# Identification of secondary metabolite compounds of PecutKuda (*Stachytarpethajamaicensis* L) flower stalk using GC-MS

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**Abstract**. This study aims to determine the types of secondary metabolite compounds from ethanol extract of PecutKuda (*Stachytarpethajamaicensis* L) flower stalk using Gas Chromatography-Mass Spectrometry (GC-MS) method. This research was started by macerating the sample for 3x24 hours using 96% ethanol as a solvent. The next step was to identify secondary metabolite compounds in the Pecut Kuda flower stalk using GC-MS. The results showed Squalene, α-Tocopherol, Ethyl Linoleate, Stigmasta-7,16-dien-3-ol, 15-Hydroxypentadecanoic acid, Phytol, 6-Octadecenoic acid, 9,12-Octadecadienoic acid. These compounds have functions as antioxidants, anti-inflammatory, antimicrobial, antibiotic and antidote to free radicals in wound healing.

## 1. Introduction

Medicinal plants are a source of biopharmaceuticals due to their chemical biosynthetic abilities.The development of traditional medicine begins by identifying the active chemical components found in medicinal plants and the results will be used for its phytochemical profile [11]. Secondary metabolite compounds role include antioxidant, anti-cancer, anti-inflammatory, and antibacterial properties [3]. Secondary metabolite compounds in the form of small molecules, are specific (not all organisms have similar compounds), have varying structures, and each compound has a different function or role. Generally, secondary metabolite compoundsin plan play arole in protection or to maintain the plants' existence in the environment. Secondary metabolite compounds are biomolecules that can be used as lead compounds in the discovery and development of new drugs [2]. Secondary metabolite compounds that are widely found in plants were: alkaloids, flavonoids, steroids, saponins, terpenoids and tannins [4]. Flavonoid compounds that have been isolated from various plants had interesting biological activities, such as being toxic to cancer cells, inhibiting the release of histamine, anti-fungal and anti-bacterial [6]; [9].

One of the plants that can be used as traditional medicinal plants is Pecut Kuda (*Stachytarphetajamaicensis*L.). In previous research, PecutKuda plants were known to contain alkaloids, flavonoids, terpenoids, tanins and polyphenols [5]. The community in West Bajo District, Luwu Regency used the fresh leaves of the Pecut Kuda as a wound medicine. Pecut Kuda was also used as an alternative medicine for treating allergies, respiratory problems, coughs, fever, constipation, digestive problems, dysentery, and menstrual pain [10]. PecutKuda leaf extract has an antioxidant

activity that can inhibit Reactive Oxygen Species (ROS) in the human body [1]. Although it is known to have many benefits, scientific information regarding the secondary metabolites of PecutKuda is still limited. This research is expected to provide scientific information about secondary metabolites in in the flower stalk of the PecutKuda (StachytarphetaJamaicensis L.) and can be used as a reference in the manufacture of medicines.

## 2. Experimental Method

This research was carried out in two locations. Sample preparation conducted at the Natural Materials Laboratory, Faculty of Science, Universitas Cokroaminoto Palopo and identification of secondary metabolite compounds using Gas Chromatography-Mass Spectrometry(GC-MS) conducted at the Makassar Forensic Laboratory Center.The sample used in this study wasfresh flower stalkof Pecut Kuda (*Stachytarpethajamaicensis* L). Samples were cleaned and aerated, then were mashed into powder using blender.

The maceration extraction method was used in this study. A total of 100 grams of sample was put in an erlenmeyer and added with 96% ethanol, soaked for 3 days at room temperature and protected from light. The samples were stirred every day to homogenize the solution. The stirring also works for balancing the concentration of solution inside and outside the cell. The high concentration solution will be pushed out and will be replaced by a low concentrationso as to create a balance of concentration inside and outside the cell.

Secondary metabolite analysis were performed using AngilentTeghnologies 7890A GC system equipped with Angilent Teghnologies 5975 inert XL EL / CI MSD with Triple-Axis Detector and capillary column Agilent 19091S-433, $325^0$ C (30 cm x 250 µm, layer thickness 0.25 µm). The carrier gas used was helium with a constant rate of 1 mL / minute, injected as much as 1 µL (split ratio 10: 1), the injector temperature is $250^0$ C, the column temperature is programmed at $80^0$ C for 5 minutes with the temperature increase set to $10^0$ C / minute. GC-MS conditions source temperature $230^0$ C, interface temperature $300^0$ C and solution cut time 3 minutes. Components are identified by comparing the sample mass spectra with the internal Library Search Report.

