORDS: sodium hypochlorite, Bleach Bottle, Water, disinfecting action, covid19.

INTRODUCTION

Today, the outbreak of the Coruna Virus is an international problem that threatens public health, not only because of what is happening in China. Rather, it is a cause for concern because of the threat it poses to other countries, especially countries with weak health systems. The emerging coronavirus, such as the SARS virus and MERS syndrome, can remain active and infectious on contaminated metal, glass or plastic surfaces for up to 9 days on average at room temperature between 15 and 20 ° C in The average. However, if the contaminated surface temperature drops to 4 ° C, the virus can remain active for up to 28 days, while the infection rate decreases if the surface temperature ranges between 30 and 40 ° C [1]. Due to the lack of specific treatments for the "COVID 19" virus, early containment and spreading prevention will be necessary to stop the ongoing outbreak and control of this infectious disease. It can be spread by contaminated hands and surfaces, which are frequently touched. In hospitals, door handles can be, for example, in addition to fixed-telephone keyboards, tables, bed frames and other items in the patient's area, often made of metal or plastic [2]. Sodium hypochlorite is a chemical compound whose chemical formula is NaClO, it consists of the cation (ion positive charge) + Na and negative ion -ClO, and it can also be classified as one of the sodium salts of hypochlorous acid. It is usually known as the ovary when dissolved in water [3]. sodium hypochlorite is practically and chemically different from chlorine. The sodium hypochlorite compound is used as an antiseptic or as a bleaching agent [4].

A weak solution of 2% home bleach in warm water is used to disinfect smooth surfaces before fermenting beer or wine. Purge will be done to these surfaces that add flavors to the drink. The byproducts of the chlorinated surfaces are also harmful so they must be disposed of. The way the sodium hypochlorite disinfectant works is similar to acid. In USA regulations, devices that manufacture foodstuff are allowed to be bleached with a solution containing bleach, taking into account that the solution is discharged from the tools before the tools come into contact with the foodstuffs and that the solution does not exceed 200 ppm of the remaining chlorine [5]. If higher concentrations are used in surfacing, the surfaces should be rinsed with clean water after sterilization. Dilution of one part of the home bleach with four parts of water (1: 4) gives an effective solution against many bacteria and some viruses, and such a solution is usually used to clean surfaces in hospitals - specifically in the United States of America -. If the solution remains on a surface that may corrode it, ethanol is used as a second buffer after bleach. Liquids containing sodium hypochlorite are used as the main high element also for home cleaning and disinfection [6]. The study aims to explain the methods of preparing the right concentration of the disinfectant solution in a laboratory that can eradicate covid19.

2, Materials and Methods

-study design: an experimental study.
-period of the study: from (1/1/2020) to the (20/3/2020).

2.1 Materials

Name of apparatus	Chemical materials
1000 ml flask	**Bleach Bottle 1%, 2%, 3%, 4%, 5%**
pipette	
100 ml flask	
PH meter	

2.2 Methods

The experiment was done in the laboratory at the same practical conditions of PH and temperature and in different bleach bottle concentrations of 1%, 2%, 3%, 4%, 5%.

- The method for prepare (0.1%) Concentration of disinfecting water solution from Bleach Bottle (sodium hypochlorite) of (1%) concentration.

1- The (100 ml) of bleach solution into the flask with a pipette was added.
2- 900 ml of water was placed in another flask with pH (7.5).
3- The bleach solution was mixed with water, making the amount of (1000 ml).
4- The result was 0.1% of the disinfecting solution of sodium hypochlorite.

Another bleach bottled concentration of (2%, 3%, 4%, and 5%) was dealing in the same way above with a change of the quantity of water (950%, 967, 975, and 980 respectively).

2.3 Statistics

Descriptive statistics were used in this study.

3. Results

Table (1): The way to prepare (0.1%) Concentration of disinfecting water solution of sodium hypochlorite from Bleach Bottle to get disinfecting action for kill covid19.

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Concentration Bleach Bottle (% sodium hypochlorite)	The Amount from Bleach in (ml)	Mixing Water in (ml)	Total (ml)
1%	100	900	1000
2%	50	950	1000
3%	33	967	1000
4%	25	975	1000
5%	20	980	1000

There was a different concentration as a percentage of bleach bottle in which the disinfecting solutions that prepare from it in mixing with various quantity of water to prepare (0.1%) of sodium hypochlorite, table-1.

Table (2): Concentration of disinfecting solution from Bleach Bottle (sodium hypochlorite) that kills Corona Viruses with time [7].

Disinfecting Agent	Concentration	Human corona Virus	Exposure time	Reduction of viral infectivity (log10)
Sodium hypochlorite	0. 1%	*SARS	1 min	>3.0
	0. 1%	** MERS	1 min	>3.0

*=Sever Acute Respiratory Syndrome **=Middle East Respiratory Syndrome

The concentration of disinfecting solution of (0.01%) sodium hypochlorite that kills Human Corona Viruses with (1) mint of exposure time reaching to a reduction equal of (>3.0) of the viral cell, table-2.

