ABSTRACT

Objective: *Cestrum nocturnum* is a shrub widely used as a traditional treatment of burns, swelling, epilepsy, antimicrobials, and analgesics. Furthermore, essential oils of *Cestrum nocturnum* are known as mosquito repellents to prevent malaria. This article aims to review and briefly describe the phytochemical and pharmacological activities of *Cestrum nocturnum*. Methods: The method used in compiling the review article by literature studies from journals in the last ten years (2010-2020). Moreover, there are 20 articles to be analyzed in this review. Results: *Cestrum nocturnum* contains chemical compounds, i.e., alkaloids, glycosides, saponins, flavonoids, terpenoids, steroids, tannins, carbohydrates, proteins, amino acids, phytosterols, and phenols. Moreover, *Cestrum nocturnum* has antioxidant, antibacterial, antifungal, antidiabetic, antiulcer, hepatoprotective, antidepressant, antianxiety, anti-HIV, burns, and wound healing (excision and incision wound). Conclusion: It has the potential to developed as a drug from a natural product.

KEYWORDS: *Cestrum nocturnum*, Phytochemical, Pharmacological.

INTRODUCTION

*Cestrum nocturnum* is a shrub from the Solanaceae family, commonly known as "nyonya malam," used as a medicine for various health problems. *Cestrum nocturnum* has shiny dark green leaves, vine stems, greenish-white tubular flowers that give off a fragrant aroma at night, and fleshy berries. This plant can grow on moist and sandy soil with a pH of 6.6 - 7.5.[1] In traditional medicine, the Chinese community uses *Cestrum nocturnum* leaves to treat burns and inflammation, and the people in West Indies islands are used to treat
epilepsy.\cite{2} This article aims to review the phytochemical and pharmacological activities of *Cestrum nocturnum*.

**Data collection**

In compiling this review article, the technique used is to use literature studies from international journals and national journals in the last ten years (2010-2020). The literature was collected from NCBI, ScienceDirect, PubMed, Google Scholar by using keywords "Phytochemicals, Chemical Compounds, Bioactive Compounds, Secondary Metabolite, Phyto Nutrient, Bioactive Nutrient, Plant Chemical, and Botanical Composition" for phytochemicals; "Pharmacology" for pharmacological activities; and "*Cestrum nocturnum*, *Cestrum graciliflorum* Dunal, *Cestrum leococarpum* Dunal, *Cestrum multiflorum* var. *mexicanum* OESchulz, *Cestrum propinquum* M. Martens & Galeotti, *Cestrum suberosum* Jacq, *Chiococca nocturna* Jacq." All abstracts and full text of the articles were collected, examined, and describe as needed. The most relevant articles were selected for screening and included in this review.

**Phytochemical**

The phytochemical contents of *Cestrum nocturnum* have been analyzed qualitatively in various extracts. The phytochemical compounds of *Cestrum nocturnum* can be seen in Table 1.

