ISSN: 2581-8341 Volume 04 Issue 12 December 2021 DOI: 10.47191/ijcsrr/V4-i12-06, Impact Factor: 5.825 IJCSRR @ 2021



The Effect of Nanogold-Nanosilver to Boost Immunity in People Affected (Reactive and Positive) by Covid-19

Aulia Hanaul Izzah¹, Titik Taufikurohmah²

¹College Stundent of Chemistry, Universitas Negeri Surabaya, Indonesia ²Lecture of Chemistry, Universitas Negeri Surabaya, Indonesia

ABSTRACT: COVID-19 virus outbreak was first found in Wuhan China. The current COVID-19 is caused by Severe Acute Respiratory Syndrome Coronavirus 2 (Sars-CoV-2). The interaction of the virus with the immune system causes the immunity of people affected by the outbreak to decrease. The combination of nanogold and nanosilver, that is an antimicrobial and antiviral agent, can inhibit the replication of the COVID-19 virus an d act as drug delivery. This research aims to determine the effect of nanogold-nanosilver that can increase immunity in people who are positively affected by the COVID-19 virus. The method used in this research was quantitative descriptive by describing the effect of the nanogold-nanosilver health drink given to increasing human immunity exposed to the COVID-19 virus seen from the number of respondent cures. The respondents consumed 500 mL of health drinks containing nanogold and nanosilver compounds with a concentration of 2 ppm per day. Based on the data obtained, the combination of nanogold and nanosilver could increase the immunity of people affected by COVID-19, marked by physical changes that became healthier, fitter and negative swab test results and accelerate the healing of COVID-19 patients.

KEYWORDS: Covid-19, Drug Delivery, Immunity, Nanogold, Nanosilver.

INTRODUCTION

This virus was first found in Wuhan, China with the increase in Covid-19 cases every day starting from the end of January to the beginning of February 2020 [1]. On January 30, 2020, the spread of the COVID-19 virus had reached various countries including Taiwan, Thailand, South Korea, Vietnam, Malaysia, Japan, Singapore, Nepal, Sri Lanka, the Philippines, Cambodia, Australia, Canada, France and Germany [2]. This virus first appeared in Indonesia on March 2, 2020. To date, the total number of positive cases of COVID-19 is 743,198 people as of December 31, 2020 [3].

Coronavirus is a type of RNA virus that has a particle size of 120-160 nm. Coronavirus initially infected animals such as bats and camels [4].]. Based on the results of phylogenetic analysis, it shows that the COVID-19 virus is part of the same subgenus as the Sarbecovirus type that caused the SARS outbreak in 2002-2004 [5]. The spread of the corona virus occurs through droplets that come out while sneezing or coughing. Cases of this transmission of the virus generally have a history of close physical contact with COVID-19 patients [6]. The stability of the corona virus in inanimate objects is not much different from the SARS virus. The corona virus will be more stable on inanimate objects with plastic and stainless steel materials for 72 hours compared to cardboard for 24 hours and copper for 4 hours [7].

Humans infected with this virus are thought to interfere with the cells in the respiratory tract that line the alveoli with receptors and make their way into the cells. In the cell, this virus undergoes replication of genetic material and synthesizes the required protein to form virions that will appear on the cell surface [8]. Symptoms caused by a corona virus infection in the respiratory tract include fever, cough, cleanness, shortness of breath, fantigue. Besides, other symptoms are productive cough, sore throat, pain in the head area, myalgia/arthralgia, nausea/vomiting, diarrhea, chills, pain in the abdomen, nasal congestion, hemoptysis and conjunctival congestion [9]. The rapid spread can affect public health care systems and severe economic and social pressures around the world. Virus interactions with immune system mediators trigger an immune response that can determine the outcome of viral infection. To date, there are still no proven drugs and antivirals for the coronavirus (SARS-CoV-2) by clinical trials [10]. Meanwhile, the immune system faces many challenges and there is still much uncertainty about the immune response in this disease as well as the role of individual components of the immune system. Thus, the efficacy of innate, cellular, and humoral immunity determines the outcome of viral infection [11].

