

## Potential Policy-Developed Global-COVID-19-Vaccine: Enriched Medical Sciences and Technology Green-Socio-Economy

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**Abstracts:** Global-epidemic COVID-19 changes the human civilization, health, travel, socioeconomic, education, and clinical research totally, with no targeted therapeutics, and treatment options. So, the effect of the virus is likely to be seen long after medical science offers a cure for COVID-19. India emphasis on different nutritious-vegetables for improving immunity to human-disease-free-healthy-life is naturally-infected with different-diseases caused by pathogens, significantly hampering food-production. Though pesticides are the most effective means of control, but they are not, cost-effective and environment-friendly. So, it has been an urgency to require; new and more efficient-solutions, technologies, products to fulfill its food and nutritional requirement, and methods to develop best vaccines or social-vaccine or the best medical therapy for immediately to control the coronavirus-COVID-19-disease and prevent more damage. Amaranth is a nutritious as well as traditional-medicinal-vegetables-plant. So, it is focused on the amaranth-plant, intercropped with okra-plant, to determine the effects on pathogens-infected-diseases of both plants; Root-Knot, Mosaic-Virus and Leaf-Curl-Virus in a well-protected-garden. After harvesting, of the two-plant-species, amaranth received maximum pathogen-infection, forming the "Potential-Eco-Friendly-Highly-Economical-Biomedicines-Catch-Vegetable-Crop-Plants", conserving "Biodiversity-Conservations-Sustainable-Climates-Health and Development with Important Socio-Economic-Implications in Agriculture", though both are highly susceptible to diseases, and the farmers would be benefited double; by controlling-diseases, and by buying-selling the amaranth-okra. In biomedicines, highly-trace-tolerance-amaranth-vegetables or the plant-virus; Amaranth-Mosaic-Virus, Okra-Yellow-Vein-Mosaic-Virus, Amaranth-Leaf-Curl-Virus, and Okra-Enation-Leaf-Curl-Virus, which has been developed as antigenic-epitopes derived from the vaccine-targets-COVID-19 infectious epidemic-disease agents, and the chimeric virus particles, may be used in vaccine formulations or treatments, as one of the most powerful cost-effective emergency-healthcare easily-available safe-edible prepare-able easy-applicable future-potential-personalized-biomedicine as vaccines or social-vaccine and safe alternative to live to replicate COVID-19 'Potential-Global-Vaccine or Social-Vaccines', enriching food-security green-socio-economy medical-science-and-technology-communication-applications-issues. Now it is planned to publish as suggestions; the use of amaranth as biomedicines for all, and amaranth-okra as future-biomedicines, based healthy diet and greater prevention against Sars-Cov-2, by boosting immune system which may significantly solve or help or advance the current problem of the COVID-19 infections, and clinical practice and acts as an indispensable source to access the pharmacological-and-policy developments globally.

**Keywords:** Potential-Policy-Developed, Global-COVID-19-Vaccine, Enriched, Medical-Sciences-Technology, Green-Socio-Economy.

### INTRODUCTION

Current threatening human-challenge, epidemic-COVID-19, face; the humanity, health crisis, civilization, socioeconomic, travel, education, and clinical research, and medical fields [1-8], and dramatic inflammatory reaction [9]. Now, health-experts, officials, and epidemiologists are calling for safely reopening schools, factories, and offices [10]. And the scientists, has been an urgency to develop vaccines against coronavirus [11] or find out the quickest and most efficient effective-treatment- pathway and prevention strategies [12]. Because, the fifth coronavirus, leaps from animals [13], genetically resistance [14], divergence, structural and the future evolution, adaptation, and spread [15], prevails a long time as an asymptomatic [16], analogous to war, and the delay of every week in the deployment of a vaccine

to the seven billion humans on earth will cost thousands of lives [17].