<table>
<thead>
<tr>
<th>Part of plant</th>
<th>Extract</th>
<th>Phytochemical Contents</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td>Extract</td>
<td>Alkaloids, anthraquinones, cardiac glycosides, carbohydrates, flavonoids, phenols, tannins, and terpenoids</td>
<td>[3]</td>
</tr>
<tr>
<td>Leaves</td>
<td>Methanol Extract</td>
<td>Alkaloids, carbohydrates, proteins, flavonoids, saponins, cardiac glycosides, tannins, and steroids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hydroalcoholic</td>
<td>Carbohydrates, alkaloids, flavonoids, cardiac glycosides, tannins, and saponins</td>
<td>[4]</td>
</tr>
<tr>
<td></td>
<td>Petroleum Ether</td>
<td>Carbohydrates, tannins, saponins, cardiac glycosides, and steroids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chloroform extract</td>
<td>Carbohydrates, cardiac glycosides, steroids, and saponins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aquadest extract</td>
<td>Carbohydrates, cardiac glycosides, steroids, saponins, and tannins</td>
<td></td>
</tr>
<tr>
<td>Leaves</td>
<td>Ethanol Extract</td>
<td>Alkaloids, flavonoids, tannins, glycosides, triterpenoids</td>
<td>[5]</td>
</tr>
<tr>
<td></td>
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<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td>Leaves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aquadest extract</td>
<td>Alkaloids, glycosides, saponins, flavonoids, and tannins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethanol Extract</td>
<td>Alkaloids, glycosides, saponins, flavonoids, terpenoids, tannins, and steroids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methanol Extract</td>
<td>Alkaloids, glycosides, saponins, flavonoids, terpenoids, tannins, and steroids</td>
<td></td>
</tr>
<tr>
<td>Leaxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aquadest extract</td>
<td>Saponins, alkaloids, flavonoids, tannins, amino acids, and carbohydrates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methanol Extract</td>
<td>Alkaloids, flavonoids, tannins, and carbohydrates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethanol Extract</td>
<td>Saponins, alkaloids, tannins, and amino acids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hexane extract</td>
<td>No chemical content</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chloroform extract</td>
<td>Alkaloids</td>
<td></td>
</tr>
<tr>
<td>Stem</td>
<td>Stem powder</td>
<td>Alkaloids, tannins, and phenols</td>
<td></td>
</tr>
<tr>
<td>Leaf</td>
<td>Conventional hydrodistillation extract</td>
<td>Alkaloids, carbohydrates, glycosides, saponins, proteins, amino acids, phenolics, and tannins</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microwave-assisted hydrodistillation extract</td>
<td>Alkaloids, carbohydrates, glycosides, saponins, proteins, amino acids, phenolics, and tannins</td>
<td></td>
</tr>
</tbody>
</table>

Prasad *et al.*, reported that using *Cestrum nocturnum* leaves extract contains chemical compounds such as alkaloids, anthraquinones, cardiac glycosides, carbohydrates, flavonoids, phenols, tannins, and terpenoids.\(^3\) Furthermore, Sahane *et al.*, reported that aquadest extract had the highest yield, namely 19% containing carbohydrates, cardiac glycosides, steroids, saponins, and tannins. The hydroalcoholic extract has a yield of 16.08% with chemical compounds, namely carbohydrates, alkaloids, flavonoids, cardiac glycosides, tannins, and saponins. Methanol extract has a yield of 13.12% with chemical compounds, namely alkaloids, carbohydrates, proteins, flavonoids, saponins, cardiac glycosides, tannins, and steroids. Chloroform extract has a yield of 9.44% with chemical compounds, namely carbohydrates, cardiac glycosides, steroids, and saponins. In comparison, the petroleum ether extract showed the lowest yield, namely 8.84% with chemical compounds, namely carbohydrates, tannins, saponins, cardiac glycosides, and steroids. Saponin compounds found in *Cestrum nocturnum* leaves can be antidiabetic.\(^4\) According to Nagar *et al.*, The ethanol
The extract of *Cestrum nocturnum* leaves has a chemical compound such as alkaloids, flavonoids, tannins, glycosides, triterpenoids, carbohydrates, polyphenols, and proteins.\(^\text{[5]}\)

Nistha *et al.*, reported that *Cestrum nocturnum* leaves using aquadest extract, ethanol extract, and methanol extract contain different chemical compounds, including aquadest extract, which contains alkaloids, glycosides, saponins, flavonoids, and tannins. Ethanol extract contains compounds such as alkaloids, glycosides, saponins, flavonoids, terpenoids, tannins, and steroids. Methanol extract contains alkaloid compounds, glycosides, saponins, flavonoids, terpenoids, tannins, and steroids.\(^\text{[6]}\) According to Tyagi *et al.*, the content of chemical compounds in *Cestrum nocturnum* has saponin compounds in aquadest and ethanol extracts. Alkaloids were found in all extracts except hexane extract. Flavonoids were found in distilled water and methanol extracts. Then tannins were found in the extract of distilled water, ethanol, and methanol. Amino acids were found in aquadest and methanol extracts. Carbohydrates were only found in methanol and aquadest extracts. However, triterpenoid and glycoside compounds were not present in all extracts.\(^\text{[7]}\)