ISSN: 2581-8341

Volume 04 Issue 12 December 2021 DOI: 10.47191/ijcsrr/V4-i12-06, Impact Factor: 5.825 IJCSRR @ 2021



Technological developments in the health sector have spread to nanomaterial technology. The drug formulation using gold nanoparticles (nanogold) has high antioxidant activity [12]. In the in vitro and in vivo toxicity test of nanogold, it is stated that nanogold is safe to use in the body. Nanogold can heal damaged tissue by increasing cell proliferation and collagen biosynthesis [13]. This activity is needed in the process of restoring tissue damage due to exposure to the Covid-19 virus. The high antioxidant activity in nanogold can increase the activity of glutathione as immune system owned in each cell [14], by increasing glutathione activity, cell-level immunity also increases and there is inhibition of proliferation in viruses [15]. Thus the body is able to withstand viral attacks when the immune system increases [16]. In addition to activating glutathione, the antioxidant activity of nanogold can fight attacks from microbes and viruses that will enter the body [17].

The silver nanoparticles (Nanosilver) is a substance that is safe for humans and some scientists use nanosilver to prevent the spread of various diseases. Silver nanoparticles (nanosilvers) have reliable antimicrobial activity with a broad spectrum [18]. Nanosilver is able to interact with viruses, bacteria and fungi and can block the function of microorganisms. Nanosilver is able to show strong antiviral activity against several viruses [19]. Nanosilver can be used as a biomedical therapeutic agent for dressing long-term burns and as an anti-bacterial agent [20]. Silver nanoparticles can inhibit influenza virus replication and provide protection to tissues against influenza virus infection [21]. In the article [22] the preclinical test for the antiviral content of nanosilver against the corona virus that infects pigs or transmissible gastroenteritis coronavirus (TGEV). The results showed that the nanosilver was able to inhibit the initiation of TGEV infection by binding to protein (S glycoprotein). The antiviral activity of silver nanoparticles may lower the risk of infection or may also prevent the COVID-19 virus.

The Nanogold-Nanosilver combination can be used as a drug delivery system that will increase the absorption of essential nutrients for the human body [15]. Nanoparticles in gold and silver have the efficiency of increasing the solubility of water-insoluble drugs, accelerating the reaction rate, increasing the half-life of drugs by reducing immunogenicity and so on [23].

In the current condition due to the COVID-19 virus outbreak, one of the efforts to prevent infection and efforts to deal with this virus is by increasing immunity in the body. Nanogold content that has high antioxidant activity can form antibodies and nanosilver. It has antiviral activity that has been tested in several viruses such as influenza and transmissible gastroenteritis coronavirus (TGEV). Therefore, it can be clinically tested the activity of the combination of Nanogold and Nanosilver in increasing immunity for patients who are reactive and positive for the COVID-19 virus.

RESEARCH METHOD

Material used was combination of synthesis of nanogold and nanosilver in the form of a health drink product with a concentration of 2 ppm. This health drink is considered to increase the immunity of the human body. The material used had the main function as an antioxidant, antiviral and drug delivery agent. The volunteers were patients who had been confirmed reactive rapid tests and positive for the COVID-19 swab test by doctors.

Method of clinical test was conducted by distributing nanogold-nanosilver products in the form of health drinks. Providing health drinks was conducted once a week every Friday. The dose taken for people with the COVID-19 virus was 1 day 1 bottle of 500 mL. Data collection came from observation, interviews and documentation. Interviews conducted with patients exposed to COVID-19 who were confirmed by the results of a rapid reactive test and positive swab test in Surabaya. Data collection was carried out within a period of 6 months from April to September 2020. Initial data collected were in the form of a statement letter for the rapid and positive results of the swab test and subsequent data in the form of a change in the result of the certificate to negative taking into account the days after drinking the nanogold-nanosilver health drink. The data analysis used was quantitative descriptive analysis, by describing the effect of nanogold-nanosilver drinks on increasing human immunity exposed to the COVID-19 virus seen from the number of respondent cures.