4. Discussion

Corona is a novelty in the family of viruses that have an oily membrane and is strongly affected by disinfectants, so it is very easy to eliminate them with disinfectants, such as water, soap, alcohol, ethanol, oxygen water, and other disinfectants, as disinfectants of any type affect this virus and reduce its focus on surfaces, but It is preferable to be in suitable concentrations, to eliminate the virus [8]. That the Corona family was one of the peaceful viruses that only infect animals, and if it affects humans it causes simple respiratory symptoms, similar to the role of a mild cold, and that until 2003, which witnessed the first deviation and mutation of the Corona family in the world, to appear in a kind A new one is called "SARS", after which "MERS" Corona appeared in Saudi Arabia in 2012, and then recently the newly created Corona in China [9]. A comparison of infection rates and deaths with the three deadly types of the Coronavirus after its mutation, indicating that "SARS" that started in February 2003 in China and moved from it to 27 countries around the world, infected 8098 cases, 774 people died from it, and it lasted almost a year and a half, and the death rate was to infection, approximately 9.8%, which is a very high rate for a family of viruses that were “peaceful” mutated into “killers” [10]. In this study, the effective and killer concentration of coronavirus from (0.1%) sodium hypochlorite solution, which was prepared in the laboratory from a different bleach bottles proportions, it was explained according to the following (1%, 2%, 3%, 4%, and 5%), and how to mix quantities of water that was added with a certain amount of bleach for containing sodium hypochlorite as shown in (table 1). For effective antiseptics to eliminate the virus, tests conducted on different disinfection solutions have shown that antiseptics contain compounds “ethanol” (a concentration of

6-71%) or “hydrogen peroxide” (a concentration of 0.5%) effective against coronaviruses If contaminated surfaces and areas are cleansed with appropriate concentrations of these disinfectants, they reduce the numbers of infectious coronaviruses from one million pathogens to only (100) within one minute [whoمصدر]. Tests have shown that other disinfecting solutions are less effective in controlling Corona infection, namely benzalkonium chloride (0.05-0.2% concentration) and chlorhexidine gluconate (0.02% concentration) [11]. In this study, a killer action of sodium hypochlorite concentration solution was indicated for the disinfectant which was (0.1%) and can sterilize the surfaces of the virus in a time of (1) minute and with a sterilization rate of (>3.0) of human coronaviruses, according to what was stated in the German study presented by (G. Kampf, et.all, 2020) [7], as shown in (table 2).

5. Conclusions

Because of (human coronavirus SARS, MERS) can eradicate in one minute by using of (0.1%) of sodium hypochlorite that can be prepared from bleach bottle, and because of covid19 was belong to the same family of coronavirus, therefore, our study thought the same action of sodium hypochlorite in disinfection.

6. References

[1] Sodium Hypochlorite Handbook. Available from: (http://www.oxy.com/OurBusinesses/Chemicals/Products/Documents/sodiumhypochlorite/bleach.pdf); Accessed at: 28/2/2020.

[2] The Sodium Hypochlorite Manual. Available from: (www.chlorineinstitute.org. The Chlorine Institute).; Accessed on 28/2/2020.

[3] Smith WT. (): (Human and Environmental Safety of Hypochlorite) In: (Proceedings of the 3rd World Conference on Detergents): Global Perspectives, pp. 13–25. 2014.

[4] "Benefits and Safety Aspects of Hypochlorite Formulated in Domestic Products”. (AISE – International Association for Soaps, Detergents and Maintenance Product). March 2017.

[5] Cárdenas Flores, A; et. al: "Clinical efficacy of 5% sodium hypochlorite for removal of stains caused by dental fluorosis". Journal of clinical pediatric dentistry, 34 (2): 180. 2009.

[6] Toilet Cleaners. Learn About Chemicals Around Your House, Pesticides. US EPA:". The United States Environmental Protection Agency. 9 May 2012.

[7] G. Kampf, et al: Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. Journal of hospital infection, Germany, vol.104, Issue 3, pp.246-251. 2020.

[8] Helmut Vogt, et al: Chlorine Oxides and Chlorine Oxygen Acids. (7th ed.), Wiley, p. 2. 2013

[9] Torabinejad, Mahmoud, Richard Walton. Endodontics: 4th Edition.Page 265. W.B. Saunders Company; Vital Book. 2008.

[10] World Health Organization: Coronovireses disease 2019. Available from: (http://www.int/emergencies/disease/novel-coronavirus-2019). Accessed at: 28/2/2020.

[11] World Health Organization: Report. Available from: (http://www.who.int/health – topics/coronavirus/coronavirus#tab=tab_1). Accessed at: 2/2/2020.