Fichadiya *et al.* reported that *Cestrum nocturnum* stem powder contains chemical compounds such as alkaloids, tannins, and phenols.\(^\text{[8]}\) Moreover, research conducted by Fatema *et al.* used the same solvent but with different techniques, i.e., conventional hydrodistillation extraction and microwave-assisted hydrodistillation extraction to produce the same chemical compounds, alkaloids, carbohydrates, glycosides, saponins, proteins, amino acids, phenolics, and tannins.\(^\text{[9]}\)

**Pharmacological activities**

Pharmacological assay of *Cestrum nocturnum* was carried out in vitro and in vivo with various extracts, fractions, and formulations.

**Antioxidants**

*Cestrum nocturnum* flower essential oil showed the strongest antioxidant activity with an IC\(_{50}\) value of 24.45±1.7 μg/mL.\(^\text{[10]}\) The ethyl acetate fraction at concentrations of 2, 3, 4, 5, 6, and 8 μg/mL also showed antioxidant activity due to the presence of flavonoids and polyphenols, which had IC\(_{50}\) values of 23.74 μg/mL.\(^\text{[11]}\) Keshari *et al.* reported that the aquadest extract of *Cestrum nocturnum* leaves with concentrations of 10, 20, 30, 40, 50, 75, and 100 μg/mL has the potential to be an antioxidant with an IC\(_{50}\) value of 29.55% due to the presence of flavonoids that can inhibit free radicals.\(^\text{[12]}\)
Antibacterial
According to Khan et al., methanol extract from the whole plant *Cestrum nocturnum* has antibacterial potential at a dose of 3 mg/mL, which can inhibit the growth of *P. aeruginosa* bacteria with a bland zone of 17 mm and a MIC value of 19 μg/mL.[13] Khatun et al. reported that *Cestrum nocturnum* flowers have potential as antibacterial tests using methanol extract at doses of 1000, 500, 250, and 62.5 μg/mL, which can inhibit the growth of *Staphylococcus aureus* bacteria (17.5±1.3) by MIC value of 62.5 μg/mL.[14]

Rashed et al. reported that the ethyl acetate fraction of *Cestrum nocturnum* stems had antibacterial activity due to the content of β-sitosterol, stigmasterol, protocatechuic acid, and apigenin. A dose of 1.0 x 10^5 CFU/mL ethyl acetate fraction from *Cestrum nocturnum* stems can inhibit the growth of *P. aeruginosa* with a MIC value of 3.75 mg/mL.[15] The methanol extract of *Cestrum nocturnum* leaves shows antibacterial activity at a dose of 3 mg/mL, which can inhibit the growth of *Escherichia coli* bacteria with an average inhibition zone value of 15 mm and *Staphylococcus aureus* with an average inhibition zone value of 14.33 mm.[16]

Antifungal
Al-Reza et al. reported that the *Cestrum nocturnum* flower has potential as an antifungal tested using hexane extract at a dose of 1500 μg/mL, which can inhibit fungal growth by 21.07±0.4; 20.0±0.2; 19.6±0.5 in *F. oxysporum*, *P. capsici*, and *S. sclerotiorum* with MIC values ranging from 500-1000 μg/mL.[17] The butanol fraction and distilled water fraction from whole plant *Cestrum nocturnum* also have the potential as an antifungal activity at a dose of 24 mg/mL, which can inhibit *C. albicans* bacteria with each % inhibition of fungal growth, namely 65% with MIC values ranging from 170-175 μg/mL.[13]