RESULT AND DISCUSSION

Data collected consisted of in-depth interviews, indirect observation, and swab test results that were stated negative from respondents with positive cases of the COVID-19 virus in Surabaya. It was administrating nanogold nanosillver health drinks to COVID-19 sufferers who were independently isolated at home and hospitalized in Surabaya. From the data, it was then analyzed and described based on the results of the interviews conducted. From the results of interviews with respondents who were exposed to the corona virus, it was explained that the experience of consuming nanogold-nanosilver health drinks at first the reaction

ISSN: 2581-8341

Volume 04 Issue 12 December 2021 DOI: 10.47191/ijcsrr/V4-i12-06, Impact Factor: 5.825 IJCSRR @ 2021



experienced was that the body became fresher and fitter for many of the respondents. In every provision of nanogold-nanosilver health drinks, the respondents were very enthusiastic. The next data obtained was the result of a swab test that turned negative for COVID-19. In the aspect of healing the volunteers suffering from the COVID-19 virus, it varied depending on the speed of antibody formation from the patient's body.



Figure 1. Graph of Healing for COVID-19 Patients in April-September 2020

In Figure 1. it shows that the recovery of ODP (People Under Supervision) rapid (+), ODP swab (+) and positive COVID-19 patients who had been given nanogold-nanosilver health drinks every month, there was an increase in patient recovery marked by rapid and swab test results from positive to negative because nanogold and nanosilver can be an antiviral agent that is able to inhibit the attachment of viruses to the host cell. In a review article, it also explained that metal in the form of colloids is able to recognize antigens which then stimulate the formation of antibodies. It shows that nanogold functions as antigen carriers proven to affect the work of B lymphocytes which are responsible for antibody formation [24]. In addition to the nanogold content, health drinks administrated to people exposed to Covid also contain other nanoparticles, such as nanosilver. A research suggested that modified nanosilver could effectively reduce infection from the influenza virus (H1N1) by blocking or inhibiting hemagglutinin and neuraminidase in vitro [25]. Hemagglutinin and neuraminidase were glycoproteins found in the influenza virus (H1N1) which function to attach the virus to host cells [26]. Thus, the combination of the two gold and silver nanoparticles (NPs) can help block the entry of the corona virus and activate the immune system to form antibodies to fight the virus. Besides, liposomes and nanoemulsions can dissolve the double lipid envelope found in the corona virus and destroy the structure. The combination of the two can also reduce the risk of death in patients exposed to the corona virus because it increases the activity of blood platelets which can cause blood clots to cause death [27].

Other than that, The trust of the community had also increased as seen from the number of patients who had been willing to become respondents in this research. This trust arose because the response of patients who had consumed this health drink felt that their body feels fitter and the body was getting better than before because some patients had mild to severe fatigue. In addition, this health drink does not have any side effects. Thus, it is safe for consumption. Throughout history, gold and silver colloids have been used in various fields, including nanomedicine. Nanogolds (AuNPs) are often used in diagnostics, therapy and so on. Several groups of researchers have tested the toxicity content of nanogold showing that the nanogold is non-cytotoxic, non-immune and biocontrollable. Therefore, it can be developed as nanomedicine [28]. Besides, several researchers also revealed that nanosilver (AgNPs) did not provide significant clinical changes in human metabolism so that they are safe to use. The use of nanosilver for health purposes must look at the parameters of shape, size, structure, and surface chemistry in determining the target to be targeted in the therapeutic procedure [29].

