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Research article

Phytochemistry and total phenolic content of methanol extract of *Pometia pinata* J.R. Forst. & G. Forst. fruit flesh from Papua, Indonesia

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Abstract: The *Pometia pinnata* fruit flesh from Papua, Indonesia is widely used in traditional medicine has been extracted. The extraction has used the solvent of methanol, ethyl acetate, and n-hexane. The yield of extraction in methanol, ethyl acetate, and n-hexane were 21.65%, 2.92% and 0.91%. Qualitative analysis of phytochemical constituents in methanol were tannins, phenolic and steroid, more complete contents of secondary metabolite, compared to those of n-hexane and ethyl acetate extracts. Quantitative analysis for total phenolic compound was 393.38±0.28 mg gallic acid equivalent (GAE.g^{-1}).
Keywords: Phytochemistry - Total phenolic content - *Pometia Pinata*.

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INTRODUCTION

The *Pometia pinnata* J.R. Forst. & G. Forst. fruit flesh from Papua, Indonesia is widely used in traditional medicine has phytochemical compound. Biologically active, phytochemicals are naturally occurring in the plants, which provide health benefits for humans (Hasler *et al.* 1999, Trimedona *et al*. 2015). They protect plants from disease and damage and contribute to plant's color, aroma and flavor. Secondary constituents are the remaining plant chemicals such as alkaloids, terpenes, flavonoids, lignans, plant steroids, curcumines, saponins, phenolics, flavonoids and glucosides (Alapati & Sulthana 2015).

Pometia pinnata J.R. Forst. & G. Forst. a member of Sapindaceae family, is widely distributed in Asia Pacific included Papua, Indonesia (Trimedona *et al*. 2015). The flesh of *Pometia pinnata* are used in traditional medicine are hypertensi, abdominal ailments including stomach complaints, diarrhea, dysentery, obstetric and gynaecological complaints. The compunds of the flesh of *Pometia pinnata* was different from the other organ of *Pometia pinnata*, so phytoscreening in flesh of *Pometia pinnata* were investigated.

Polyphenolic nature enables them to scavenge injurious free radicals such as super oxide and hydroxyl radicals (Dewick *et al*. 2002). The flesh of *Pometia pinnata* can be regarded as promising plant species for natural plant sources of antioxidants with high potential value for drug preparation (John *et al*. 2014). The aims research to knowed composition of the secodary metabolites and total phenolic compound of n-hexane, ethyl acetate and methanol extract from *Pometia pinnata*.

MATERIALS AND METHODS

Protocols and instruments

Pometia pinnata were harvested from local market in Pontianak, West Kalimantan, Indonesia The fruit flesh of *Pometia pinnata* was drained in room temperature, and then were powdered. In addition all chemicals used were of analytical grade, are Folin-Ciocalteu reagent, galic acid, sodium carbonate solution, Dragendorff's reagent, Mayer's reagent, methanol, ethyl acetate, n-hexane, concentrated sulfuric acid, concentrated HCl, ferric chloride hexahydrate ($FeCl_3.6H_2O$), DMSO, acetic acid anhydride, acetic acid glacial, and chloroform were purchased from Merck.

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Sample extraction

Sample preparation was conducted by maceration process using several organic solvents used Irawan method (Irawan *et al.* 2017). 135 g of powdered fruit flesh of *Pometia pinnata* were immersed in 100 mL of n-hexane for 3 days, and then filtered. Filtrate was then evaporated until dry sample was obtained, and this step resulted in raw extract of n-hexane. The residue from first immersion was entirely immersed back in 100 mL ethyl acetate for 3 days to obtain raw extract of ethyl acetate. The solution was then filtered and evaporated, and the residue from this step was immersed in 100 mL methanol for 3 days, resulted in raw methanolic extract. The maceration process was repeated several times to obtain clear extract containing all expected chemical species.

Phytochemical assay

The reason of solvent choosing based on caracteristic of polarity metabolite seconder compound. The assay included several test for alkaloid, tannin, saponin, reducing sugar, flavonoid, glucoside, phenolic, glycosidesteroid, and sterol - triterpenoid according to the method describe by Tiwari *et al.* (2011).

Total phenolic content

The total phenolic content of the extract was determined by the Folin–Ciocalteu method (Tiwari *et al*. 2011), 200 µL of crude extract (1 mg.mL^{-1}) were made up to 3 mL with distilled water, mixed thoroughly with 0.5 mL of Folin–Ciocalteu reagent for 3 min, followed by the addition of 2 mL of 20% (w/v) sodium carbonate. The mixture was allowed to stand for 60 min in the dark condition, and absorbance was measured at 650 nm. Total phenolic content was then calculated from the calibration curve, and the results were expressed as mg of gallic acid equivalent of g dry weight.