The aquadest fraction of *Cestrum nocturnum* stems had antifungal activity due to the content of kaempferol 8-0-methyl ether, kaempferol, kaempferol 3-0-α-rhamnoside, and luteolin 7-0-β-glucoside tested at a dose of 1.0x10^5 CFU/mL so that it can inhibit the growth of the fungus *A. fumigatus* bacteria with a MIC of 2.5±0.00.[15] The methanol extract of *Cestrum nocturnum* leaves the potential as an antifungal with a dose of 10 mg/mL, which can inhibit the growth of *Candida glaberata* with an average inhibition zone value of 23.67 mm and *Aspergillus flavus* with an average bland zone value of 25.33 mm.[16]
Antidiabetic
Hydroalcoholic extract from *Cestrum nocturnum* leaves at doses of 200 and 400 mg/kg body weight showed antidiabetic activity showed by decreased blood glucose levels on the 15th day. Moreover, experience weight loss by administering hydroalcoholic extracts.\[18\] The ethanol extract of *Cestrum nocturnum* leaves with a dose of 400 mg/kg body weight showed significant results on antidiabetic activity. It was showed a decrease in blood glucose levels on day 28. Moreover, *Cestrum nocturnum* contains flavonoids that can regenerate damaged β cells in animals with diabetes.\[19\]

Anti-ulcers
The 70% methanol extract of *Cestrum nocturnum* leaves has the potential as an antiulcer at doses of 100, 300, and 500 mg/kg subjected to nephrocurative evaluation and nephroprotective evaluation. In the nephrocurative evaluation, there was a decrease in body weight, decreased albumin levels, increased blood urea nitrogen, serum creatinine, and uric acid on day 10. Moreover, on day 26, body weight and albumin levels increased while blood urea nitrogen, serum creatinine, and uric acid decreased in methanol extract (500 mg/kg)

Table 2: Pharmacological activities of *Cestrum nocturnum* L. (in vitro and in vivo).