ISSN: 2581-8341

Volume 04 Issue 12 December 2021 DOI: 10.47191/ijcsrr/V4-i12-06, Impact Factor: 5.825 IJCSRR @ 2021



Variable		quantity (n)	percentage (%)
COVID-19 (260)	days 1-5	26	10 %
	days 6-10	223	85,76%
	days 11-14	11	4,23%
ODP Rapid (+) (405)	days 1-5	49	12,09 %
	days 6-10	323	79,75 %
	days 11-14	33	8,14%
ODP Swab (+) (96)	days 1-5	15	15,62%
	days 6-10	75	78,13%
	days 11-14	6	6,25 %



Figure 2. Graph the recovery of patients who are exposed to COVID-1

Figure 2 is a The recovery day chart for each COVID-19 patient divided into 3 groups, such as the first group of patients who tested positive for COVID-19, the second group of ODP patients who were declared reactive rapid tests, and the third group of ODP patients who tested positive for swab tests. From the three groups, it shows the similarity, the healing of each group is mostly found on days 6-10.

Table 1 is comparison of cure in each group of patients exposed to the corona virus. Judging from the day of recovery, there were patients who recovered on days 1-5, days 6-10 and days 11-14. Patients in group 1 who recovered on day 6-10 showed the highest percentage of 85.76%. while in group 2, patients who recovered on day 6-10 were 79.75% and in group 3 patients who recovered on day 6. 6-10 is 78.13%. This was because the process of forming antibodies in each person's body is different depending on the physical condition of each patient exposed to the corona virus. Antibodies were produced by B lymphocytes. Antibodies are glycoproteins produced as a defense immune response against toxic foreign molecules called antigens. Antibodies were shaped like the letter "Y" in which the two arms are tasked to bind to antigens and recognize them specifically [30]. The content of nanogold can act as an antigen-carrying agent that has been shown to stimulate activity in macrophage phagosity and increase antibody formation. The effect of nanogold on lymphocyte action can be seen from a ten-fold increase in proliferation. This indicated that

1655 *Corresponding Author: Titik Taufikurohmah



www.ijcsrr.org

ISSN: 2581-8341

Volume 04 Issue 12 December 2021 DOI: 10.47191/ijcsrr/V4-i12-06, Impact Factor: 5.825 IJCSRR @ 2021



the nanogold can act directly as a pathogen destroying agent [31]. The antioxidant activity of nanogold can also assist the body in fighting against viruses and microbes [15]. Nanogold can increase the activity of glutathione as an antioxidant that can regulate the immune system, with an increase in glutathione, cell immunity will increase and can inhibit the proliferation of the corona virus. Besides, nanogold can inhibit the oxidative damage of DNA, protein and lipids through a mechanism as a radical scavenger or free radical scavenger [32]. Nanogold has been shown to have the ability to interact with cells or tissues, the metabolic system that cannot cause toxicity, injury or immune reactions when working at a specific site (biocompatibility) [33] and low cytotoxicity. Thus, it is safe to use for medicinal and diagnostic purposes [24]. The content of nanosilver compounds is able to show strong antiviral activity against several viruses [19]. It can be seen that the nanosilver is able to bind to the outer layer of the virus. Therefore, it inhibits the initiation of viral infection by binding to the surface of the S. Glycoprotein protein and the release of silver ions can lower the pH of the respiratory epithelium where the COVID-19 virus normally resides. Furthermore, it becomes more acidic and the virus can't replicate [34].

The combination of two nanoparticles of nanogold and nanosilver, into one material can provide a synergistic effect by inhibiting the replication process of the corona virus and inhibiting the binding of the virus to the host surface receptors. Angiotensin-converting enzyme (ACE2) is a receptor that acts as an intermediary in attaching the virus to host cells. Therefore, the two nanoparticles are able to inhibit viral binding by lowering ACE2 levels. They can fight corona virus infection and increase antibodies to fight ACE2 [35]. The combination of these two nanoparticles, namely nanogold-nanosilver, also acts as drug delivery, thus, it helps accelerate the healing of patients infected with the COVID-19 virus. For now there is no definite cure for COVID-19 so that in the healing process several hospitals use drugs that are thought to be useful for the corona virus (SARS-CoV-2) such as Lopinavir/Ritonavir (LPV/ r), Remdesvir (RDV), Chloroquine and hydroxychloroquine, and others. The role of drug delivery of nanogold and nanosilver is to assist the improvement of drug delivery and drug targeting that can increase effectiveness and reduce the level of toxicity or side effects of a drug.

