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IDENTIFICATION OF ANTIOXIDANT BIOACTIVE COMPOUNDS ON LEAVES OF EGGPLANT SPARROW (SOLANUM TORVUM) FROM VARIOUS GROWTH LOCATIONS

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Abstrak. Eggplant plants consist of various types such as purple eggplant, index eggplant, sparrow eggplant, Dutch eggplant, and others, easy to grow, and favored by consumers. The aim of the study was to analyze the levels of antioxidant bioactive compounds in the fresh and dried leaves of the sparrow eggplant in various growing locations. The research method is a quantitative chemical test with measurement parameters DPPH, Total Phenol, Tannins, and Flavonoids. Experimental treatments were fresh leaves and dried leaves of sparrow eggplant obtained from 3 locations, namely Malang, Kediri, and Mojokerto. The experimental results showed that there were differences in the content of bioactive compounds in sparrow eggplant leaves at the three locations and the potential of the Batu Malang area with an ambient temperature of around 210 C. - 25 0 C had the highest antioxidant levels, namely wet leaves, and dry leaves in the following order: DPPH 68%, and 70.37%; Total phenol 42.52 mg/g, and 32.13 mg/g; Tannins 0.87 mg/g and 0.76 mg/g; Flavonoids 0.97 mg/g and 2.12 mg/g.

Keywords: Bioactive; Growing location; Sparrow eggplant (Solanum torvum).

INTRODUCTION

Sparrow eggplant is widely grown in Indonesia and is favored by consumers because it contains active compounds that have health functions. The sparrow eggplant has small fruit with a diameter of 1 cm, green with white spots, when ripe it turns yellow, some call it rimbang especially in the West Sumatra area, some call it takokak, pokak, according to the name of the area (Kurniawaan, 2019).

(Kurniawan, 2019) explained that this type of eggplant can inhibit spermatogenic activity through the hypothalamic-pituitary-spermatogenesis pathway at a dose of 10 grams and 15 grams which was studied in male rats for 1 month because it contains solasodine alkaloids. Research (Helilusiatiningsih, 2021), eggplant takokak or sparrow eggplant which is cured for 5 days at room temperature around 300 C contains water content 72.3%, ash content 2.2%, protein 5.7%, fat 2.1 %, 13.3% carbohydrates and experienced a decrease in fruit weight of about 4.09 grams, fresh initial weight was just harvested 5.6 grams.

According to another research opinion (Helilusiatiningsih, 2021), eggplant pokak obtained from Batu, Malang contains 9.7% fat content, 3.6% protein content, 0.97% Vitamin C, 3.7% carbohydrates, also contains minerals such as Mg 79.1 ppm, Ca 36.6 ppm. According to (Rahman et al., 2017) takokak fruit has bioactive compounds, namely steroids, tannins, flavonoids, saponins. This is in agreement (Wilda, 2021) turky berry (Solanum torvum) contains chemical components, namely steroidal and sapogenin.

Researchers (Helilusiatiningsih et al., 2020), Solanum torvum found antioxidants namely tannins, saponins, alkaloids and flavonoids. The problem is that most researchers only analyze and consume the sparrow eggplant or abroad known as the turkey berry. Parts of plant organs that have not been widely consumed and studied are the leaves (Chauhan et al., 2019). This experiment aims to analyze the content of antioxidant bioactive compounds in fresh and dried eggplant leaves obtained from 3 growing locations naamely Mojokerto, Batu (Malang), Kediri (Nakitto et al., 2021).

The benefits of this research are novelty, and provide real information from the sparrow eggplant leaf organs obtained from growing places with different climates. Research (Helilusiatiningsih, 2021), explains that freshly picked eggplant leaves obtained from the source village of Manjing Kulon Malang have 58.16% water content, 35.29% carbohydrates, 0.32% fat and 5.74% protein. vitamin C about 1.34%.

MATERIALS AND METHODS

Research was carried out from January to April 2022, in the Chemistry laboratory of Kadiri Islamic University, East Java and the Biochemistry Laboratory of Brawijaya University, Malang. The sparrow eggplant material was obtained from 3 growing locations, namely Malang, Kediri and Mojokerto. Chemicals: 95% methanol, 0.2 mM DPPH, Gallic acid, Folin ciocalteu reagent, 2 mL Na2CO3 7.5%, distilled water, NaNO2, NaOH, AlCl3,, Folin ciocalteu, The tools used in the research: knife, analytical balance, measuring cup, rotary evaporator, shaker, filter paper, incubator, analyzed parameters, namely fresh leaves and dried

leaves (dried to a moisture content of about 7%). Three growing locations were taken.