<table>
<thead>
<tr>
<th>Pharmacological Activities</th>
<th>Extract / Fraction / Formulation</th>
<th>Part of plant</th>
<th>Dosage / concentration</th>
<th>The Results</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antioxidants</td>
<td>Essential oil</td>
<td>Flower</td>
<td>Not specific</td>
<td>The essential oil in <em>Cestrum nocturnum</em> flowers shows antioxidant activity</td>
<td>[10]</td>
</tr>
<tr>
<td></td>
<td>Ethyl Acetate Fraction</td>
<td>Leaf</td>
<td>2, 3, 4, 5, 6, 8 µg/mL</td>
<td>Ethyl acetate fraction showed antioxidant activity supported by flavonoids and polyphenols</td>
<td>[11]</td>
</tr>
<tr>
<td></td>
<td>Aquadest extract</td>
<td>Leaf</td>
<td>10, 20, 30, 40, 50, 75, and 100 µg/mL</td>
<td>Aquadest extract shows antioxidant activity, which supported by the content of flavonoids which can inhibit free radicals</td>
<td>[12]</td>
</tr>
<tr>
<td>Antibacterial</td>
<td>Methanol Extract</td>
<td>The whole plant</td>
<td>3 mg/mL</td>
<td>The methanolic extract showed significant antibacterial activity</td>
<td>[13]</td>
</tr>
<tr>
<td></td>
<td>Methanol Extract</td>
<td>Flower</td>
<td>1000, 500, 250, 62.5 µg/mL</td>
<td>The methanol extract showed antibacterial activity</td>
<td>[14]</td>
</tr>
<tr>
<td></td>
<td>Ethyl Acetate Fraction</td>
<td>Trunk</td>
<td>1.0 x 10⁵ CFU/mL</td>
<td>The ethyl acetate fraction of the <em>Cestrum nocturnum</em> stem has antibacterial activity due to β-sitosterol, stigmasterol, protocatechuic acid apigenin.</td>
<td>[15]</td>
</tr>
<tr>
<td></td>
<td>Methanol</td>
<td>Leaf</td>
<td>3 mg/mL</td>
<td>The methanol extract of</td>
<td>[16]</td>
</tr>
<tr>
<td>Extract</td>
<td>Concentration</td>
<td>Activity</td>
<td></td>
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</tr>
<tr>
<td><strong>Antifungal</strong></td>
<td></td>
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</tr>
<tr>
<td>Hexane Extract</td>
<td>Flower Hexane extract 1500 μg/mL</td>
<td>The hexane extract from the <em>Cestrum nocturnum</em> flower has antifungal activity [17]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butanol fraction Aquades Fraction</td>
<td>The whole plant 24 mg/mL</td>
<td>The whole plant <em>Cestrum nocturnum</em> with butanol fraction and distilled water fraction had antifungal activity [13]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquades Fraction</td>
<td>Trunk 1.0x10^5 CFU/mL</td>
<td>The distilled water fraction has antifungal activity supported by kaemferol 8-0-methyl ether, kaempferol, and kaempferol 3-0-α-rhamnoside and luteolin 7-0-β-glucoside. [15]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methanol Extract</td>
<td>Leaf 10 mg/mL</td>
<td>The methanol extract of <em>Cestrum nocturnum</em> leaves has antifungal activity [16]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydroalcoholic Extract</td>
<td>Leaf 200 and 400 mg/kg BW</td>
<td>The hydroalcoholic extract showed significant antidiabetic activity [18]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethanol extract</td>
<td>Leaf 400 mg/kg</td>
<td>The ethanol extract shows significant results on antidiabetic activity, which supported by the content of flavonoids that can regenerate damaged β cells [19]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Antidiabetic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70% methanol extract</td>
<td>Leaf 100, 300, 500 mg/kg</td>
<td>The 70% methanol extract of <em>Cestrum nocturnum</em> leaves has antiulcer activity [20]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexane Extract Methanol Extract</td>
<td>Leaf Methanol extract and hexane extract 300, 500, 700 mg/kg</td>
<td>The methanol extract and hexane extract have antiulcer activity [21]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethanol Extract: Aquades (30:70)</td>
<td>Leaf 250 and 500 mg/kg</td>
<td>Ethanol extract: aquades has a hepatoprotective activity supported by the content of flavonoids and phenols that have hepatoprotective activity. [22]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Antidepressants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethanol Extract Aquades Extract</td>
<td>Leaf 500 mg/kg</td>
<td>The ethanol extract and distilled water extract had significant results on antidepressant activity due to the flavonoid content [23]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Antianxiety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethanol Extract Aquades Extract</td>
<td>Leaf 500 mg/kg</td>
<td>Ethanol extract and distilled water extract had significant results against hatchlings due to their flavonoid content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anti-HIV 1</strong></td>
<td>Methanol extract 80%</td>
<td>80% methanol extract, ethyl acetate extract, butanol extract [24]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extract Type</td>
<td>Plant Part</td>
<td>Concentration</td>
<td>Activity Note</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------</td>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethyl Acetate Extract</td>
<td>Leaf</td>
<td>0.00%, 2.00%, 4.00%, 7.99%</td>
<td>The formulation of <em>Cestrum nocturnum</em> leaves has properties as fuel because of tannins, which can help the wound healing process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butanol Extract</td>
<td>Leaf</td>
<td>2% and 5%</td>
<td>The ethanol extract ointment from the leaves of <em>Cestrum nocturnum</em> has properties as an excision wound due to the content of triterpenoids, tannins, and flavonoids.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquadest Extract</td>
<td>Leaf</td>
<td>2% and 5%</td>
<td>The ethanol extract ointment from the leaves of <em>Cestrum nocturnum</em> has properties as an incision wound because of the content of triterpenoids, tannins, and flavonoids.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There were significant differences in body weight and albumin levels in the nephroprotective evaluation with methanol extract (500 mg/kg). Moreover, there is a decrease in blood urea nitrogen, serum creatinine, and uric acid levels.\(^{[20]}\) According to Saleem *et al.*, *Cestrum nocturnum* leaves with methanol extract and hexane extract at doses of 300, 500, and 700 mg/kg have antiulcer activity. Methanol extract (700 mg/kg) showed 81% anti-ulcer activity and with hexane extract (700 mg/kg) showed anti-ulcer activity 83% higher than standard value 77%.\(^{[21]}\)