CONCLUSION

Based on the result of the research, it is known that Nanogold and Nanosilver health drinks have high antioxidant content and antiviral activity that can increase immunity for patients with COVID-19, characterized by physical changes that become healthier and fitter, then changes in swab test results from initially positive to negative COVID-19. The antiviral activity of nanosilver is able to inhibit the initiation of viral infection and viral replication. In addition, nanogold and nanosilver are capable of being drug delivery systems that assist in delivering drugs and target drugs that can increase effectiveness.

ACKNOWLEDGEMENTS

First, we give our gratitude to The Ministry of Research and Technology/Indonesian National Agency for Research and Innovation that has supported research on the development of manufacturing nanogold-nanosilver drugs to support the development of domestic medicinal raw materials in the second year as an effort to boost immunity in people affected by COVID-19 in Surabaya.

REFERENCES

- Z. Wu and J. M. McGoogan, "Characteristics of and Important Lessons from the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72314 Cases from the Chinese Center for Disease Control and Prevention," *JAMA - J. Am. Med. Assoc.*, vol. 323, no. 13, pp. 1239–1242, 2020, doi: 10.1001/jama.2020.2648.
- 2. World Health Organization (WHO), "Coronavirus disease 2019 (2019-nCOV) Situation Report 11," 2020.
- 3. https://nasional.okezone.com/, "Update Corona di Indonesia Desember 2020," 2020.
- 4. A. G. F. Brooks, K. C. Carroll, J. S. Butel, and S. A. Morse, *Medical Microbiology 24 th Edition*, vol. 7, no. 3. 2007.
- 5. A. E. Gorbalenya *et al.*, "The species and its viruses a statement of the Coronavirus Study Group," *Biorxiv (Cold Spring Harb. Lab.*, pp. 1–15, 2020, [Online]. Available: https://www.biorxiv.org/content/10.1101/2020.02.07.937862v1.full.
- 6. Y. Han, "The transmission and diagnosis of 2019 novel coronavirus infection disease (COVID 19): A Chinese perspective," no. March, pp. 639–644, 2020, doi: 10.1002/jmv.25749.
- 7. S. W. X. Ong *et al.*, "Air, Surface Environmental, and Personal Protective Equipment Contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) from a Symptomatic Patient," *JAMA J. Am. Med. Assoc.*, vol. 323,

ISSN: 2581-8341

Volume 04 Issue 12 December 2021 DOI: 10.47191/ijcsrr/V4-i12-06, Impact Factor: 5.825 IJCSRR @ 2021



no. 16, pp. 1610–1612, 2020, doi: 10.1001/jama.2020.3227.