To overcome, India emphasis on preventive measures by the cost-effective fresh weed-vegetables, of low income-food, the amaranth plants, -"Aid to Eating and Staying Healthy during COVID-19", to provide food and immunity, and WHO develops a blueprint for diagnostics [18], with whole-genome sequencing [19-22] due to amaranths, the fifth largest of the world and presence of antiviral proteins for immunomodulatory activities [23], the best vaccine and best medical therapy, and prevent more damage [24,25], and peptide [26], terpenoids of plants [27,28], and use algae [29], due low-cost diagnostic test COVID-19-kits [30]. But the global food security crisis in COVID-19 [31], impact on amaranth market [32], and supply-chain and import-export [33]. And the production is hampered

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adversely by the naturally occurring diseases; Root-Knot (RK), Amaranth Mosaic Virus (AMV), Okra Yellow Vein Mosaic Virus (OYVMV), Amaranth Leaf Curl Virus (ALCV) and Okra Enation Leaf Curl Virus (OELCV)-disease. The use of chemicals is the most effective means of control, but they are expensive and not environment-friendly [34,35], and the genetics-resistance [23,36] to AMV, OYVMV, ALCV and OELCV in amaranth and okra respectively, and diversity of viruses affect the production, financial losses, and climatic changes impact on the global economy also [37,38]. A number of bio-agents or bio-nematicides or biomedicine [39-45] stands as a suitable and useful- against different diseases. But it remains some problems in the rapid depletion of natural resources, biodiversity conservation, and not cost-effective [46]. ‘Homeopathy’ may solve all the above-mentioned problems [47,48]. But it has some cost. Only, intercropping would help in identifying the “Susceptible Catch-Vegetable-Crop-Plants” for possible control of plant diseases [49-58].

The main aims and objectives, are to find out the most suitable solution, a trial was planned in order to use of amaranth plant (*Amaranthus viridis* L.) cv. CO-1, as a “Susceptible Catch Weed Vegetable Crop Biomedicine Plants”, intercropped with okra (*Abelmoschus esculentus* L. Moench) Cv. Ankur – 40, to determine the effects on pathogens-infected-diseases; Root-Knot (RK), Amaranth Mosaic Virus (AMV), Okra Yellow Vein Mosaic Virus (OYVMV), Amaranth Leaf Curl Virus (ALCV) and Okra Enation Leaf Curl Virus (OELCV), in a well-protected-garden. And to overcome the present epidemic COVID-19 disease, it is planned to publish as suggestions, for greater prevention against COVID-19, by boosting the human immune system.

## MATERIALS & METHODS

### Location and Preparation of the Field Trial

The experiment was carried out in the garden of the Department of Zoology, Visva-Bharati University, Santiniketan – 731235, West Bengal, India, (25±2°C and RH75±5%) [34,35,41,49-58]. Soil was interchanged to keep the nematode population as uniform as possible [34,35,41,49-60]. All the data were counted for statistical analysis by analysis of variance (P<0.05).

### Plantation

Aseptically germinated seeds of amaranth (*Amaranthus viridis* L. cv. CO-1) and okra (*Abelmoschus esculentus* L. cv. Ankur-40), were planted alternately with a gap of 25cm in the first two plots [34,35,41,49-60]. The plots were: uninoculated amaranth-okra, inoculated amaranth-okra, inoculated amaranth, and inoculated okra [61-69]. All the naturally infected-diseases; Root-Knot (RK), Amaranth Mosaic Virus (AMV), Okra Yellow Vein Mosaic Virus (OYVMV), Amaranth Leaf Curl Virus (ALCV) and Okra Enation Leaf Curl Virus (OELCV), occurred at 4-

leaf stage of okra plants [34,35,41,49-60]. All the data were counted for statistical analysis by analysis of variance (P<0.05).

### Harvesting

Sixty-five days after plantation of okra, all the plants were uprooted and the following parameters of growth and pathogens infection were recorded: average number of leaves /plant, the average number of disease; AMV, OYVMV, ALCV and OELCV, -infected leaves/plant (%), the average number of root galls/plant, the average number of nematodes (RK) per 2g of root and 200 g soil, average biomass (g) of fresh weight of shoot and root, and average protein % of root and fruits-protein content. Three samples of root from each species of plants were taken at random and the total protein fraction in each sample was estimated [34, 35, 41, 49-62]. All the data were counted for statistical analysis by analysis of variance (P<0.05).

### Recipe for Consumption

Amaranth, the entire plant is a tasty delicacy found in many dishes, making it quite a versatile medicinal vegetable, and consumed in a variety of ways [19-23,33,41], like curry, stews, soups, and the seeds can also be sprouted, roasted and used to flavor rice or mixed with honey to form cakes [19], snacks, biscuits and a porridge . Grilled Peach And Papaya Salad With Amaranth Granola, Amaranth Tikkis, Amaranth Chocolate Ravioli, Amaranth Cupcakes, Amaranth Flour, Carrot And Raisin Cookies, Amaranthus Granola with Lemon Yogurt, Berries And Marigold, Gluten-Free Amaranth Tabbouleh, Ramdana Ki Chikki, and Almond and Amaranth Ladoo, are the healthy recipes of amaranth, and easily add them to our diet to stay healthy and active [64].