RESULTS AND DISCUSSION

1. Pipit eggplant leaves (Mojokerto location)

Based on quantitative tests on sparrow eggplant leaf organs are presented in Table 1. And Figure 1. The sparrow eggplant plant area thrives in the yard where the soil is rich in water and nutrients. Fresh and dried leaves have different content of antioxidant compounds. The dry leaves had higher levels of DPPH and flavonoids than the fresh leaves but the total phenol and tannins were higher in the fresh leaves than in the dry leaves (Rabeta & Lai, 2013).

According to research (Helilusiatiningsih, 2021) explained that the levels of proximate compounds in dry leaves were higher than fresh leaves except for higher water content in fresh ones. The location of plant growth also affects the nutritional components and phytochemical compounds present in the fruit, leaves, and other organs.

Table 1. Growing Locations of Pipit Eggplant in Mojokerto

Compounds	Fresh Leaf	Leaves
DPPH (%)	59.56	62.45
Phenol (mg/g)	36.38	10.43
Tannins (mg/g)	0.23	0.18
Flavonoids (mg)	0.41	1.34

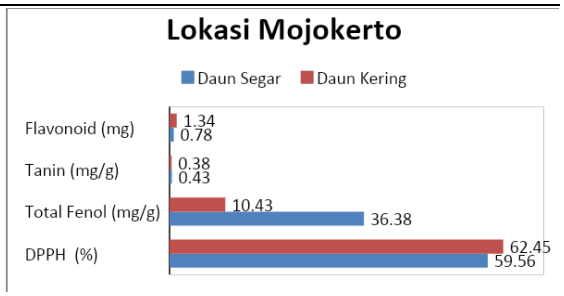


Figure 1. Antioxidant test of sparrow eggplant leaves

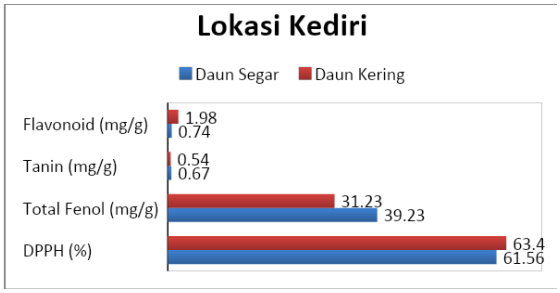
Plants that grow in Kediri are classified as fertile and easy to plant because they contain high nutrients. Environmental influences such as temperature, RH, rainfall, fertility levels are as required by plants. Sparrow eggplant has not been widely cultivated by farmers, grows with the help of nature and is spread in areas near rivers or water sources, rather dim (Khanal et al., 2020). The test results of antioxidant compounds in the city of Kediri are shown in Table 2. And Figure 2. The levels of bioactive compounds are different from the eggplant in Mojokerto, this is due to various intrinsic and extrinsic factors including weather, sunlight intensity, environmental temperature, water content, nutrients. and genetic factors (Li, 2013).

According to (Purnamasari et al., 2021), post-harvest fruit and vegetables are strongly influenced by internal and external factors that cause physiological damage that causes a decrease in the existing chemical content such as water content, protein, fat, vitamins A, B, C, E, K, compounds bioactive compounds, other compounds due to microbial spoilage or extreme environmental temperatures.

Table 2. Location of Growing Eggplant Pipit in Kediri

Compound	Fresh	Leaves

Content of		Dried Leaves
DPPH (%)	61.56	63.40
Total Phenol (mg/g)	39.23	31.23
Tannins (mg/g)	0.67	0.54
Flavonoids (mg/g)	0.74	1.98



Pipit Eggplant that grows in cold temperature areas such as in Batu Malang is quite a lot because the environment is supportive. The antioxidant content in the leaves is higher than that grown in Mojokerto and Kediri, see Table 3. And Figure 3. According to (Estiasih et al., 2022), drying is a way to preserve agricultural materials so that they lose some water, and other materials experience changes in their levels and composition. due to the biochemical processes that occur in the material during heating. Research (Kahar & Ulfiyah, 2016), Eggplant plants are vegetables that contain nutritional value, namely vitamins A, B, C, carbohydrates, proteins and antioxidant compounds alkaloid solanine.