- H. Zhang, J. M. Penninger, Y. Li, N. Zhong, and A. S. Slutsky, "Angiotensin-converting enzyme 2 (ACE2) as a SARS-CoV-2 receptor: molecular mechanisms and potential therapeutic target," *Intensive Care Med.*, vol. 46, no. 4, pp. 586–590, 2020, doi: 10.1007/s00134-020-05985-9.
- B. Aylward and W. Liang, "Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)," 2020. [Online]. Available: https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf.
- 10. L. Dong, S. Hu, and J. Gao, "Discovering drugs to treat coronavirus disease 2019 (COVID-19)," *Drug Discov. Ther.*, vol. 14, no. 1, pp. 58–60, 2020, doi: 10.5582/ddt.2020.01012.
- A. H. Mansourabadi, M. Sadeghalvad, H. R. Mohammadi-Motlagh, and N. Rezaei, "The immune system as a target for therapy of SARS-CoV-2: A systematic review of the current immunotherapies for COVID-19," *Life Sci.*, vol. 258, no. August, p. 118185, 2020, doi: 10.1016/j.lfs.2020.118185.
- 12. T. Taufikurohmah, G. M. Sanjaya, A. Baktir, and A. Syahrani, "Activity Test of Nanogold for Reduction of Free Radicals, a Pre-Assessment Utilization Nanogold in Pharmaceutical as Medicines and Cosmetics," *J. Mater. Sci. Eng. B*, vol. 2, no. 12, pp. 611–617, 2012.
- 13. T. Taufikurohmah, D. Winarni, A. Baktir, I. G. M. Sanjaya, and A. Syahrani, "Histology Study: Pre-Clinic Test of Nanogold in Mus Musculus Skin, at Fibroblast Proliferation and Collagen Biosynthesis," vol. 3, no. 5, pp. 55–60, 2013.
- 14. D. Baram-Pinto, S. Shukla, A. Gedanken, and R. Sarid, "Inhibition of HSV-1 attachment, entry, and cell-to-cell spread by functionalized multivalent gold nanoparticles," *Small*, vol. 6, no. 9, pp. 1044–1050, 2010, doi: 10.1002/smll.200902384.
- 15. T. Taufikurohmah and D. Soepardjo, "Herpes Disease : Case Study Of Herpes Transmission In Islamic Cottage Schools," vol. 1, pp. 88–94, 2019.
- 16. J. H. Johnston and T. Nilsson, "Nanogold and nanosilver composites with lignin-containing cellulose fibres," *J. Mater. Sci.*, vol. 47, no. 3, pp. 1103–1112, 2012, doi: 10.1007/s10853-011-5882-0.
- T. Taufikurohmah, A. P. Wardana, S. Tjahjani, I. G. M. Sanjaya, A. Baktir, and A. Syahrani, "The Clinical Test of Nano gold Cosmetic for Recovering Skin Damage Due to Chemicals: Special Case," *J. Phys. Conf. Ser.*, vol. 947, no. 1, pp. 0– 5, 2018, doi: 10.1088/1742-6596/947/1/012056.
- S. Vikas, K. S. Krishan, and K. S. Manjit, "Nanosilver: Potent antimicrobial agent and its biosynthesis," *African J. Biotechnol.*, vol. 13, no. 4, pp. 546–554, 2014, doi: 10.5897/ajb2013.13147.
- 19. H. H. Lara, N. V. Ayala-Nuñez, L. Ixtepan-Turrent, and C. Rodriguez-Padilla, "Mode of antiviral action of silver nanoparticles against HIV-1," *J. Nanobiotechnology*, vol. 8, pp. 1–10, 2010, doi: 10.1186/1477-3155-8-1.
- R. M. Rosa, J. C. Silva, I. S. Sanches, and C. Henriques, "Simultaneous photo-induced cross-linking and silver nanoparticle formation in a PVP electrospun wound dressing," *Mater. Lett.*, vol. 207, pp. 145–148, 2017, doi: 10.1016/j.matlet.2017.07.046.
- 21. I. V. Kiseleva *et al.*, "Anti-influenza effect of nanosilver in a mouse model," *Vaccines*, vol. 8, no. 4, pp. 1–17, 2020, doi: 10.3390/vaccines8040679.
- 22. X. Lv *et al.*, "Biomaterials Inhibitory effect of silver nanomaterials on transmissible virus-induced host cell infections," *Biomaterials*, vol. 35, no. 13, pp. 4195–4203, 2014, doi: 10.1016/j.biomaterials.2014.01.054.
- 23. P. Mishra, M, Chauhan, "Nanosilver and its Medical Implications," vol. 2, no. 5, pp. 1–10, 2015, doi: 10.15406/jnmr.2015.02.00039.
- 24. Z. Xiang *et al.*, "Gold Nanoparticles Inducing Osteogenic Differentiation of Stem Cells: A Review," *J. Clust. Sci.*, vol. 29, no. 1, 2018, doi: 10.1007/s10876-017-1311-0.
- A. S. Levina, M. N. Repkova, N. A. Mazurkova, and V. F. Zarytova, "Nanoparticle-Mediated Nonviral DNA Delivery for Effective Inhibition of Influenza a Viruses in Cells," *IEEE Trans. Nanotechnol.*, vol. 15, no. 2, pp. 248–254, 2016, doi: 10.1109/TNANO.2016.2516561.
- 26. Y. Li *et al.*, "Silver Nanoparticle Based Codelivery of Oseltamivir to Inhibit the Activity of the H1N1 Influenza Virus through ROS-Mediated Signaling Pathways," *ACS Appl. Mater. Interfaces*, vol. 8, no. 37, pp. 24385–24393, 2016, doi: 10.1021/acsami.6b06613.