### Healthcare Medical Sciences and Technology Communication Food Security Economy

The activity of students, researchers, regulators, teachers, staff, community, photographers, visitors, different scientist, academicians, clinicians, administrators, institutions, farmers, NGO named “Burdwan Green Haunter and Students’ Goal”, and media personnel, -campaign or -aware or -make the news or -publication [34,35,41,49-58,65].

## RESULTS

### On Root-Knot and Mosaic Foliar Diseases

**Table-1.** shows that the use of amaranth as a “Susceptible Catch-Vegetable-Crop-Biomedicine-Plants”, against naturally pathogens-infected diseases; Root-Knot, Amaranth-Mosaic-Virus, Okra-Yellow-Vein-Mosaic-Virus, Amaranth-Leaf-Curl-Virus, and Okra-Enation-Leaf-Curl-Virus, in a well-protected-garden intercropped with okra plants by analysis of variance (P<0.05), though both the amaranth and okra plants were susceptible to root-knot nematodes and foliar diseases. Here amaranth was more susceptible than okra in terms of root-gall number nematode

population in root and root protein content forming “Potential-Eco-Friendly-Highly-Economical-Biomedicines-Catch-Vegetable-Crop-Plants”. In the inoculated Amaranth-Okra intercropped field, amaranth and okra, show the highest infection respectively, in terms of the average number of leaves /plant, the average number of disease (Amaranth-Mosaic-Virus, Okra-Yellow-Vein-Mosaic-Virus, Amaranth-Leaf-Curl-Virus, and Okra-Enation-Leaf-Curl-Virus) infected leaves/plant (%), the average number of root galls/plant, the average number of nematodes (Root-Knot) per 2g of root and 200 g soil, average biomass (g) of fresh weight of root, and average protein % of root- protein content, but increased average biomass (g) or fresh weight of shoot and average protein % of fruit-protein content, in comparison to other plots. While *M. incognita* population increased significantly both in the soil as well as in roots in 65 days in the monoculture. But amaranth showed the highest intensity of nematode infection (Table-1).

### In Future Suggestions in Research

The results fulfill the goal of a research suggestions as proposal because the consumption of intercropped amaranth with okra, use as biomedicines, need to justify future research.

### In Healthcare Medical Sciences and Technology Communication Food Security

The students, researchers, teachers, staff, community, photographers, visitors, different scientist, administrators, institutions, farmers, NGOs, and media personnel campaign, aware, discuss, arrange workshops and seminars, make news and publish as abstract regarding the importance of “COVID-19 Cost-Effective Social-Vaccine Develop from Potential Amaranth-Biomedicine: Improving Immunity Healthcare Medical Sciences and Technology Communication Food-Security Green-Economy Applications, and Nutritious foods-, Healthcare-, Defense response- and Immunity- as well as Biodiversity Conservation- Issues”, in different national- and local- audiovisual media (TV channels), different social media, web pages, newspapers and different -national and -international Journals as well as Congress Proceedings also.

**Table-1: Field study of amaranth intercropped with okra infected with RK, AMV,**

Plots	Average number of leaves /plant	Average number of disease infected leaves / plant ( % )		Average number of root galls / plant	Average number of nematodes (populations)		Average biomass (g)		Average protein %	
		AMV / OYVMV	ALCV / OELCV		Soil (200g)	Root (2g)	Shoot	Root	Root	Fruits
I.Uninoculated Amaranth Okra	98.98a±1.12	22.08a%±2042	8.09%a±0.87	Nil	Nil	Nil	198.50a±2.02	43.00a±1.15	2.97a±0.01	Nil
	18.58a±0.08	72.20b%±2.12	32.42%b±0.42	Nil	Nil	Nil	91.10a±1.02	12.00a±0.10	4.01a±0.01	2.99a±0.13
II.Inoculated Amaranth Okra	102.28a±6.42	23.17a%±1.03	9.02%a±0.78	3987.58a±22.03	108.98a±2.42	1499.98a±12.22	103.00b±2.20	59.80b±1.99	6.58b±0.02	Nil
	16.94a±0.02	38.03a%±0.52	11.06%a±0.11	12.05a±1.14	108.98a±2.42	53.75a±11.33	81.00b±1.35	14.30a±0.16	4.29a±0.03	1.98b±0.02
III.Inoculated Amaranth	99.02a±4.22	48.03c%±1.71	18.83%c±1.09	4929.43b±29.21	28.06b±1.04	1968.75b±10.15	100.00b±1.02	63.95c±1.19	6.27b±0.03	Nil
IV.Inoculated Okra	11.34b±0.42	85.06c%±0.11	54.04%c±0.12	1697.20b±5.20	36.75b±1.93	873.00b±1.01	31.98c±0.01	34.75b±1.53	5.69b±0.02	1.07c±0.01

