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Research Article

THE POTENCY OF *LACTUCA SATIVA* LINN. AND *APIUM GRAVEOLENS* L. FROM INDONESIA AS TRANQUILIZER

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ABSTRACT

Introduction: An attempt to explore the medicinal plants as tranquilizers is relatively rare.
Objective: This study aims at examining the sedation effects of 70% ethanolic extract of *Lactuca sativa* Linn. leaves and antidepressant effects of 70% ethanolic extract of *Apium graveolens* L. seeds.
Material & Method: The animals test used are female mice Swiss strain. The Dose of 70% ethanolic extract of *Lactuca sativa* Linn. leaves and *Apium graveolens* L seeds are 200 mg/kg, 400 mg/kg, and 800 mg/kg respectively. The Sedation test uses the rotarod method with diazepam as positive control and anti-depression test uses FST method with amitriptyline as positive control. The sedation test analysis is performed by ANOVA followed by Benferroni test by comparing the fall of time before and after treatment, while the antidepressant analysis test is performed by Kruskal wallis followed by Mann whitney test by comparing the duration of immobility pre and post treatment between groups.
Result: In the sedation test, there is significant deference between the 70% ethanolic extract of *Lactuca sativa* Linn dosage 200; 400 and 800 mg / kg respectively and negative control with p value <0.05 by the Benferroni test. In anti depressant test, the duration of immobility (pre-post treatment) extracts groups shorter than negative control. On Mann whitney test, there are significant difference between the ethanolic extract of *Apium graveolens* L seeds dose 200; 400 and 800 mg/kg and negative control ($p<0.05$).
Conclusion: The ethanolic extract of *Lactuca sativa* Linn and *Apium graveolens* L seeds have potential as tranquilizer.
Keywords: *Lactuca sativa* Linn., *Apium graveolens* L., Tranquilizer, sedation, anti-depressants.

INTRODUCTION

Lettuce (*Lactuca sativa* Linn.) is often used in traditional medicine. *Lactuca sativa* is a member of the genus of Lactuca (lettuce). The common name in Indonesia is Selada[1]. The characteristics of this plant are thin roots and erect stems 30-100 cm tall, branching at the top and regular spiral-shaped leaves[2]. The leaves are colorful, green, red, yellow, gold or blue according to varieties[3]. *L sativa* Linn. is commonly used as hypnotic sedative[4,5,6]. Many researchers have been conducted in order to explore the efficacy of this plant scientifically. The study include that the sap of lettuce has antifungal effect[7]. Oil from the lettuce seeds have sedative and hypnotic properties[5]. It was also reported that this plant has anti diabetic effect[6].

Celery (*Apium graveolens* L.) is a plant used as food additive. In India, the dry food of A. graveolens is known as Celery. Celery seed is used by Ayurvedic physician (Vaidyas) to treat people suffering from cold, flu, as diuretic, antispasmodic, various types of arthritis[10,11]. This plant is member of Apium genus and family Apiaceae. Indonesian people know this plant as Seledri [12]. The common names are Wild Celery, Ajmod, Ajwain-kapatta[13]. A. graveolens can grow up to 0.6 m. The leaves are pinnate, thin, oblique rhombic shape, a length of 2 cm to 7.5 cm, a width of 2 cm to 5 cm with a pointed leaf tips. Short stem and taproot[14]. Several studies to explore the pharmacological effects of celery plants reported that: Seed of celery (*Apium graveolens* L.) has sedation effect[15]. Crude seed

extract of *Apium graveolens* have adulticidal activity to Aedes aegypti with LD_{50} 6.6 mg/cm2[16]. The aqueous extract of celery seed has the effect of lowering blood pressure[17]. The ethanolic extract of *A. graveolens* has hypolipidemic effect on male albino rats[18].

This research examines the potency of *L. sativa* Linn as sedative agent and *A. graveolens* L. as antidepressant agent.

MATERIAL AND METHODS

Material

The plants used in this research were *Lactuca sativa* Linn. and *Apium graveolens* L. harvested from Karanganyar, Jawa tengah, Indonesia in July 2013. The animal test were male mice Swiss strain obtained from Pharmacology laboratory of Faculty of Pharmacy of Universitas Muhammadiyah Surakarta. The research was approved by health research ethics committee of Faculty of Medicine of Universitas Muhammadiyah Surakarta with number: 054b/A.1/KEPK-FKUMS/II/2015.

