JOURNAL OF TROPICAL ETHNOBIOLOGY

Vol. V No. 1 **January 2022** **P-ISSN 1693-6892**
E-ISSN 2722-0257

The Ethnobiological Society of Indonesia

Antidesma bunius (L.) Spreng. (Foodstuffs and Its Bioactivity)

Marina Silalahi	Prodi Pendidikan Biologi FKIP, Universitas Kristen Indonesia, Jakarta, Indonesia
Endang C. Purba	Perhimpunan Masyarakat Etnobiologi Indonesia (PMEI), Bogor, Indonesia
I. G. A. Rai Sawitri	Perhimpunan Masyarakat Etnobiologi Indonesia (PMEI), Bogor, Indonesia
Riska S. Wahyuningtyas	Prodi Pendidikan Biologi FKIP, Universitas Kristen Indonesia, Jakarta, Indonesia
Novika Sitepu	Prodi Pendidikan Biologi FKIP, Universitas Kristen Indonesia, Jakarta, Indonesia
Corresponding email	marina.silalahi@uki.ac.id

ABSTRACT

Antidesma bunius has been long used as food and traditional medicine by vary local communities in Indonesian. This study aims to explain the potential of *A. bunius* as a food ingredient and its bioactivity. The method used is survey and library research published online at Google Scholar by using keywords such as *A. bunius*, bioactivities of *A. bunius* and uses of *A. bunius*. *Antidema bunius* is an indigenous plant of Indonesia and has been cultivated in the yard as a shade and source of fruit. The local people in West Java have been used the A. bunius fruits for *rujak* ingredient which called as *rujak buni*. As a food ingredient, *A. bunius* fruit is used as an ingredient for salads and has been processed to be syrup, jelly, sauce and wine. The bioactivity of *A. bunius* is as an antioxidant, anti-bacterial, anti-cancer, anti-diabetic mellitus, anti-inflammatory and anti-cholesterol. The fruits of *A. bunius* has potential to be developed as a nutraceutical, especially as an anti-cancer and antioxidant-rich food.

Keywords: *Antidema bunius*, antioxidant, *rujak buni*, anti-cancer

INTRODUCTION

Antidesma bunius has been long used as food by local people of Indonesian. By Betawi ethnic, *A. bunius* is known as *condet* and has been immortalized as one of the centers of Betawi ethnic settlement in East Jakarta, while by Sundanese it is known as *buni*. This shows that *A. bunius* has cultural value for the local Indonesian community, especially the people who live around Jakarta. The fruit of *A. bunius* has been long traded so that it has economic value. The *rujak buni* is a traditional cuisine that uses *buni* fruit as the main component and its considered as one of the culinary specialties of the Bogor area or Sundanese ethnicity. Silalahi and Mustaqim (2020) stated that as food, *A. bunius* fruit can be consumed as fresh fruit and has been processed into syrup, jelly, sauce and wine. The old fruit has a blackish red color so it is widely used as a natural dye (Yelliantty *et al*., 2021).

Besides being used as food, *A. bunius* has been used as a traditional medicine to treat wounds. The use of plants as traditional medicine is related to their bioactivity. *Antidesma*

bunius has activity as antibacterial, anti-inflammatory (Pongnaratorn *et al*., 2017), anti-oxidant, anti-hypertensive (Aksornchu *et al*., 2021), anti-microbial (Yelliantty *et al*., 2021), and anti-cancer (Pongnaratorn *et al*., 2017; Yelliantty *et al*., 2021). The bioactivity of *A. bunius* is related to its secondary metabolite content such as anthocyanins (Aksornchu *et al*., 2021), 5-hydroxymethylfurfural (HMF), furaldehyde, and citric acid (Yelliantty *et al*., 2021). Anthocyanins have activity as antioxidants and anti-hypertensives (Aksornchu *et al*., 2021).

Although *A. bunius* fruit has long been traded and has economic value, empirically it appears that its utilization is not optimal because it is only used by certain groups. The factors cause its, *A. bunius* to be underutilized as a source of fresh fruit, including: sour fruit taste, small fruit size, perishable fruit (Suravanichnirachorn *et al*., 2018), and less well-known to the public. This study aims to explain the use of *A. bunius* as food and traditional medicine as well as its bioactivity.

METHODS

Study Area

This study was conducted at the Jatisampurna subdistrict, Bekasi District, West Java Province in April-August 2021. The methods used in this study are survey and library research. The survey was conducted to *rujak buni* traders in Jatisampurna District, Bekasi City, West Java. The research library in this study was sourced from Google Scholar by using keywords such as *A. bunius*, bioactivities of *A. bunius* and uses of *A. bunius*.

Data Analysis

The information obtained was analyzed qualitatively and synthesized so as to explain botany, the benefits of *A. bunius* as a food ingredient and its bioactivity.

RESULTS AND DISCUSSION

Botany of *Antidesma bunius* (L.) Spreng.