### OYVMV, ALCV and OELCV diseases

a, b, c: Significant difference in a column by analysis of variance ( $P \leq 0.05$ ).

## DISCUSSION

### In Unidirectional Common Thread Healthy Diet Prevention COVID-19

The cost-effective fresh weed vegetables, the amaranth, qualify as an ideal food source for people of low income-food deficit countries, and the entire plant is used to make medicine, -“Aid to Eating and Staying Healthy during COVID-19”, to provide food and immunity [19,20,66-68].

### Advantages of Weed-Amaranth as Biomedicine On Catch-Weed-Crop

It is evident from the observation that amaranth and okra plants were highly susceptible to Root-Knot, Amaranth Mosaic Virus, Okra Yellow Vein Mosaic Virus, Amaranth Leaf Curl Virus and Okra Enation Leaf Curl Virus disease, but less infected in the intercropped with amaranth-okra plants, in the intercropped plot, in comparison to inoculated naturally infected plots. Though, both the amaranth and okra, are very good hosts of these nematodes as well as foliar pathogens [66-69]. However, root-knot nematodes liked to feed on amaranth rather than okra when it had a choice, forming the “Susceptible Catch-Vegetable-Crop-Biomedicine-Weed-Plants”. Here the amaranth

root system colonizes and occupies the large area, it is likely that the plant-parasitic nematodes will preferably be found in its roots [49-58]. In other words, amaranth could serve as a good potential catch crop thereby reducing pathogens infection of other vegetables.

### On Double Benefit

In intercropping, land equivalent ratio, benefit-cost ratio, and monetary advantage index are used to assess the productivity and its economic benefits. The farmers would be benefited double; by controlling root-knot diseases, and by buying and selling the amaranth-okra fruits [49-58].

### On High Tolerance to Environmental Stresses

The influence of environmental factors of amaranth to temperature, solution pH, moisture stress, depth of emergence, hexavalent chromium-Cr(VI) stress, drought, nickel and use dual crop [69-73].

### On Climate Change and Food Security in Agriculture

Plants growth directly rate by increasing photosynthesis and stomata- activity, conserves solar energy in the glucose, and significantly reduces CO<sub>2</sub> in the climate. So we can say that both plants might have induced synthesis of many new proteins which increase photosynthesis have stimulated increased photosynthesis rate, stomata-activity, and water retention capacity plants by inducing defense response [34,35,39-58]. These results may suggest that plant diseases might be effectively controlled by the amaranth plant as a 'cover vegetables crop'. It is a new and more efficient solution, technologies, products and it has to fulfill its food and nutrition requirement [74], which indirectly influence climate change and resource productive economies enriching quality of midday meal as well as the agricultural sector in food security [34-58,60,62].

### On Amaranth Consumption and Digestion for Prevention Epidemiological Diseases

Amaranth is the oldest widely cultivated, for both medicinal and culinary oligo-purpose, the cost-effective fresh vegetables, qualify as an ideal safe food for people of low income countries and also has economic viability, and it is easily available in all regions, low priced, seed, oil, and leaf are used as food, the amaranth, -"Aid to Eating and Staying Healthy during COVID-19", to provide food and immunity, entire plant is used to make modern medicine, resisting different diseases; analgesic, diuretic, antifungal, vermifuge, antiulcer, laxative, antiviral, asthma, ulcers, diarrhea, swelling of the mouth or throat, and high cholesterol and hypertension, hepatoprotective and antioxidant activities, and it is developed a blueprint for diagnostics, vaccines, and therapeutics against novel coronavirus by WHO [18-20,66-68], forming the 'Nature's Gift to the poor human disease-free healthy life' multipurpose crop [22,23,65], consumed in a

