

Psidium guajava* L. AS AN ALTERNATIVE FOR ANTI-INFLUENZA VIRUS: A REVIEW**Yedy Purwandi Sukmawan^{1*} and Hendy Suhendy²¹Department of Pharmacology and Clinical Pharmacy, Sekolah Tinggi Ilmu Kesehatan Bakti Tunas Husada, Tasikmalaya. West Java, Indonesia.²Department of Pharmacognosy, Sekolah Tinggi Ilmu Kesehatan Bakti Tunas Husada, Tasikmalaya. West Java, Indonesia.Corresponding Author: Yedy Purwandi Sukmawan**

Department of Pharmacology and Clinical Pharmacy, Sekolah Tinggi Ilmu Kesehatan Bakti Tunas Husada, Tasikmalaya. West Java, Indonesia.

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ABSTRACT

Background: As of March 11, 2020, the World Health Organization declared COVID-19 pandemic. More than one hundred countries were affected by this virus with 132.758 confirmed and 4955 death as March 13, 2020. **Aim of the study:** Much research was conducted to discover an effective drug. Lopinavir/ritonavir, ribavirin, interferon- α , chloroquine phosphate, and arbidol have been recommended for the treatment of this virus. However, no verified anti-viral for the treatment of this COVID-19. *Psidium guajava* L is one of the valuable of herbal medicine for the anti-influenza virus. **Materials and Methods** We conducted a systematic review with a search strategy involving PubMed and Cochrane. **Results:** Two article were met the inclusion criteria. This plant showed anti-influenza virus activity through many mechanisms of action. **Conclusion:** This broad mechanism of action involved in anti-influenza virus activity makes this plant a promising novel for this COVID-19 outbreak treatment.

KEYWORDS: *Psidium guajava*, Tea, Flavonoid, Anti-influenza virus, Covid-19.**INTRODUCTION**

Present days worldwide are shocked by the Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2) outbreak. The World Health Organization (WHO) called this as Corona Virus Disease-2019 (COVID-19). The disease first detected from Wuhan, the capital of Hubei Province and spread throughout China and to many countries.^[1] One hundred and four countries were affected by this COVID-19 with 132.758 confirmed and 4955 death as of March 13, 2020.^[2] The clinical symptoms involve fever, chills, cough, fatigue, and shortness of breath.^[3] This outbreak may continue to increase and impact more confirmed people for COVID-19 infection.

Much research to discover effective drugs were conducted all over the world. Lopinavir/ritonavir, ribavirin, interferon- α , chloroquine phosphate and arbidol have been recommended for the treatment of this virus.^[4] Hydroxychloroquine may also be considered, and no vaccine is available.^[5] However, no verified antiviral for this COVID-19 and this treatment may change if there's additional information. Hereby, we conducted a systematic review of the potency of *Psidium guajava* as an alternative for the anti-influenza virus.

METHODS

We conducted a systematic review for *Psidium guajava* according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The search strategy involving PubMed and Cochrane database using "psidium guajava" and "influenza virus" as Medical Subject Headings (MeSH) terms. The studies need to fulfill the following inclusion criteria (1) *Psidium guajava* as an intervention (2) Influenza virus infection (3) animal and/or human involving study.

RESULTS AND DISCUSSION

In the results of the systematic review, we found 56,755 articles, but only 2 articles from PubMed that met inclusion criteria and will be continued to be reviewed.

The first article is from Sriwilaijaroen *et al* (2012).^[6] showed the tea of *Psidium guajava* which prepared by 20 gram of the dried leaves was steeped in 1 Liter water of 85°C for 8 minutes markedly inhibited the growth of A/Narita/1/2009 (amantadine-resistant pandemic 2009 strain), A/Yamaguchi/20/06 (sensitive strain) and A/Kitakyushu/10/06 (oseltamivir-resistant strain) at an IC₅₀ 0.05%, 0,58%, and 0.23%, respectively. This tea can inhibit viral hemagglutination, and also neuraminidase activity.^[6] It is known, that both of the hemagglutinin and neuraminidase recognize sialic acid

as a receptor of the virus for binding and release.^[7] The inhibition of viral hemagglutination activity indicated this guava tea can produce effective antibody for the virus and effective inhibition in the early stage of infection, in while neuraminidase inhibitory activity of this guava tea indicated inhibition of the viral release from the host cell to infected the new host cells.^[6,8] Other results of Sriwilajaroen (2012) study showed there is another component besides tannin which contributes to the anti-influenza virus activity. It is known since a long time ago about the anti-viral activity of tannin, one of the mechanisms is through the antioxidant activity because reactive oxygen species and nitrogen species are produced in an acute respiratory viral infection that has been implicated in lungs tissue injury.^[9] The safety data of the water extract showed no significant harmful effect of the oral administration.^[19] However in high doses of this water extract 500 mg/g BB showed severe injury of the hepatocyte cells and AST-ALT elevation level.^[10]

The second article is from Khalil *et al* (2019),^[12] showed Guava leaves extract at an early stage of infection able to depleted Akt protein kinase gene expression and stimulate the pro-apoptotic p53 more than 7-fold which cause the death of the cells. In a while, the activation of kinase able to prevents cell death through the inhibition of the cytochrome-c.^[11] Furthermore, the flavonoid purified fraction of guava can inhibit virus replication via IL-1 β and IL-8 in association with P53 gene expression.^[12] Eight flavonoid compound has been identified including quercetin-3-O- β -D-xylopyranoside, quercetin-3-O- α -L-arabinopyranoside, avicularin, quercitrin, quercetin, kaempferol, rutin and isoquercitrin.^[13] Quercetin is considered as the most active of anti-oxidant activity in *Psidium guajava*.^[14] Quercetin inhibitory effect for the influenza virus is a dose-dependent manner, at an early stage and during the process of virus infection through interaction or binding with hemagglutinin.^[15] Rutin effects for the influenza virus is through the decrease of thiobarbituric acid reactive substance (TBARS) in the lungs organ of experimental influenza virus infection animals.^[16] Kaempferol significantly reducing virus titers in bronchoalveolar lavage fluids in influenza-virus infected mice.^[17] However, there is no research about the activity of avicularin, quercitrin, and isoquercitrin against the anti-influenza virus. Other advantages of this plant can reduce cough as we known one of the symptoms of COVID-19 is cough condition.^[2,18] The broad mechanism of action involved in the anti-influenza virus activity of *Psidium guajava* makes this plant a promising novel for this COVID-19 outbreak.

CONCLUSION

The dried tea leaves extract showed activity against the influenza virus through many mechanisms of action. Therefore this broad mechanism of action involved in the anti-influenza virus activity of *Psidium guajava* makes this plant a promising novel for this COVID-19 outbreak.

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CONFLICT OF INTEREST

We declare no conflict of interest of this study.

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