Phyllanthaceae is a morphologically diverse pantropical plant which has about 60 genera and about 2000 species (Savolainen *et al*., 2000), and one of the important genera is *Antidesma* which has about 100 species (Hoffman, 1999). *Antidesma* Burm. ex L. has a dioecious tree and shrub habitus commonly found in tropical rainforest understorey and shrubby vegetation and is thought to be the center of diversity in the Malesia region (Hoffman, 1999). By local people Indonesian, *A. bunius* is known as *buni* (general) or *condet* (ethnic Betawi). *Antidesma bunius* is widely distributed, from India - Southern China, then throughout Malesia, Northeastern Australia and the Pacific Islands. In Java island and the Philippines, this species is widely cultivated (Silalahi and Mustaqim, 2020).

Antidesma bunius is tree, 30 m high, sometimes shrub, many branches (Figure 1A). Leaves: single, alternate and supported by a pincushion. Leaves bearing linear, deciduous, 4 – 6 mm long and 1.5 – 2 mm wide, stalks 3 – 17 mm long. The strands are oblong, oval or round in breech eggs and with a texture that tends to peel or resemble paper but is thick. Strands 5 – 32 cm long and 2 – 10 cm wide, rounded to pointed at the base, flat edges, pointed to rounded at the tip. Secondary ossification 5 – 11. Flowers: Inflorescences from leaf axils or branch tips.

Male inflorescences are 6 - 25 cm long, the number of branches between 3 - 14, while female inflorescences are 4 - 18 cm long, generally branchless and sometimes branched with a maximum number of 4. Male flowers with 3 or 4 stamens and rarely 5. Flowers female with 3 or 4 pistils and rarely up to 6. Fruits and Seeds: Stone-type fruit with an oblong and often flattened shape, 5 – 11 mm long and 4 – 7 mm wide (Figure 1B). Red or dark ripe fruit (Figure 1C) (Li and Hoffmann, 2008; Silalahi and Mustaqim, 2020).

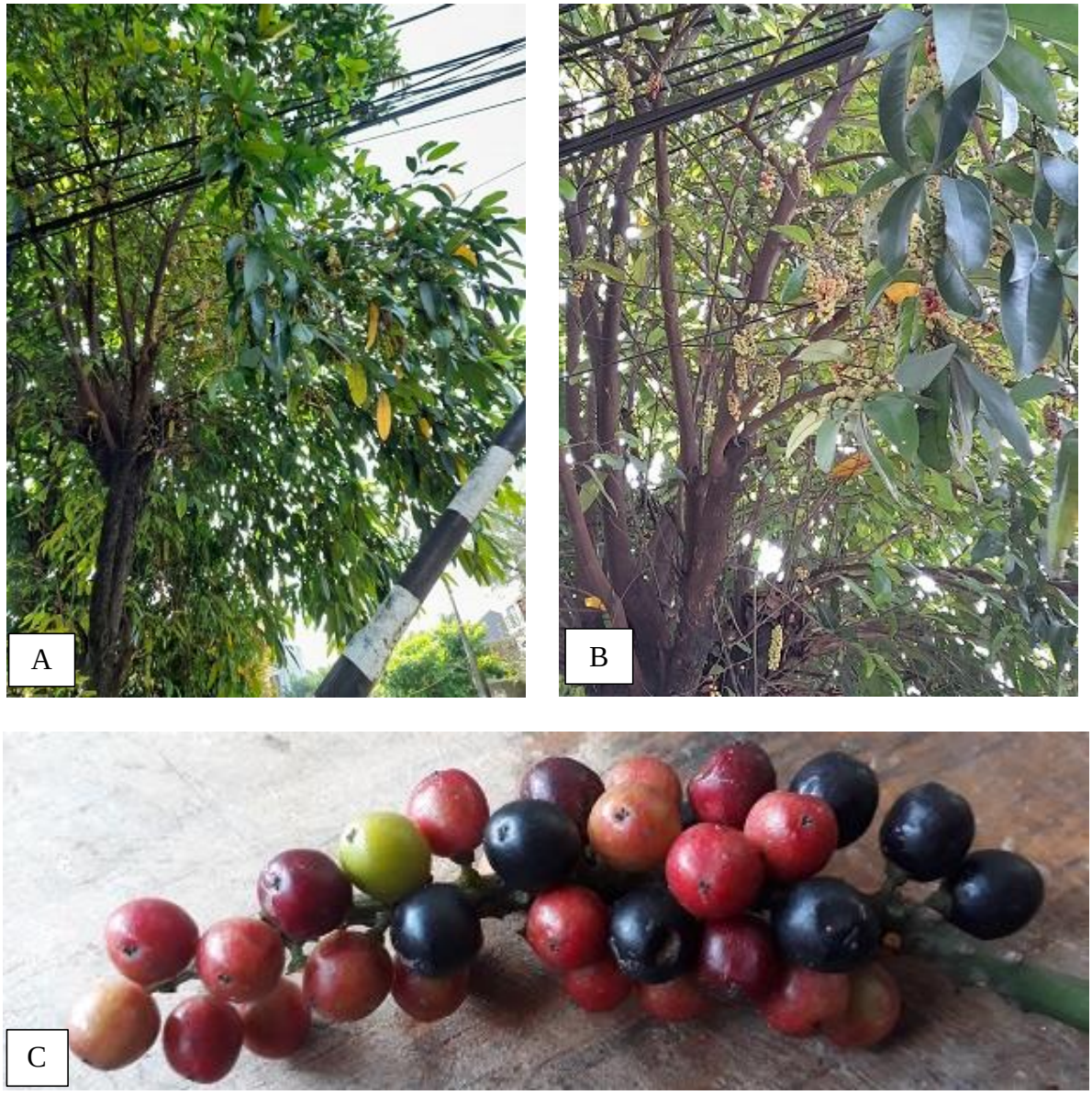

Figure 1. *Buni* (*Antidesma bunius*). A. Habitus; B. The branches with the young fruit; C. The fruits (old and ripe blackish red)

