

## Conference Paper

# Ginger Village: A Step Towards a Healthier Society

Petri Lestari\*, Yani Lukmayani, Ratih Aryani and Kiki Mulkiya Yuliatwati

Pharmacy Department, Faculty of Mathematics and Natural Sciences, Universitas Islam Bandung, Bandung, Indonesia

**Abstract.**

The COVID-19 pandemic has been challenging for health, economic, and social conditions in Indonesia. There is a need to educate people to maintain and improve physical health. This includes the use of supplements and herbs as a method of prevention against diseases. Ginger has been proven to be an effective preventive and therapeutic agent. It is analgesic, anti-inflammatory, antiemetic, antioxidant and an immunomodulator. A community program was conducted to educate the public on the benefits of ginger and other supplements and herbs, to actively cultivate ginger plants and to produce products based on ginger. It was conducted in Ginger Village, Karasak Ward, Astanaanyar Subdistrict, Bandung City. The program consisted of seminars about the benefits of supplements and herbs, training to produce ginger drinks at home, and a donation of a hundred ginger plants to Karasak Ward society.

**Keywords:** ginger, health supplement, community service

Corresponding Author: Petri Lestari; email: petri.lestari@unisba.ac.id

Published 27 December 2022

Publishing services provided by Knowledge E

© Petri Lestari et al. This article is distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use and redistribution provided that the original author and source are credited.

Selection and Peer-review under the responsibility of the SIRES Conference Committee.

## 1. INTRODUCTION

Cumulative confirmed cases Covid-19 have been increasing between 2020-2021 in Indonesia. It was approached 1,511,712 national cumulative confirmed cases on 31 March 2021, specifically 250,282 cases in West Java Province and 15,444 cases in Bandung City. The cases have been grown up in the next months, even more second wave was happened in July 2021. West Java is being second rank on Covid-19 cases among provinces after DKI Jakarta. The cases in Bandung City approaching the second highest in West Java. The symptoms recorded were cough, fever, runny nose, fatigue, headache, sore throat, breathless, muscle cramp, nausea, abdominal pain, and diarrhea [1-3].

Increase in Covid-19 cases has been impacting on needs of body immunity improvement, in addition to health protocol implementation prevent viral transmission. Immune system is body defense against exposure of strange substances. The substances originated from outside or inside the body itself. On good conditions, immune reactions able to protect the body [4,5]. Immune system is being improved by hygiene maintenance,

**OPEN ACCESS**

sufficient intake of nutrition, completed with supplement and herbs consumption [6]. Therefore, natural ingredients that had been proven active as immune system enhancer, antiviral, antioxidant, and anti-inflammatory have some chance to become alternative prevention and supporting Covid-19 therapy [7].

Some medicinal plants had been proven as immunostimulants. Those are sambiloto (*Andrographis paniculata*), turmeric (*Curcuma longa*), ginger (*Zingiber officinale*), Javanese turmeric (*Curcuma xanthorrhiza*), and meniran (*Phyllanthus urinaria*) [4]. Immunostimulants are agents that enhancing non-specific immune which contribute for body protection against bacterial or viral infections [8].

Ginger (*Zingiber officinale* Rosc.) is one of family medicinal plants that common cultivated to maintains people's health furthermore as preventive, promotive and curative therapy. The major constituents in ginger rhizomes are carbohydrates (50–70%), lipids (3–8%), terpenes, and phenolic compounds. Terpene components of ginger include

zingiberene,  $\beta$ -bisabolene,  $\alpha$ -farnesene,  $\beta$ -sesquiphellandrene, and  $\alpha$ -curcumene, while phenolic compounds include gingerol, paradols, and shogaol. The specific odor of ginger is related to zingiberene and bisabolene, while the pungent flavor is due to volatile oils of gingerols (23–25%) and shogaols (18–25%). Besides these components, amino acids, raw fiber, ash, protein, phytosterols, vitamins (e.g., nicotinic acid and vitamin A), and minerals are also present in ginger [9]. Gingerol and shogaol was known responsible for analgesic, antiemetic, antipyretic, and prostaglandin suppression actions of ginger [10,11]. Gingerol and shogaol levels in red ginger (*Zingiber officinale* var. *Rubrum*) is higher than big ginger (*Zingiber officinale* var. *Roscoe*), and the highest is in small ginger (*Zingiber officinale* var. *Amarum*) [12].