variety of ways, fruits rich in vitamins, calcium, folic acid, carbohydrates, phosphorus, magnesium and potassium, iodine, and other mineral matters, and a good source of superior nutritional quality -oil and -protein, unsaturated fatty acids such as linoleic acid, and makes them easier to digest. *A. viridis* have several active constituents like tannins, resins, reducing sugars and amino acids. The methanolic leaves extract was reported for the presence of rutin and quercetin [68]. It also possess spinosterol (24-ethyl-22-dehydrolathosterol) as a major component along with 24-methylathosterol 24- ethyllathosterol, 24-methyl-22- dehydrolathosterol, 24-ethyl cholesterol and 24-ethyl-22-dehydrocholesterol as minor components in sterol fraction. The roots of *A. viridis* possess a steroidal component, amasterol (24-methylene-20-hydroxycholesta- 5,7-dien-3 $\beta$ -ol). Amaranth is also known for several potential pharmacological properties-health beneficial effects on human diseases, like cardiovascular disease, type 2 diabetes, kidney diseases, skin infection, digestive diseases, some cancers, antibacterial, antioxidant, nootropic, eye, body immunity, blood pressure, obesity, asthma, constipation, heart disease, obesity, osteoporosis, gastrointestinal health, sexual health, and neurological disorders, etc [19-23,33,41,66-78].

### On Genetic Improvements

Among the diverse wild gene pool of amaranth, it holds the resistant source of gene for many biotic stresses, diseases and pests infestation, and resistant gene transfer, and also on germplasm [79, 80].

### Development of Suggestions-Amaranth as Biomedicine against COVID-19

#### On Genome Biology

We're not completely human, the genetic material inside our cells; one hundred forty-five genes from animals, and in 'Genome Biology', the hundreds of genes that appeared to have been transferred from bacteria, archaea, fungi, other microorganisms, and plants to animals. In the case of humans, they found one hundred forty-five genes have jumped from simpler organisms [81] and underpinning all organisms [82]. Approximately, ten percent of the human genome of virus-DNA [83], shows the inter-individual variation [84]; "The Human Genome Is Full of Viruses and our body requires viruses, but viruses don't always require a body" [85].

#### On Genetic and Immune Resistance Mechanisms

It is reported, "Genetic Resistance to Coronavirus Infection- A Review", three host resistance mechanisms: genetic control at the level of the, -cellular receptors, -macrophage and -acquired immunity [14]. SARS-CoV-2 is the etiological agent responsible for the pandemic COVID-19 outbreak and the main protease (Mpro) of SARS-CoV-2 is a key enzyme that plays an important role [86]. When the human body is attacked

by germs, the immune system kicks into gear to fight off the assault [87].

### **On Decreasing, the Chemicals' Usage**

The fertilizers-pesticides, plus improvements in the crop input use efficiency could minimize greenhouse gas emissions, and 'our common future' to produce more food while generating less environmental pressure [80].

### **On Traditional Medicine**

In the evolution, the 70%- 80% population is primarily dependent on traditional medicines [8,14,18,19,22-30,33,88] and the innate response of the patient's immune system, highlighting anti-microbial peptides as the host's own defense molecules, and it could be used as potential therapeutic agents [89]. The World Health Organization, Africa, also welcomes innovations around the world for potential treatments for COVID-19 [104], and develops vaccine by using 'Plant-based Technology' [33, 43, 44, 57, 58, 90, 91].

### **On Human Immunomics Initiative**

Human Immunomics Initiative (HII) aims, how the human immune system fights disease with advances in computing and artificial intelligence, genomics, systems biology, and bioinformatics [92], following the guideline of WHO entitled "Vaccine-preventable diseases and vaccines" [93], and the long-stay stress in emergencies [94], with harmonized clinical trials are aimed to accelerate licensure and distribution by the public-private partnership and platform [95], due to more humid climates and summer weather will not substantially limit pandemic growth [96].

### **On Nature of Binding**

The coronavirus, enters human cells by binding of its viral spike protein to the membrane-bound form of them aminopeptidase angiotensin-converting enzyme 2(ACE2) [14, 15], protease inhibitors and angiotensin-receptor, thus increasing the availability of target molecules for SARS-CoV-2 [97-99]. The T cells- immune warriors help us fight, because they were previously infected with other coronaviruses [100], by 'Antibody Testing for COVID-19' [101] by which designer antibodies could battle [102].