Foodstuffs and Bioactivity of *Antidesma bunius*

Foodstuffs are plants that have nutritional value. Fruits of *A. bunius* has been long used as a food ingredient, especially as a source of fresh fruit and cooking spices. *Buni* fruit is relatively small in size and has many seeds, so it is not liked by the public as a source of fresh fruit. For local Sundanese people, especially those who live in West Java and around Jakarta, *buni* fruit is used as the main spice for *rujak*, known as *rujak buni* (Figure 2A). The *rujak* (like

salad) is a traditional Indonesian culinary dish made from various types of fresh fruit then doused with a sauce-like seasoning.

In making *rujak buni* (Figure 2A), traders use old and ripe fruit (Figure 1C). The process begins with separating the fruit from the stalk, then washing it with water and then draining it using a "sieve" from a bamboo winch (Figure 2B). The fruit is ground using a mortar (Figure 2C) with other rujak spices such as chili (*Capsicum annuum*) and palm sugar (*Arenga pinnata*). The crushed buni fruit is red so it looks more attractive (Figure 2C). Amalia and Afnani (2013) stated that AB fruit contains anthocyanins so that it can be used as an alternative to food coloring.

Figure 2. The processing makes of *rujak buni* (*Antidesma bunius*). A. The cabinet for arranging *rujak* ingredients; B. The drained *buni* fruit; C. The trader processing seasoning *rujak buni*; D. The *rujak buni* seasoning that has been processed, bright colors make it more attractive

Based on observations and interviews to traders that we conducted in Bekasi, that *rujak buni* is similar to other *rujak* in Indonesia, using raw materials such as guava (*Syzygium aqueum*), jicma tuber (*Pachyrhizus erosus*), mango (*Mangifera indica*), but the addition of fruit of *Salacca zalacca* is differentiates from the other *rujak* (Figure 3A). The rujak buni is served by sprinkling the processed *buni* fruit seasoning on the top surface of the *rujak* (Figure 3B). The *rujak buni* as a culinary has the potential to be developed because in addition to having nutritional value, it also has bioactivity in the health sector or known as nutraceutics.

The buni fruits can be used as raw material for making fruit juice (Suravanichnirachorn *et al*., 2018) and grape ingredients (Belina-Aldemita *et al*., 2013) because its has high water content. However, the content and nutritional quality of buni fruit juice is influenced by the processing process. The pasteurized *A. bunius* juice contains high antioxidant activity

compounds (Chaikham *et al*., 2016). The buni fruit extracted at a temperature of 50^{o} C has high phenolic content so that it has the potential to be developed as a healthy food (Yasser *et al*., 2020b). Ultra-sonication technology is an appropriate processing technique to maintain the desired characteristics of buni juice (Chaikham *et al*., 2016).

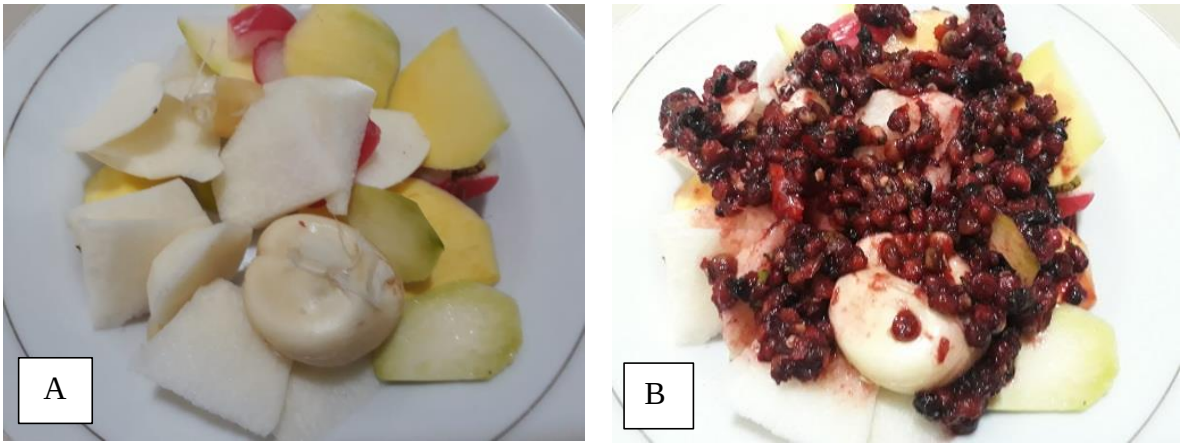

Figure 3. The *rujak buni*. A. The ingredients of *rujak buni*. B. The *rujak buni* with seasoning is served on a plate

The high moisture content of *buni* fruit causes it to rot easily, therefore the processing of *A. bunius* fruit needs to be developed so that it can last a long time but its nutritional value can be maintained. Suravanichnirachorn *et al*. (2018) stated that to extend the shelf life of *A. bunius* juice, it can be freeze-dried with the addition of maltodextrin and gum arabic. He further stated that maltodextrin and gum arabic can improve the physical quality of *A. bunius* fruit powder but the total anthocyanin content (TAC) and antioxidant activity tend to decrease. The addition of maltodextrin at 35% as drying agent *A. bunius* resulted in a TAC of 2.63 mg/g. The anthocyanins in *A. bunius* powder are delphinidin (1.10 mg/g) and cyanidin-3-O-glucoside (0.78 mg/g) (Suravanichnirachorn *et al*., 2018).