**Hepatoprotective**

Ethanol extract: aquadest (70:30) from the leaves of *Cestrum nocturnum* has hepatoprotective activity due to the content of flavonoids and phenols, which have hepatoprotective activity induced by paracetamol at doses of 250 and 500 mg/kg. So that ethanol extract: aquadest has hepatoprotective activity against hepatotoxicity, which can reduce liver enzymes (AST, ALT, ALP, and TB) due to paracetamol.\(^{[22]}\)

**Antidepressants**

The ethanol extract and distilled water extract of *Cestrum nocturnum* leaf at 500 mg/kg have antidepressant activity due to flavonoids. A swimming test and tail suspension test were
Conducted to see the immobility time of 5 minutes. The results obtained significantly reduce the time of immobility to potential as an antidepressant.[23]

Antianxiety
Ethanol extract and distilled water extract of *Cestrum nocturnum* leaves at a dose of 500 mg/kg have antianxiety due to flavonoids. Test the Elevated plus maze (EPM) model and test the locomotor using an actofotometer. The results were obtained that significantly increased the number of entries and time spent on the open EPM device. The locomotor test significantly decreased locomotor activity on the actophotometer device so that it has the potential to be antianxiety.[23]

Anti-HIV
*Cestrum nocturnum* stem with 80% methanol extract, ethyl acetate extract, butanol extract, and aquadest extract was tested on anti-HIV-1 tested on C8166 cells using MTT media. Moreover, the anti-HIV-1 activity was obtained from all weak extracts with a Therapeutic Index (IT) value lower than 10. A significant result on anti-HIV-1 activity measured by the IT value should be above 10 and less than 100 with AZT for comparison.[24]

Burns
*Cestrum nocturnum* leaves made in the form of a formula consisting of 4 concentrations of 0.00%, 2.00%, 4.00%, and 7.99%. The effect of giving *Cestrum nocturnum* leaves has a wound-healing percentage of 82.89±5.49% with a concentration of 4% *Cestrum nocturnum* leaves. The percentage of wound healing was thought to be due to the optimal and precise combination of *Cestrum nocturnum* leaf powder formula so that wound healing can also be faster. Moreover, *Cestrum nocturnum* leaves contain tannins that can help the wound healing process through several cellular mechanisms, including warding off free radicals and increasing blood vessels and fibroblasts, depositing collagen, forming granule tissue, epithelizing, and increasing wound contraction through astringent properties.[25]

Excision wound
*Cestrum nocturnum* leaves are efficacious as wound excision because they were supported by triterpenoid compounds and tannins that can heal wounds with various mechanisms such as wound contraction and increased epithelial velocity. Moreover, flavonoid compounds can prevent wound infection because they have antiviral and antibacterial activity. The ointment of the ethanol extract of *Cestrum nocturnum* leaves with a concentration of 2%, and 5% was
tested on the excision wound, and at a concentration of 5% showed an increase in fibrous cells, blood vessels, and collagen fibers so that it can significantly act as an excision wound.\textsuperscript{[5]}

**Incisions wound**

*Cestrum nocturnum* leaves are efficacious as a cut wound because they were supported by flavonoids, triterpenoids, and tannins that can heal wounds with various mechanisms such as wound contraction and increased epithelial velocity. The ethanol extract ointment of *Cestrum nocturnum* leaves concentration 2% and 5% was tested on the cut. Concentration 5% showed the tensile strength of the wound 201.83±4.98 caused by an increase in collagen fibers around the wound area.\textsuperscript{[5]}

**CONCLUSION**

*Cestrum nocturnum* plants have various chemical compounds, including alkaloids, glycosides, saponins, flavonoids, terpenoids, steroids, tannins, carbohydrates, proteins amino acids. *Cestrum nocturnum* has various pharmacological activities such as antioxidants, antibacterial, antifungal, antidiabetic, antiulcer, hepatotoxicity, antidepressant, antianxiety, anti-HIV, burns, excision wounds, and incision wounds.

**FUNDING**

Nil.

**AUTHOR CONTRIBUTIONS**

All the authors have contributed equally.

**CONFLICTS OF INTEREST**

The authors declare no conflicts of interest.

**REFERENCES**