ISSN: 2581-8341

Volume 04 Issue 12 December 2021 DOI: 10.47191/ijcsrr/V4-i12-06, Impact Factor: 5.825 IJCSRR @ 2021



- 27. M. A. Elkodous, "Engineered nanomaterials as fighters against SARS-CoV-2: The way to control and treat pandemics," *Environ. Sci. Pollut. Res.*, 2020, doi: 10.1007/s11356-020-11032-3.
- 28. E. Boisselier and D. Astruc, "Gold nanoparticles in nanomedicine: preparations, imaging, diagnostics, therapies and toxicity," *Chem. Soc. Rev.*, vol. 38, no. 6, pp. 1759–1782, 2009, doi: 10.1039/b806051g.
- 29. C. A. Dos Santos *et al.*, "Silver nanoparticles: Therapeutical uses, toxicity, and safety issues," *J. Pharm. Sci.*, vol. 103, no. 7, pp. 1931–1944, 2014, doi: 10.1002/jps.24001.
- 30. N. Fadhilah and S. Megantara, "Penggunaan Nanopartikel Emas Dalam Teknologi Untuk Diagnosis Kanker," *Farmaka*, vol. 16, no. 2, pp. 254–263, 2018.
- L. A. Dykman and N. G. Khlebtsov, "Gold Nanoparticles in Biology and Medicine : Recent Advances and Prospects," vol. 3, no. 9, pp. 34–55, 2011.
- 32. A. Zuber *et al.*, "Detection of gold nanoparticles with different sizes using absorption and fluorescence based method," *Sensors Actuators, B Chem.*, vol. 227, pp. 117–127, 2016, doi: 10.1016/j.snb.2015.12.044.
- 33. A. Timoszyk, "A review of the biological synthesis of gold nanoparticles using fruit extracts: Scientific potential and application," *Bull. Mater. Sci.*, vol. 41, no. 6, pp. 1–11, 2018, doi: 10.1007/s12034-018-1673-4.
- 34. A. Salleh *et al.*, "The potential of silver nanoparticles for antiviral and antibacterial applications: A mechanism of action," *Nanomaterials*, vol. 10, no. 8, pp. 1–20, 2020, doi: 10.3390/nano10081566.
- 35. S. Gurunathan *et al.*, "Antiviral potential of nanoparticles—can nanoparticles fight against coronaviruses?," *Nanomaterials*, vol. 10, no. 9, pp. 1–29, 2020, doi: 10.3390/nano10091645.

Cite this Article: Aulia Hanaul Izzah, Titik Taufikurohmah (2021). The Effect of Nanogold-Nanosilver to Boost Immunity in People Affected (Reactive and Positive) by Covid-19. International Journal of Current Science Research and Review, 4(12), 1652-1658