Gingerol in ginger was identified as free radicals' scavenger through stimulation of superoxide dismutase, catalase, and glutathione peroxidase so ginger has antioxidant activity. Ginger is effective as anti-inflammatory because the active compound can prevent NF- $\kappa$ B, a protein complex that controls DNA transcription and cytokine production. Paradol, shogaol and gingerol in ginger suppress prostaglandin production through inhibition of cyclooxygenase-1 and 2, suppress leukotriene synthesis with inhibit lipoxygenase [10,13].

Ginger is one of many natural immunomodulator. In vitro study showed that ginger inhibit lymphocytes proliferation, mediated by reduction of interleukin IL-2 and IL-10 productions. Ginger essential oils had improved cellular immune responses in immunosuppressed mice. Ginger powder improved non-specific immune response in trouts. Study in trouts showed enhancement in leucocytes and neutrophils after ginger powder

administration for 12 weeks. Total and differential leucocytes count are important for non-specific immune system, and involved in phagocytic activities and responses against bacteria, viruses, and parasites [10,14,15].

Ginger is potential to improve respiratory disease. Gingerol and shogaol can induce bronchodilatation and reduce hyperresponsiveness of airway with alter intracellular calcium influx on respiratory tract smooth muscles. These isolates become alternative for respiratory disease therapy both as single therapy and combination with other agent like  $\beta_2$ -agonist in asthma [16].

Ginger as an important dietary agent which possesses carminative effect, decreases pressure on lower esophageal sphincter, reduces intestinal cramping, and prevents dyspepsia, flatulence, and bloating. A clinical trial investigated the effects of ginger extract (100 mg, corresponding to 2 g of rhizome twice a day) on gastrointestinal motility and showed a significant increase in gastrointestinal motility in the intervention group in comparison with the placebo. The studies have shown that ginger in dose of 1 g/day is effective in pregnancy nausea and vomiting with no significant side effects [9].

Based on requirement to educating people about benefits of herbs, encourage people to actively planting family medicinal plants at home and develop healthy product containing herbs, so we conducted this community service to developed Ginger Village. Ginger became the focus of this program because of its easiness to cultivated and simplicity for product formulation. Ginger has been consumed by Indonesian people in daily lives for many years so that familiar in taste and benefits for health. This program was initiated by collaboration with Karasak Ward government. Ginger Village is in Karasak Ward and has become a work plan of the government.

## 2. METHODS

The community service was held on 7 April 2021, at the same time with World Health Day, located in Karasak Ward, Astanananyar Subdistrict, Bandung City. Karasak ward was selected as the target because of their track record to actively develop family medicinal plants garden and one of the governments workplan in this year is to launch Ginger village that is very suitable with the focus of this community service.

The committee conducted series of programs consists of seminar, training, and donation of red ginger plants for Ginger Village development. Seminar and training were attended by 35 participants as community representatives in Karasak. Seminar discussed about supplements and herbs (including about ginger) as immune enhancers. The training is about how to make ginger powder drink, demonstrated by committee in

the form of tutorial video. Sample of product resulted was shared to the participants. The main agenda of this events is launching and first cultivation of Ginger Village by Karasak people and government, supported by the committee, on 10 April 2021. This event has implemented health protocol on Covid-19 pandemic.

### 3. RESULTS AND DISCUSSIONS

We educated people about effects and doses of administration of supplements like vitamins C, D, and E and zinc and probiotics to enhancing immune system. We also informed people about effects of ginger and many herbs that

have activities to promote health and immune system based on many literatures and research, and how to process the herbs appropriately to get better outcome. The seminar about supplements, herbs and ginger had increased about 36% of participants knowledge, based on test results. Main score of posttests was compared with main score of pretests of all participants.