### **On Epitopes**

It is reported that a panel of seven murine monoclonal antibodies (mAbs) was raised against particles of leaf curl virus, and serological and epitope of isolates of leaf curl geminivirus [103], which show a general similarity in epitope profile [104] with little diversity [105]. The antigenic epitopes could constitute a cost-effective and safe alternative to animal virus [103-105].

### **On Viral Nano-biotechnology**

It is an emerging and fascinating field, and plant virus-based nanoparticles have been explored for several years either to express subunit vaccines or as epitope presentation systems, and have been developed for imaging, drug delivery, and therapeutic applications [106].

### **On Updated Coronavirus Dashboard**

Scientists say that novel coronavirus forming a global crisis [107]. So, it has to need 'Modeling of Coronavirus Infection' [108], 'WHO-Timeline and Dashboard Updated' [109,110], and by using artificial intelligence (AI) software [111], and the global collaboration to accelerate the development, production and equitable access to new COVID-19 diagnostics, therapeutics, and vaccines [112].

### **Emergency Applicable Suggestions- Potential Global-COVID-19-Vaccine**

Plant-based vaccines offer several advantages over the conventional systems such as ease of production, storage, higher yields, stability and safety, and advantages in comparisons, prospects, and challenges or constraints in the production of plant-based vaccines and antibodies [113]. Now, the results and discussion fulfill the goal for the research suggestions.

### **First Suggestion for Potential Global-COVID-19-Vaccine**

In biomedicines, the plant virus, Amaranth Mosaic Virus (AMV) and Amaranth Leaf Curl Virus (ALCV), may be used in vaccine formulations to regulate immune function against coronavirus, which has been developed as antigenic-epitopes derived from the vaccine targets COVID-19 infectious epidemic disease agents, and the chimeric virus particles (CVPs) could represent a cost-effective and safe alternative to live replicating coronavirus vaccines. And it may be effective by the humoral and cellular immune responses generated by these CVPs following both parenteral and mucosal delivery and highlight the potential of CVPs to elicit protective immunity from COVID-19 infection [57, 58, 106, 113, 114]. These plant virus-based nanoparticles are attracting the attention of researchers and clinicians for imaging, drug delivery, and therapeutic applications [106]. Here, vaccination or treatments, is the use of remedies against diseases either earlier in an epidemic or given routinely to prevent diseases. When the latter is used it involves mostly the users just like any conventional vaccination which administers the antigen in an inactive state to gain immunity towards the disease and is given before the onset of disease or disease symptoms in an individual as a prevention rather than cure [115]. It is obligatory that information on ClinicalTrials.gov, a resource provided by the U.S. National Library of Medicine (NLM), to the National Institutes of Health (NIH) or other agencies of the U.S. Federal Government, is provided by study

sponsors and investigators, and they are responsible for ensuring that the studies follow all applicable laws and regulations [92,116,117]. It is also studied, the cost-effectiveness of emergency care interventions, in low and middle-income countries like India [118,119]. But it will not only be cost-effective but also easily available and prepare able, higher yields, stability and safety as well as and safe alternatives to live replicating COVID-19 vaccines [109-113,118-120].

### **Second Suggestion for Potential Global-COVID-19-Vaccine**

The amaranth (fresh or cooked) may be consumed as biomedicines @ 100g (one cup) twice daily (during taking meal) for at least 6-weeks, against naturally occurring coronavirus infections 45-days before the symptom onset OR illness onset (as a vaccine) OR onset of symptoms (if possible) - associated COVID-19 infections have been reported (treatments) [63,66-79,119]. The edible biomedicine-weed amaranth or okra may also be directly personal-used for “Clinical Trial or as a Potential Global-Vaccine” after getting permission from the; -WHO, -Clinical Trials.gov., -U.S., NLM and -NIH [92,116,117]. It is the most; cost-effective, easily-available, safe-edible, and easily-prepare able as well as and safe alternative to live replicating COVID-19 vaccines [43, 44, 57, 58, 109-113, 118-120].

### **Planned to Publish Suggestions**

The COVID-19 outbreak, helps the readers as well as a scientific community to take measures or treatment opportunities or discovery of vaccines to avoid new coronavirus, and provide a platform for young/upcoming scientists and future researchers to share/explore their research on International Journal of Healthcare and Medical Sciences for “Effective and Simple Methods of Preventing the Transmission of Viral Diseases-COVID-19” [1, 8, 119].