Antioxidant

The degenerative diseases in humans are associated with free radicals such as diabetes mellitus and cancer. The antioxidant compounds are compounds that can prevent or slow down cell damage caused by free radicals. The commercial compounds as antioxidants such as butyl hydroxy anisole (BHA), butyl hydroxy toluene (BHT), propyl gallate, tert-butyl hydroxyquinone (TBHQ), and tocopherols. The bioactivity of *A. bunius* as an antioxidant has been reported by Kassem *et al*. (2013), Quiming *et al*. (2016), Tajbin *et al*. (2021), Aksornchu *et al*. (2021), and Islary *et al*. (2017).

The bioactivity of *A. bunius* as an antioxidant varies depending on the type of organ, concentration and substance for extraction. The stages of *A. bunius* fruit development affect changes in physico-chemical properties, anti-radical activity and accumulation of polyphenolic compounds (Butkhup and Samappito, 2011) which directly or indirectly affect their antioxidant activity. The total content of immature phenolics was higher than that of the ripe ones, while the anthocyanin content was the opposite. The content of procyanidin B2, procyanidin B1, (+)-catechin, (–)-epicatechin, rutin and tran-resveratrol as the main polyphenols in fruit increases during fruit development and ripening. The content of other phenolic acids such as gallic, caffeic, and ellagic acids decreased significantly during fruit development and ripening (Butkhup and Samappito, 2011).

The antioxidant activity is measured by methods such as water-based methods through the 2,2-diphenyl-1-picrylhydrazyl (DPPH) test, ferric reducing antioxidant power (FRAP), ferrous ion chelating (FIC) while fat-based with thiobarbituric acid (TBA) (Maesaroh *et al*., 2018). The *A. bunius* extract strongly inhibited 1,1-diphenyl-2-picrylhydrazyl (DPPH) (IC_{50} = 56.49 ± 3.4 g/mL), ethyl acetate fraction extract (IC_{50} = 136.52 ± 0.03 g/mL) while the CH_2Cl_2 fraction (IC_{50} = 202.60 ± 0.09 g/mL) (Tajbin *et al*., 2021). DPPH scavenging test, methanol extract (IC_{50} = 3.10µg/ml) showed excellent activity compared to standard BHT (IC_{50} = 2.30µg/ml) (Islam *et al*., 2018a).

The *A. bunius* ripe fruit and seeds has more antioxidants than the half-ripe and unripe ones (Sartagoda *et al*., 2021). However, *A. bunius* fruit extract has lower antioxidant activity than L-Ascorbic acid (Yelliantty *et al*., 2021). The *A. bunius* fruit fraction showed the highest free radical scavenging activity through the DPPH test of 97.39 ± 2.48% compared to other organs (Quiming *et al*., 2016). The antioxidant power of *A. bunius* leaf FRAP has IC_{50} 182.22 0.64 g/mL (Aksornchu *et al*., 2021). A similar was reported by Islary *et al*. (2017) which stated that *A. bunius* fruit had a FRAP antioxidant value of 61.583±3.818 M TE/g DE.

The bioactivity of *A. bunius* as an antioxidant to be related to its phytochemical content such as flavonoids, tannins (Quiming *et al*., 2016), phenolics, and vitamin C (Kassem *et al*., 2013). The total phenolic content (TPC) of *A. bunius* fruit was 119,356±1,395 mg GAE/g DE, while the total flavonoid content (TFC) was 64,323±8,828 mg QE/g DE. Fresh fruit of *A. bunius* contains vitamin C of 7.30 ± 1.452 mg/100 g mg/100 g. The antioxidant activity (DPPH, ABTS and H_2O_2) is thought to be related to vitamin C (Islary *et al*., 2017). The leaf extract of *A. bunius* increased the activity of the enzyme glutathione reductase and decreased the level of nitric oxide, indicating that its activity as an antioxidant was comparable to that of quercetin (Kassem *et al*., 2013).

Anti-Bacteria

Pathogenic bacteria cause infections of the digestive tract, respiratory tract and human skin. The facts show that the need to antibiotics is increasing, so the exploration continues, including *A. bunius*. The bioactivity of *AB* as an antimicrobial has been reported by (Herlinawati, 2020), Indrawati and Rizki (2017), Pongnaratorn *et al*. (2017), and Indrawati *et al*. (2020). The *A. bunius* fruit inhibits the growth of bacteria such as: *Salmonella thypimurium, Bacillus cereus* (Indrawati and Rizki, 2017), *Salmonella typhi* (Herlinawati, 2020), *Streptococcus mutans*, *Straphylococcus aureus*, and *Streptococcus pyogenes* (Pongnaratorn *et al*., 2017).