The powder drink has been selected as the training object in this community service. In general, ginger can be processed into various ready to consume products such as essential oil, ginger powder, ginger syrup, ginger sweet, ginger candy, and ginger crystal. In powder form, people can deserve their own beverage in more simple way. With a sweet instant powder, the quality of the product can be maintained, not easily contaminated, not easily infected with the disease, and no preservatives needed in the product [17]. The steps of ginger powder drink production were trained by committee using tutorial video. Hereafter, the video was also published by committee in social media. Therefore, it will be easy to access by people in Karasak and others as a guide in making ginger powder drink by themselves at home. Since the condition during pandemic, we chose not to performed practical work in training.

Many herbal powder drinks are made by extraction, filtration, and crystallization, pass through optimization process that observe several factors. Crystallization is process to form crystals from solution, with sugar (sucrose) added. In making instant powder drink, sugar is also being sweetening and preservative agent [18]. Sugar concentration affects yield, water content, solubility, color, and taste of powder drink [19]. Sucrose component in cane sugar produces better crystals than palm sugar which contains glucose and fructose [20].

As much as 500 g ginger is peeled and washed, then chopped, crushed, and blended with 200 mL of water. Or in other way, ginger is shredded to get more essential oils and gingerol [21]. Mashed ginger was filtered by strainer or clean cloth, so it separated

from the pulp. Ginger concentrate was left about 1-1.5 hour. This sedimentation did for separating starch from ginger concentrate, so the concentrate will not become thick and difficult to dried.

The concentrate without the starch was cooked on medium flame. One of the important keys to making beverages in the form of powder is the evaporation process. Evaporation used to remove some of the water contained in liquid food by boiling. Evaporation aims to increase the solids and still in the form of puree. Zingerone and significant active compound were decomposed during the thermal processing [17].

As much as 600 g sugar was added then stirred until the sugar dissolved and the liquid was boiling. Intensively stirring process is needed to prevent caramelization induced by heat releasing during crystallization. Heating process with gradual temperature reduction can help to drying the crystals [22]. After the stove was turned off, stirring process was continued until form ginger powder.

Ginger Village was developed to encourage people in Karasak Ward to cultivated ginger at their own home, especially red ginger. Red ginger was chosen because gingerol and shogaol levels in red ginger is higher than big ginger [12], and the size is bigger than small ginger. The first cultivation in Karasak Ginger Village was held on 10 April 2021 by the people, led by the chief of Karasak Ward government. In the future, the government plans to extend the plants quantity from other sources.

A hundred red ginger plants were supplied by the community service committee. As the results, Ginger Village has been established with our accompaniment. For simplicity, red ginger was planted in polybags. Red ginger cultivation in polybags nowadays is preferred because of limited area. Plant selection is most important. After polybags ready to use, the soil was prepared, mixed with fertilizer. Large size of polybags about 60x40 cm was selected because the ginger plants will grow bigger and need more spots for roots to grow. The plants need routine maintenance by watering every day and add fertilizer. Soil in polybag must be always damp. Fertilizer that recommended is dung. Fertilizer was given after the plant starts growing. Weeding the weeds is also important [23].

Now, Ginger Village is established in Karasak with the name of the committee is mentioned on the signpost of the Ginger Village gate.

## 4. CONCLUSIONS

Ginger Village in Karasak Ward, Bandung city is one step to achieve healthier society, besides on many efforts needed to enhance the healthiness of people. Ginger village

was launched in April 2021 with supports of a hundred plants by the community service committee. The program was preceded by education in the form of seminar about supplements, ginger and other herbs, and training about home production of ginger powder drink. With this program, we expected that Karasak people will routinely using supplements or herbs (and ginger) to improve body health and its immune system, actively planting the ginger and be able to produce ginger powder drink at home that will potentially increasing economic and health status of the society in the future. In the next year, the committee plan to continue development of Ginger Village and training about producing other form of healthy products based on ginger.

## ACKNOWLEDGEMENT

The authors gratitude to Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM) Universitas Islam Bandung for providing financial support through this community service and Karasak Ward-Astanaanyar Subdistrict government for the collaboration in organizing this community service.