Table 3. Location of Growing Eggplant Pipit in Batu Malang

Compound Content of	Fresh Leaves	Leaves Dry
DPPH (%)	68.72	70.37
Total Phenol (mg/g)	42.52	32.13
Tannins (mg/g)	0.87	0.76
Flavonoids (mg/g)	0.97	2.12

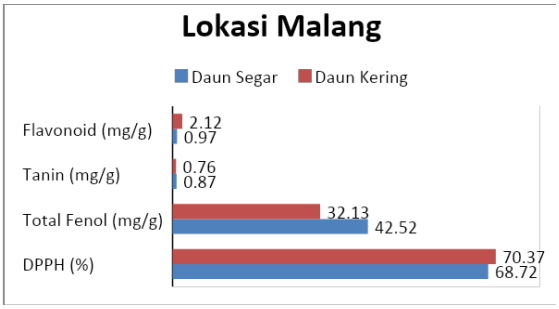


Figure 3. Eggplant leaf antioxidant test

In the experimental treatment, the comparison of growing location and condition of sparrow eggplant leaves can be shown in Figures 4 and 5. The dried leaves are more durable if stored in an airtight container or tightly closed packaging (Mobolade et al., 2019). Leaf locations obtained from Batu Malang had higher DPPH and total phenol, tannin, and flavonoid values, compared to Kediri and the lowest was Mojokerto (Rindita et al., 2020).

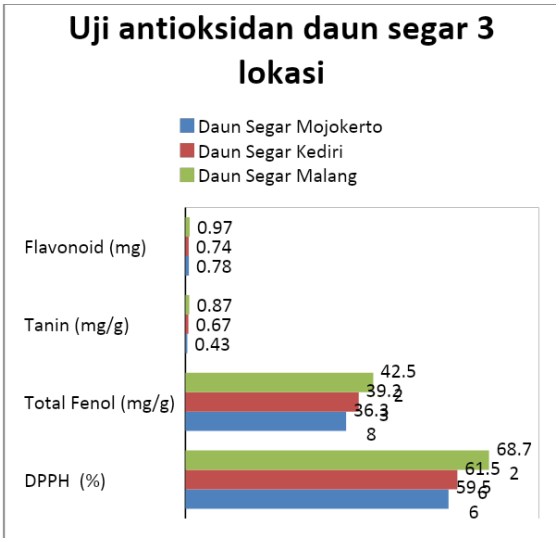


Figure 4. Location Test Diagram and Fresh

Leaves

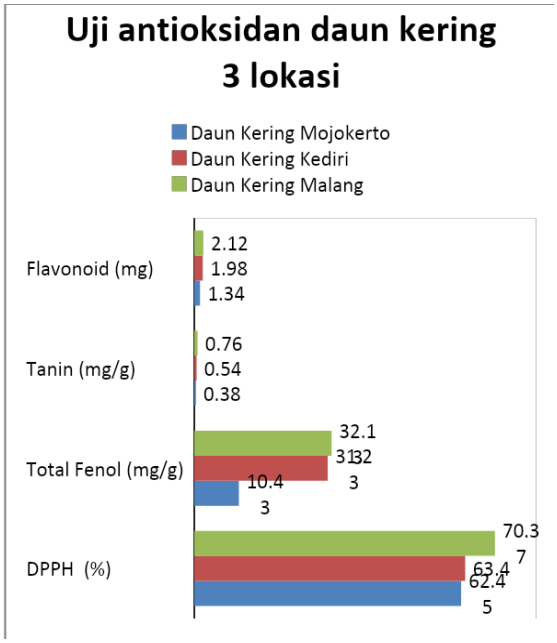


Figure 5. Location Test Diagram and Dry Leaves

Areas that have a cool environmental temperature and optimal nutrient content support the growth and development of eggplant plants to be effective so that the bioactive content formed is higher in Batu Malang City compared to locations with slightly hot environmental temperatures such as Mojokerto, Kediri.

CONCLUSIONS

The results of observations and data analysis can be concluded as follows: fresh leaves and dried leaves of sparrow eggplant in the Mojokerto region have DPPH levels (%) 59.56 and 62.45; phenol (mg/g) 36.38 and 10.43 ; tannins (mg/g) 0.23 and 018 ; flavonoids (mg/g) 0.41 and 1.34 . Kediri has a DPPH value (%) of 61.56 and 63.40; phenol(mg/g) 39.23 and 31.23 ; tannins (mg/g) 0.67 and 0.54 ; flavonoids (mg/g) 0.74 and 1.98 , respectively. Stone has DPPH (%) 68.72 and 70.37 ; phenol (mg/g) 42.52 and 32.13 ; tannins (mg/g) 0.87 and 0.76 ; flavonoids (mg/g): 0.97 and 2.12.

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