The bioactivity of *A. bunius* fruit as antibacterial was influenced by concentration, extraction compound, organ and contact time. The inhibition zone is directly proportional to the concentration of the *A. bunius* extract, therefore the higher the concentration, the larger the inhibition zone (Indrawati and Rizki, 2017; Herlinawati, 2020). The leaf ethanol extract has inhibition zone on *Salmonella typhi*, namely 5% (13 mm), 10% (14 mm), 20% (15 mm) and 40% (17 mm) (Herlinawati, 2020). Indrawati and Rizki (2017) reported that the bioactivity of *A. bunius* extract against *B. cereus* was lower than that of *S. thypimurium*. The antibacterial activity of *A. bunius* young fruit extract to *S. aureus* (1.73 cm) was higher than that of tetracycline (standard antibiotic) (1.05 cm). The antibacterial activity of *A. bunius* young fruit against *S. pyogenes* was not different from that of tetracycline (2.46 cm), while its activity against *S. mutans* was lower (1.96 cm) than that of tetracycline (3.86 cm). Ripe fruit (black color) *A. bunius* shows anti-bacterial activity. The minimum inhibition concentration (MIC) green fruit extract was 0.0125 mg/ml to *S. pyogenes* and 0.025 mg/ml to *S. mutans* and *S. aureus* (Pongnaratorn *et al*., 2017).

The bioactivity of *A. bunius* as an antibacterial is related to its secondary metabolites (Pongnaratorn *et al*., 2017), and endophytic bacteria (Indrawati *et al*., 2020). The *A. bunius* fruit extract contains the highest total phenolic in the leaves followed by green fruit and ripe fruit so that their activities different (Pongnaratorn *et al*., 2017). Indrawati *et al*. (2020) reported that endophytic bacteria in *A. bunius* have potential as anti-bacterial pathogens against Gram-negative (*S. thypimurium*, *E. coli*), and Gram-positive (*S. aureus*) (Indrawati *et al*., 2020).

Anti-Cancer

Cancer is one of the causes of human death. The bioactivity of *A. bunius* as anti-cancer is often associated with its activity as an antioxidant. The *A. bunius* leaf extract showed cytotoxic activity against human colorectal HCT-116 and human lung adenocarcinoma A549 (Geronimo *et al*., 2020). The *A. bunius* fruit secondary metabolites affect mitochondrial integrity and can modulate stress-responsive genes in cancer cells. Cancer cells treated with *A. bunius* extract resulted in a decrease in cell viability of about 27%, coupled with a decrease in the oxidative stress index of about 59% accompanied by upregulation of NRF2 and NRF2-dependent genes. Mitochondrial transmembrane (MTP) increased ~3-fold in response to *A. bunius* extract and increased BECLIN1, ATG5, and LC3 gene expression (Benigno *et al*., 2020). Ethanol extract of *A. bunius* fruit inhibited the viability of breast cancer cells (MDA-MB-231) by CCK-8 test with IC50 of 219 g/mL after the cells were treated for 72 hours. The ethanol fraction of AB fruit inhibited MDA-MB-231 cell migration and delayed the G1 to S phase transition compared to controls. The bioactivity of AB as anti-cancer is related to amentoflavone compounds (Funing *et al*., 2021).

Anti-Diabetes Mellitus

Diabetes mellitus is a metabolic disorder characterized by increased blood glucose levels (Quiming *et al*., 2016) caused by the body failing to produce sufficient amounts of insulin (Islam and Koly, 2018). Treatment of diabetes mellitus using synthetic drugs is expensive and often results in unwanted effects such as nausea and anxiety (Quiming *et al*., 2017). Local communities in the Philippines have long used *A. bunius* to treat diabetes (Tanquilut *et al*., 2019). The *A. bunius* extract (500 mg/kg) administered orally via gavage for 14 days significantly reduced fasting blood glucose (FBG) levels compared to positive controls (glibenclamide 10 mg/kg) (Grijaldo *et al*., 2019). The bioactivity of *A. bunius* stem bark ethanol extract as anti-diabetes mellitus is related to glucosidase inhibition (Elya *et al*., 2012). The inhibition of the α-glucosidase enzyme in the red/ripe fruit extract *A. bunius* was higher than that of the green fruit (Hamidu *et al*., 2020). The ethanolic extract fraction of AB fruit was administered orally (extract 500 mg/kg body weight) in alloxan-induced diabetic female Balb/C rats showing glucose lowering activity (Quiming *et al*., 2017). Diabetic rats induced by alloxan, then treated with 100 mg/kg, 300 mg/kg or 500 mg/kg *A. bunius* fruit ethanol extract showed anti-hyperglycemia, with 500 mg/kg ethanolic fruit extract being the most effective (Alvarado *et al*., 2015). Phytochemical screening showed that the extract contained phenols, indoles, steroids and flavonoids (Alvarado *et al*., 2015).

Anti-Inflammation

Inflammation is the body's mechanism in protecting itself from infection with microorganisms such as viruses, bacteria, and fungi. The ethanol extract and ethyl acetate fraction of *A. bunius* leaves have effective anti-inflammatory activity at a dose of 200 mg/kg bw (Kautsar *et al*., 2019). The antidesoside, podocarpusflavone A and amentoflavone compounds from *A. bunius* leaves showed an inhibitory effect on NO production in LPS-

stimulated BV2 cells and RAW264.7 macrophages, with IC_{50} (8.5 to 26.9 M) (Trang *et al*., 2016).