RESULT AND DISCUSSION

Sample extraction

The results showed that different extracting agent resulted in different percentage of yield. From 135 g dry flesh of fruit of *Pometia pinnata*, it yielded 1.23 g (0.91%) of yellow solution of raw n-hexane extract, 3.94 g (2.92%) of brownish yellow solution of raw ethyl acetate extract and 29.24 g (21.65%) of blackish yellow of raw methanolic extract. The results showed that the methanolic extract contains the largest yield compared to the other types of extracts. The percentage of yield of extract indicated the extracting capacity of extracting agent. The highest yield of methanolic extract indicated that methanol has the highest extracting capacity for secondary metabolite in the flesh of fruit of *Pometia pinnata*. On the other side, the lowest yield for n-hexane related to the fact that n-hexane has the lowest extracting capacity. Azmir *et al.* (2013) stated that the efficiencies of extraction methods mostly depend on the understanding the nature of plant matrix and chemistry of bioactive compounds. The possible explanation for this phenomenon was the fact that the secondary metabolites contained in the methanolic extract were polar or semipolar thus needed the extracting agent which has the similar polarity. This explanation must be supported by further phytochemical assay.

The physical appearance of the extract solution also provided supporting information that different kinds of the secondary metabolites were extracted from different solvent. Phytochemical assay of n-hexane, ethyl acetate, and methanol raw extract revealed that methanolic extracts had phenolic and tannin compound (Table 1). Methanolic extract showed the most complete contents of secondary metabolite, compared to those of n-hexane and ethyl acetate extracts.

Table 1. Phytochemical assay of flesh of fruit of *Pometia pinnata* J.R. Forst. & G. Forst.

No	Parameter	n-hexane extract	ethyl acetate extract	methanolic extract
1	Alkaloid	+	-	-
2	Flavonoid	-	-	-
3	Tannin	-	-	+
4	Phenolic	-	-	+
5	Saponin	-	+	-
6	Sterol Triterpenoid	+	-	+

Total phenolic contents

Total phenolic content of the methanolic flesh of fruit of *Pometia pinnata*, calculated from the calibration curve $R^2 = 0.9978$ (Fig. 1.), was 393.38±0.28 mg gallic acid equivalent (GAE.g^{-1}) (Table 2). Phenolic compounds have redox properties, which allow them to act as antioxidants. The phenolics are composed of one

or more aromatic rings bearing one or more hydroxyl groups and are therefore potentially able to quench free radicals by forming stabilized phenoxyl radicals (Soobrattee *et al.* 2005). Phenolic compound could be content of terpenoid compund, flavonoid or the other phenols. The total phenolic concentration could be used as a basis for rapid screening of antioxidant activity. The antioxidant activity of which depends on the presence of free OH groups, especially 3-OH.

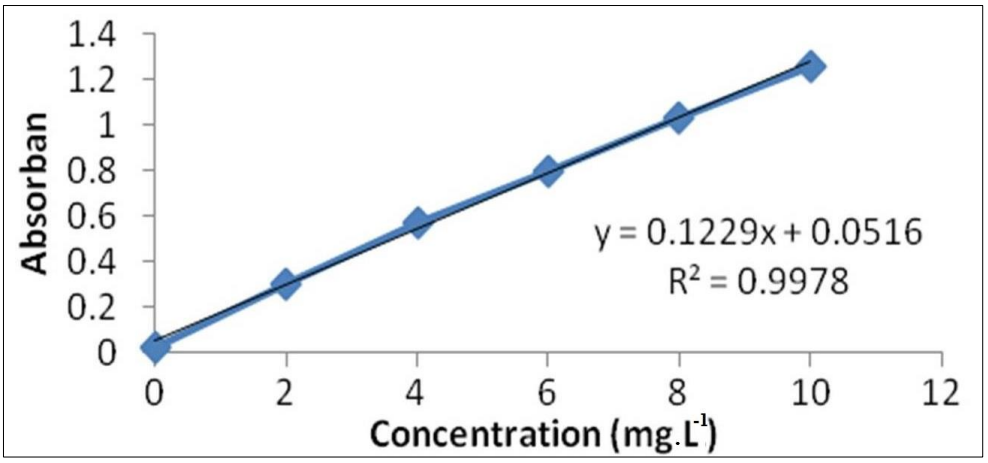

Figure 1. Calibration curve of Gallic acid

Table 2. Total phenolics content of methanolic extract of fruit flesh of *Pometia pinnata.*

No.	Total phenolics content[a]
1	39.31
2	39.85
3	40.26
Average	**39.81±0.48**

Note: [a] = mg gallic acid equivalent (GAE.g^{-1}).

CONCLUSION

This present study proved that the methanol extract of fruit flesh of *Pometia pinnata* was the most complete compund compeared n-hexane and ethylacetate extract. The methanol extract of fruit flesh of *Pometia pinnata* presence of total phenolics contained 393.38±0.28 mg GAE.g^{-1}. Our result suggested that fruit flesh of *Pometia pinnata* is a potential source of antioxidant agents and can be used as a natural antioxidant and preservative in food and non-food systems. However, further phtyochemical analysis is required to isolate the elements of the plant that show a broad spectrum of pharmacological activity.

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