## References

- [1] Satuan Tugas Penanganan Covid-19, (n.d).
- [2] Pusat Informasi dan Koordinasi Covid-19 Provinsi Jawa Barat, (n.d).
- [3] Pusat Informasi Covid-19 Kota Bandung, (n.d).
- [4] Badan POM RI. 2020.
- [5] Abbas AK, Lichtman AH, Pillai S. Cellular and Molecular Immunology E-Book. Elsevier Health Sciences; 2014.
- [6] Badan POM RI. 2020 (n.d).
- [7] Mrityunjaya M, Pavithra V, Neelam R, Janhavi P, Halami PM, Ravindra PV. Immune-Boosting, Antioxidant and Anti-inflammatory Food Supplements Targeting Pathogenesis of COVID-19. *Front Immunol.* 2020;11:570122.
- [8] Del-Rio-Navarro BE. S. GonzAlez-Diaz, A. J. Escalante-Dominguez, and V. Blandón-Vijil. *Int J Biotechnol.* 2007;9:246–60.
- [9] Nikkhah Bodagh M, Maleki I, Hekmatdoost A. Ginger in gastrointestinal disorders: A systematic review of clinical trials. *Food Sci Nutr.* 2018 Nov;7(1):96–108.
- [10] Singh R, Singh K. *Res J Life Sci Bioinform Pharm Chem Sci.* 2019;5(2):113.
- [11] Fatehi-Hassanabad Z, Gholamnezhad Z, Jafarzadeh M, Fatehi M. *Daru.* 2005;13:70–3.

- [12] D. Fathona. 2011.
- [13] Ezzat SM, Ezzat MI, Okba MM, Menze ET, Abdel-Naim AB. The hidden mechanism beyond ginger (*Zingiber officinale* Rosc.) potent in vivo and in vitro anti-inflammatory activity. *J Ethnopharmacol.* 2018 Mar;214:113–23.
- [14] Haghighi M, Rohani MS. *Journal of Medicinal Plant and Herbal Therapy Research.* 2013;1:8–12.
- [15] Fadeifard F, Raissy M, Jafarian M, Boroujeni HR, Rahimi M, Faghani M. Effects of black seed (*Nigella sativa*), ginger (*Zingiber officinale*) and cone flower (*Echinacea angustifolia*) on the immune system of rainbow trout, *Oncorhynchus mykiss*. *Arq Bras Med Vet Zootec.* 2018;70(1):199–204.
- [16] Townsend EA, Siviski ME, Zhang Y, Xu C, Hoonjan B, Emala CW. Effects of ginger and its constituents on airway smooth muscle relaxation and calcium regulation. *Am J Respir Cell Mol Biol.* 2013 Feb;48(2):157–63.
- [17] Apriyana W, Rosyida VT, Hayati SN, Darsih C, Poeloengasih CD (Conf IO, editor). *Ser. Earth Environ. Sci.* IOP Publishing; 2017. p. 12027.
- [18] Sukmawati W, Merina M. PELATIHAN PEMBUATAN MIPELATIHAN PEMBUATAN MINUMAN HERBAL INSTAN UNTUK MENINGKATKAN EKONOMI WARGANUMAN HERBAL INSTAN UNTUK MENINGKATKAN EKONOMI WARGA. *Jurnal Pengabdian Kepada Masyarakat.* 2019;25(4):210–5.
- [19] B. Haryanto. 2017.
- [20] Srikaeo K, Sangkhiaw J, Likittrakulwong W. Productions and Functional Properties of Palm Sugars. *Walailak J Sci Technol.* 2019;16(11):897–907.
- [21] Sutralestari N, Devi M, Soekopitojo S. *Teknologi Dan Kejuruan: jurnal Teknologi. Kejuruan Dan Pengajarannya.* 2018;41:77–88.
- [22] Mursalin M, Nizori A, Rahmayani I. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi.* 2019;3:71–77.
- [23] Dinas Ketahanan Pangan, Pertanian Dan Perikanan Kota Banjar Baru (n.d.).