Anti-Cholesterol

Cholesterol is one of the causes of circulatory system disorders. Diets rich in fat increase the risk of cardiovascular disease (CVD) so that the prevention of heart tissue damage is beneficial in the prevention of CVD (Udomkasemsab *et al*., 2018). The *A. bunius* fruit has anti-obesity potential because it has an effect on lipase enzyme activity (Krongyut and Sutthanut, 2019). The mice fed a high-fat diet then treated with *A. bunius* fruit extract orally 300 mg/kgBW/day for 12 weeks increased PON1 mRNA expression in BALB/c mice fed a high-fat diet comparable to the group of mice given simvastatin (Tawali *et al*., 2019). Ethanol extract *A. bunius* showed adipocyte adipogenesis inhibitory effect whose activity was directly proportional to concentration (Krongyut and Sutthanut, 2019). Ethanol extract *A. bunius* was found to be a potential anti-obesity agent through inhibition of the lipase enzyme and anti-adipogenesis in adipocytes which was significantly correlated with the total phenolic content (Krongyut and Sutthanut, 2019)

Male mice fed a high-fat diet and then given *A. bunius* extract orally at a dose of 0.38, 0.76 or 1.52 g/kg improved the expression of genes involved with pro-inflammation such as tumor necrosis factor alpha (TNF-α), interleukin-6 (IL-6), vascular cell adhesion molecule-1 (VCAM-1), monocyte chemoattractant protein-1 (MCP-1) and endothelial nitric oxide synthase (eNOS) (Udomkasemsab *et al*., 2018). The bioactivity of *A. bunius* extract depending on the processing process. The *A. bunius* steamed fruit had the highest pancreatic lipase inhibitory activity compared to others (Crieta *et al*., 2021). The *A. bunius* fruit water extract contains three phenolic compounds, namely 3-(Hydrazinomethyl) Phenol, 5 Allyl-2 Methoxy Phenol and 3 (3.5-di-Tertiary Butyl, 4-Hydroxyphenyl) Propionic Acid (Yasser *et al*., 2020a).

CONCLUSIONS

Antidesma bunius has nutritional content so it has the potential to be developed as a healthy food ingredient. By the local communities in Indonesia, the fruit of *A. bunius* has been used as ingredient for make *rujak buni* and has been processed to syrups, jellies, sauces and wines. The bioactivity of *A. bunius* is anti-oxidant, anti-bacterial, anti-cancer, anti-diabetic mellitus, anti-inflammatory and anti-cholesterol. The *A. bunius* fruit has the potential to be developed as a nutraceutical, especially as an anti-cancer and antioxidant-rich food.

REFERENCES

Aksornchu, P., Chamnansilpa, N., Adisakwattana, S., Thilavech, T., Choosak, C., Marnpae, M., Mäkynen, K., Dahlan, W., and Ngamukote, S. 2021. Inhibitory effect of *Antidesma bunius* fruit extract on carbohydrate digestive enzymes activity and protein glycation in vitro. *Antioxidants* 10(1): 32.

Alvarado, J., Quiming, N., Nicolas, M.G., Verzosa, D.T., and Alvarez, M.R. 2015. Hypoglycemic activity of ethanolic and aqueous extracts of *Antidesma bunius* fruits on alloxan-induced hyperglycemic ICR mice. *Journal of Chemical and Pharmaceutical Research* 7(12): 265-270.

Amalia, F., and Afnani, G.N. 2013. Extraction and stability test of anthocyanin from buni fruits (*Antidesma bunius* L) as an alternative natural and safe food colorants. *Journal of Food and Pharmaceutical Sciences* 1(2): 49-53.

Belina-Aldemita, M.D., Sabularse, V.C., Dizon, E.I., Hurtada, W.A., and Torio, M.A.O. 2013. Physicochemical properties of bignay [*Antidesma bunius* (L.) Spreng.] wine at different stages of processing. *Philippine Science Letters* 6(2): 249-256.

Benigno, S.J., Oyong, G., Licayan, J.J., and Sumayao, J.R. 2020. *Antidesma bunius* aqueous crude extract promotes cell death via modulation of redox-sensitive and autophagy associated genes in HCT 116 human-derived colorectal cancer cells. *Archives of Biological Sciences* 72(3):433-443.

Butkhup, L., and Samappito, S. 2011. Changes in physico-chemical properties, polyphenol compounds and antiradical activity during development and ripening of maoluang (*Antidesma bunius* L. Spreng) fruits. *Journal of Fruit and Ornamental Plant Research*, 19(1): 85-99.

Chaikham, P., Prangthip, P., and Seesuriyachan, P. 2016. Ultra-sonication effects on quality attributes of maoberry (*Antidesma bunius* L.) juice. *Food Science and Technology Research* 22(5): 647-654.

Crieta, B.R.A., Tuaño, A.P.P., Torio, M.A.O., Villanueva, J.C., Gaban, P.J.V., and Castillo-Israel, K.A.T. 2021. In vitro lipid-lowering properties of the fruits of two bignay [*Antidesma bunius* (L.) Spreng] cultivars as affected by maturity stage and thermal processing. *Food Chemistry: Molecular Sciences* 100020: 1-8.