## 3. Result and Discussion

### *3.1. Extract Sample*

Extraction of 1000 grams of PecutKuda Flower stalk using 500 ml of 96% alcohol produced 200 ml of solvent which will be further analyzed using the GC-MS method.

### *3.2. GC-MS (Gas Chromatography-Mass Spectrometry) analysis*

Table 2. Results of GC-MS analysis on PecutKudaflower stalk samples

| Peak | Retention Time | % Area | Compound Name | Quality (%) | Molecular Formulas |
|---|---|---|---|---|---|
| 7 | 27.657 | 6,59 | Squalene | 99 | $C_{30}H_{50}$ |
| 2 | 24.573 | 13,14 | $\alpha$-Tocopherol | 98 | $C_{29}H_{50}O_2$ |
| 5 | 26.343 | 41,66 | Ethyl Linoleate | 95 | $C_{20}H_{36}O_2$ |
| 8 | 29.095 | 26,72 | Stigmasta-7,16-dien-3-ol | 93 | $C_{29}H_{48}O$ |
| 6 | 26.481 | 2,77 | 15-Hydroxypentadecanoic acid | 81 | $C_{15}H_{30}O_3$ |
| 1 | 21.451 | 1,32 | Phytol | 81 | $C_{20}H_{40}O$ |
| 4 | 26.293 | 6,19 | 6-Octadecenoic acid | 59 | $C_{18}H_{34}O_2$ |
| 3 | 26.262 | 1,61 | 9,12-Octadecadienoic acid | 46 | $C_{18}H_{32}O_2$ |

Table 2 showed that the dominant compounds in the ethanol extract of Pecut Kuda stalks are Squalen, α-Tocopherol, Ethyl Linoleate, Stigmasta-7,16-dien-3-ol, 15-Hydroxypentadecanoic acid, Phytol. In addition, the GC-MS results from the ethanol extract of PecutKudaflower stalks also identified

Squalene and Phytol compounds. Squalen was known to be able to synergize with α-Tocopherol as an antioxidant compound and reduce oxidation levels. Apart from Squalen compounds, Phytol is also a chemical compound that used as a precursor for vitamin E. This occurs because the content of Vitamin E contained in the PecutKudastalk reaches 98% similarity to a retention time of 24,573, so it is useful as an antimicrobial in the wound healing process.

α- Tocopherol or vitamin E is needed by the body, especially in maintaining body resistance and revitalizing the skin. Tocopherols were important antioxidants to prevent oxidative damage to cells. It is known that most natural antioxidants work synergistically in producing broad-spectrum antioxidant activity which creates an effective defense system against attacks from free [8]. Another compound from the ethanol extract of PecutKuda flower stalks is Stigmasta-7,16-dien-3-ol or Stigmasterol which is classified as a sterol compound.

Sterols were known as alcohol steroids (sub group of steroids) that were naturally present in plants, animals and fungi. Sterols have important bioactivity, for example in the formation of membrane structures, the formation of hormones and vitamin D, as a repellent and insecticide as well as an antimicrobial [7]. Steroid compounds have microbial activity that can trigger the growth of epithelial tissue in wound tissue.

The Pecut Kuda flower stalk also contain Ethyl Linoleate compounds which were included in the unsaturated fatty acid group. The role of unsaturated fatty acids as an antibacterial is related to their ability to inhibit fatty acid synthesis. Fatty acid synthesis in bacteria is needed in the production of a number of components containing lipids, including cell membranes [13].

In previous research conducted by [12] on the effect of topical feeding of Pecut Kuda leaves ethanol extract on open wound healing on mice back, it was found that Pecut Kuda leaf extract has effectiveness in the wound healing process. This is because the leaves of Pecut Kuda contain secondary metabolites such as terpenoids, saponins, flavonoids, tannins and steroids.

## 4. Conclusion

Based on the results of the research that has been done, it can be concluded that the extract of the PecutKudaflower stalk (*Stachytarpethajamaicensis*L) contains secondary metabolite, such as Squalene, α-Tocopherol, Ethyl Linoleate, Stigmasta-7,16-dien-3-ol, 15-Hydroxypentadecanoic acid, Phytol, 6- Octadecenoic acid, 9,12-Octadecadienoic acid. These compounds have functions as antioxidants, anti-inflammatory, antimicrobial, antibiotic and antidote to free radicals in wound healing.

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