### **Suggestions for Emergency Applications Amaranth-Based Healthy diet Greater Prevention against COVID-19**

Eating amaranth based healthy diet with vitamin D, is very important during the COVID-19 pandemic because affect our body’s ability to prevent, fight and recover from coronavirus infections by improving supporting immune systems which is reported in the ‘Genome Biology and Evolution’, these genetic changes may have sharpened the body’s defenses against the pathogens [1-25,57,58,63,64,118,121].

### **Amaranth-Based Vaccines Offer Several Advantages**

Conventional vaccines though effective, have high production costs, involve tedious purification processes, and have biosafety issues, requiring time-consuming biosafety tests for commercial production. But plant-based vaccines and antibodies offer several

advantages, such as ease of production, storage, higher yields, stability, and safety [4,18,90,94-96,100,106-114,121-124].

### **Emergency Applications of Potential Personalized Vaccines**

There is a massive international effort underway to develop diagnostic reagents, vaccines, and antiviral drugs in a bid to slow down the spread of the disease and save lives, with a rapid supply of vaccines and antiviral drugs for the emergency manufacturing and application against COVID-19 [118,125], by inducing a potent immune response through both humoral and cellular components of the immune system [17, 18, 126, 127].

### **Emergency Use Cost-Effective Personalized-Potential-Global-Vaccine**

Amaranth weed should be used as a potential emergency care cost-effective personalized-biomedicine ‘Vaccine or Social-Vaccine for all’ because it resists and change unhealthy pandemic social and economic structures and useful metaphor for health promotion [17, 18, 118, 126-128], because it sharpened our immune system [121], and the SARS-CoV-2 genome can provide useful information, on how drugs targeting other coronaviruses may improve outcomes for COVID-19 patients [129]. And the World Health Organization and other international organizations have set up a system to accelerate and equitably distribute vaccines, “the COVID-19 Vaccines Global Access (COVAX) Facility” [1-11,130,131], for preventing any controversy, with the “Biosimulation- can help to achieve the COVID-19 vaccine development” by avoid the dangerous rush for vaccines [132].

### **Future Approach in Research**

It will be achieved from typical analysis or justifications of literature review, are the ultimate keys to extending good health and nutrition globally [24, 33]. In the future, combination of ‘Amaranth-Okra’ may not only be ‘Potential Economical Crop’ against various pathogens in agriculture, but also “Potential Cost-Effective Green-Economical Emergency Potential Global-Vaccine specially for poor or Social-Vaccine Biomedicine against COVID-19 with Safe and Elicits Significant Immune Responses”, and it resists and change unhealthy pandemic social and economic structures [57,58,65,128-133].

### **CONCLUSIONS**

The weed amaranth-vegetables could serve as a good “Eco-Friendly Potential-Biomedicines Highly-Economical Catch Vegetable Crop Plants for All”, conserving “Biodiversity Conservations Sustainable Climate Health and Development with Important Green-Socio-Economic Implications in Agriculture” and “Healthy Amaranth Diet Greater Prevention against COVID-19”, thereby reducing different plant diseases. It has important economic implications in agriculture to

fulfill its food and nutrition requirements and improved midday meals by preventing malnutrition. And highly trace-tolerance-amaranth may be used, in vaccine formulations or treatments, as one of the most powerful potential-biomedicine, improving natural immunity against COVID-19. It is the most; powerful cost-effective emergency-healthcare easily-available safe-edible prepare-able easy-applicable future-potential-personalized-biomedicine and safe alternative to live replicating COVID-19-‘Potential Global-Vaccine or Social-Vaccines’, enriching food-security green-socio-economy medical-science-and-technology-communication applications issues. Now it is planned to publish as suggestions; the use of amaranth as biomedicines, and combination of amaranth-okra as future-biomedicines, based healthy diet and greater prevention against Sars-Cov-2, by boosting our immune system which may significantly solve or help or advance the current problem of the COVID-19 infections, and clinical practice and acts as an indispensable source to access the pharmacological developments globally. And amaranth-based social-biomedicine potential-vaccines offer several advantages over the conventional systems such as ease of production, storage, higher yields, stability and safety, and advantages in comparisons, prospects and challenges or constraints in the production of plant-based potential-policy-developed-vaccines for all.

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#### CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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