Elya, B., Malik, A., Mahanani, P.I.S., and Loranza, B. 2012. Antidiabetic activity test by inhibition of α-Glucosidase and phytochemical screening from the most active fraction of Buni (*Antidesma bunius* L.) stem barks and leaves. *International Journal of PharmTech Research* 4(4): 1667-1671.

Funing, M., Masood, T., Dongmei, H., Bin, W., and Yu, G. 2021. Inhibitory activity of fruits extracts of *Antidesma bunius* on the proliferation and migration of MDA-MB-231 Breast Cancer Cells. *Journal of Food and Nutrition Research* 9(2): 61–67.

Geronimo, A.J.O., Bancual, M.E.J.F., Ko, K.A.L., Soliba, L.M.L., Ildefonso, J.J.C., Soriano, A.M.B., Tagalog, A.C.M.M., Acosta, N.E., Ang, V.S., and Apigo, M.A. 2020. Free radical scavenging and in vitro cytotoxic activity of bugnay (*Antidesma bunius*) leaves extract against A549 human lung adenocarcinoma and HCT-116 human colorectal cancer cell lines. *Indonesian Journal of Cancer Chemoprevention* 11(3): 124–133.

Grijaldo, S.J.B., Quiming, N.S., Nicolas, M.G., and Alvarez, M.R.S. 2019. In vivo hypoglycemic activities of male and female *Antidesma bunius* (L.) Spreng. in alloxan-induced diabetic mice. *Oriental Journal of Chemistry* 35(4): 1398.

Hamidu, L., Simanjuntak, P., and Dewi, R.T. (2020). Potensi ekstrak buah buni (*Antidesma bunius* (L) Spreng) sebagai inhibitor enzim α-glukosidase. *Jurnal Fitofarmaka Indonesia* 7(1): 27–30.

Hoffmann, P. 1999. The genus *Antidesma* (Euphorbiaceae) in Madagascar and the Comoro Islands. *Kew Bulletin* 54(4): 877-885.

Herlinawati, H. 2020. Efektivitas ektrak daun buni (*Antidesma bunius* L) terhadap pertumbuhan bakteri *Salmonella typhi*. *Jurnal Kedokteran* 6(1): 49-56.

Indrawati, I., and Rizki, A.F.M. 2017. Potensi ekstrak buah buni (*Antidesma bunius* L) sebagai antibakteri dengan bakteri uji *Salmonella thypimurium* dan *Bacillus cereus*. *Jurnal Biodjati* 2(2): 138–148.

Indrawati, I., Rosiana, N., Rizki, A.F.M., and Nada, N. 2020. Antimicrobial potency from endophytic bacteria of bignay plant (*Antidesma bunius* (L.) Spreng.) against pathogenic bacteria. *World News of Natural Sciences* 31: 1-8.

Islam, S., Munira, S., Zaman, S., Koly, F.S., Sukorno, F.I., Ahammed, S., and Hridoy, R.A. 2018a. Estimation of phytochemical, antioxidant screening profile and thrombolytic activities of methanolic extract of *Antidesma bunius* L. leaf. *Horticulture International Journal* 6: 358–363.

Islam, S., and Koly, S. 2018b. A review on phytochemical and pharmacological potentials of *Antidesma bunius*. *Journal of Analytical & Pharmaceutical Research* 7(5), 602–604.

Islary, A., Sarmah, J., and Basumatary, S. 2017. Nutritional value, phytochemicals and antioxidant properties of two wild edible fruits (*Eugenia operculata* Roxb. and *Antidesma bunius* L.) from Assam, North-East India. *Mediterranean Journal of Nutrition and Metabolism* 10(1): 29–40.

Kassem, M. E. S., Hashim, A.N., and Hassanein, H.M. 2013. Bioactivity of *Antidesma bunius* leaves (Euphorbiaceae) and their major phenolic constituents. *European Scientific Journal* 9(18): 217-228.

Kautsar, L., Sitorus, P., and Dalimunthe, A. 2019. Anti-inflammatory activity of ethanol and fraction of buni leaves (*Antidesma bunius* L.) on white rat in carrageenan induced paw inflammation. *Asian Journal of Pharmaceutical Research and Development* 7(5): 1-5.

Krongyut, O., and Sutthanut, K. 2019. Phenolic profile, antioxidant activity, and anti-obesogenic bioactivity of mao luang fruits (*Antidesma bunius* l.). *Molecules* 24(22): 4109.

Li, B. and Hoffmann, P. 2008. *Antidesma*. *In* Wu, Z.Y., Raven, P.H., and Hong D.Y. (eds.). *Flora of China. Vol. 11 (Oxalidaceae through Aceraceae)*. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis: 209-215.

Maesaroh, K., Kurnia, D., and Al Anshori, J. 2018. Perbandingan metode uji aktivitas antioksidan DPPH, FRAP dan FIC terhadap asam askorbat, asam galat dan kuersetin. *Chimica et natura acta* 6(2): 93-100.

Pongnaratorn, P., Kuacharan, P., Kotsuno, V., Pakdee, N., Sriraj, P., and Sattayasai, J. 2017. In vitro antimicrobial activity of *Antidesma bunius* extracts on oral pathogenic bacteria. *Thai Journal of Pharmaceutical Sciences* 41(4): 144-149.

Quiming, N., Asis, J.L., Nicolas, M., Versoza, D., and Alvarez, M.R. 2016. In vitro α-glucosidase inhibition and antioxidant activities of partially purified *Antidesma bunius* fruit and *Gynura nepalensis* leaf extracts. *Journal of Applied Pharmaceutical Science* 6(05): 97–101.

Quiming, N., Dayanan, J.N., Nicolas, M., Verzosa, D., and Alvarez, M.R. 2017. Hypoglycemic activities of chromatographic fractions of *Antidesma bunius* fruit ethanolic extract on alloxan-induced hyperglycemic Balb/C mice. *Journal of Applied Pharmaceutical Science* 7(02): 120–123.

Sartagoda, K.J., Ilano, M.C., Flandez, L.E., and Castillo-Israel, K.A. 2021. Evaluation of the antioxidant activity of bignay (*Antidesma bunius* (Linn.) Spreng var. Kalabaw) flesh and seeds as affected by maturity and processing method. *Chiang Mai University Journal of Natural Sciences* 20(2): e2021042.

Savolainen, V., Chase, V.W., Hoot, S., Morton, C.M., Soltis, D.E., Bayer, C., Fay, M.F., De Bruijn, A.Y., Sullivan, S., and Qiu, Y.L. 2000. Phylogenetics of flowering plants based on combined analysis of plastid atpB and rbcL gene sequences. *Systematic Biology* 49: 306–362.

Silalahi, M., and Mustaqim, W.A. 2020. *Tumbuhan berbiji di Jakarta Jilid 1: 100 jenis-jenis pohon terpilih*. UKI Press, Jakarta.

Suravanichnirachorn, W., Haruthaithanasan, V., Suwonsichon, S., Sukatta, U., Maneeboon, T., and Chantrapornchai, W. 2018. Effect of carrier type and concentration on the

properties, anthocyanins and antioxidant activity of freeze-dried mao [*Antidesma bunius* (L.) Spreng] powders. *Agriculture and Natural Resources* 52(4): 354-360.

Tajbin, R., Sonia, Z., Saurav, H., Hossain, S.I., and Rasheduzzaman, J.M. 2021. In vitro antioxidant activity of *Antidesma bunius* leaf extracts. *Journal of Pharmacognosy and Phytochemistry* 10(3): 1–6.

Tanquilut, N.C., Alonzo, N.Q., James, A.E., Rowlands, D.K., Sanchez, G.C., San Jose, R.D., Yesner, E., Tanquilut, M.R.C., and Reyes, B.A.S. 2019. Hypoglycemic activity of *Antidesma bunius* (L.) Spreng and *Mollugo oppositifolia* L. fresh and alcoholic extracts in the db/db diabetic mouse model. *Journal of Medicinal Plants Research*, 13(17): 396–400.

Tawali, S., As' ad, S., Hatta, M., Bukhari, A., Khairi, N., Rifai, Y., and Dwiyanti, R. 2019. Anthocyanin-rich buni-berry (*Antidesma bunius*) extract increases paraoxonase 1 gene expression in BALB/c mice fed with a high-fat diet. *Journal of Young Pharmacists*, 11(1): 46-50.

Trang, D.T., Huyen, L.T., Nhiem, N.X., Quang, T.H., Hang, D.T.T., Yen, P.H., Tai, B.H., Anh, H.L.T., Binh, N.Q., and Van Minh, C. 2016. Tirucallane glycoside from the leaves of *Antidesma bunius* and inhibitory NO production in BV2 cells and RAW264. 7 macrophages. *Natural Product Communications* 11(7): 1934578X1601100717.

Udomkasemsab, A., Ngamlerst, C., Adisakwattana, P., Aroonnual, A., Tungtrongchitr, R., and Prangthip, P. 2018. Maoberry (*Antidesma bunius*) ameliorates oxidative stress and inflammation in cardiac tissues of rats fed a high-fat diet. *BMC Complementary and Alternative Medicine* 18(1): 1–11.

Yasser, M., Rafi, M., Wahyuni, W.T., Widiyanti, S.E., and Asfar, A. 2020a. Total phenolic content and antioxidant activities of buni fruit (*Antidesma bunius* L.) in moncongloe maros district extracted using ultrasound-assisted extraction. *Rasayan Journal of Chemistry* 13(1): 684–689.

Yasser, M., Rafi, M., Wahyuni, W.T., Asfar, A.M.I.A., and Widiyanti, S.E. 2020b. Total phenolic content of methanol extract from buni fruits (*Antidesma bunius* L.) water. *Journal of Physics: Conference Series*, *1655*(1), 12029.

Yelliantty, Y., Kartasasmita, R.E., Surantaatmadja, S.I., and Rukayadi, Y. 2021. Identification of chemical constituents from fruit of *Antidesma bunius* by GC-MS and HPLC-DAD-ESI-MS. *Food Science and Technology*: 1-10.

P-ISSN 1693-6892
E-ISSN 2722-0257

Journal of Tropical Ethnobiology

VOLUME V NUMBER 1 JANUARY 2022

CONTENTS

ISSN 1693-6892
9 771693 689278