Preparation extract

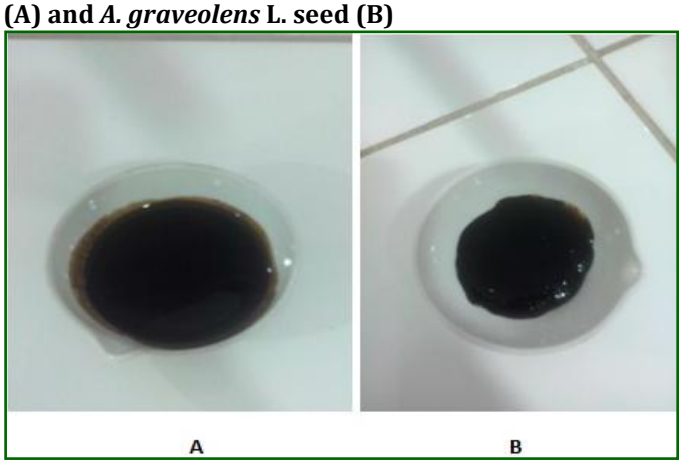
The *Lactuca sativa* Linn. leaves and *Apium graveolens* L. seeds covered by black flannel cloth were dried under the sun. Once dried, the *Lactuca sativa* Linn. leaves and *Apium graveolens* L. seeds were blended to obtain the powder. The powder was macerated by 70% ethanolic extract for 3 days. The filtrate was aerated in the vacuum evaporator until thick extract was obtained. Extraction process was done in laboratory of Pharmacology of Faculty of Medicine of Universitas Muhammadiyah Surakarta, Indonesia.

The *L. sativa* Linn. and *A. graveolens* L plant can be seen in figure 1.

Figure 1: *L. sativa* Linn. and *A. graveolens* L plant

The result of the maceration can be seen in figure 2

Figure 2: The tick extract of *L. sativa* Linn. leaves (A) and *A. graveolens* L. seed (B)



The sedation test

A total of 25 female Swiss mice were divided into 5 groups. Each group consists of 5 mice. All mice were adapted on the rotarod for 2 weeks before treated. On the day of the test deploy, each mice was placed on rotarod. The rotarod was rotated with 10 rpm and was counted fall of time in the top rotarod apparatus. All mice were treated by extract /control appropriated test group, namely:

1. Negative control: Aquadest 0.5 mL/200 g bw
2. Positive control: Diazepam 1.3 mg/kgbw
3. Group III: Ethanolic extract of *Lactuca sativa* Linn dose 200 mg/kgbw
4. Group IV: Ethanolic extract of *Lactuca sativa* Linn dose 400 mg/kgbw
5. Group V: Ethanolic extract of *Lactuca sativa* Linn dose 800 mg/kgbw

Forty five minutes after treatment, all mice were put on top of rotarod. Rotarod was rotated 10 rpm and were counted fall of time in the top rotarod apparatus more. The treatment of mice can be seen in figure 3

Figure 3: The extract treatment on sedation test

Antidepressant test

Antidepressant activity test uses the FST (Forced swimming test) method. A total of 25 mice were divided into 5 groups with 5 mice each group. Design test is as follows: All mice were put into the tube (transparent cylindrical tube (30x15x20) cm^3 filled with water) for 15 minutes and the duration of immobility of mice was counted (mice in the idle state). After that, the mice were treated by drug/extract orally suitable groups. These groups were:

1. Negative control: Aquadest 0.5 mL/200 g bw.
2. Positive control: Amitriptilin 6.6 mg/Kgbw.
3. Group III: Ethanolic extract of *Apium graveolens* L. dose 200 mg/kgbw.
4. Group IV: Ethanolic extract of *Apium graveolens* L. dose 400 mg/kgbw.
5. Group V: Ethanolic extract of *Apium graveolens* L. dose 800 mg/kgbw.

Thirty minutes after treatment, all mice were put in FST tube for 15 minutes and the duration of immobility was again counted.

Treatment on antidepressant test can be seen in figure 4.

Figure 4: The extract treatment on antidepressant test

Statistical analysis

The data of sedation test were expressed by mean ± SD and it of fall of time were analyzed by ANOVA followed by Benferroni test, while the duration of immobility pre and post treatment on anti depressant test were analyzed by Kruskal wallis followed by Mann whitney.

RESULTS AND DISCUSSION

A. The Sedation test

On maceration process of *L. sativa* Linn with 70% ethanol was obtained 21.6 g viscous extract from 1kg of dry leaves. The sedation effect of *Lactuca sativa* Linn leaves can be seen in table 1.

Table 1: The Mouse fall of time after treatment

Groups	Dose	Mean ± SD of fall of time (second)		(before/after) x 100%	*p. value (vs negative control)
		Before treatment	After treatment		
Negative control	0.5mL/20bw	802 ± 517.349	785.2 ± 467.095	114.93	
Positive control (Diazepam1,3 mg/kgbw)	1.3 mg/kg	444 ± 443.2133	181.6 ± 323.4622	33.8	0.008
	200 mg/kg	489.6 ± 460.5891	294.8 ± 192.9461	44.56	0.021
The 70% Ethanolic extract of *Lactuca sativa* Linn.	400 mg/kg	504.2 ± 527.1932	215.2 ± 195.9023	32.7	0.008
	800 mg/kg	979.6 ± 769.8622	421.6 ± 341.3639	33.64	0.007

*p value by Benferroni test

In anova test there is significant difference between positive control (diazepam) and negative control with p value 0.008 ($p<0.05$). Based on table 1, there are significant deference between the 70% ethanolic extract of *Lactuca sativa* Linn groups and negative control with p value <0.05 by the Benferroni test. It can be concluded that the 70% ethanolic extract of *Lactuca sativa* Linn dosage 200; 400 & 800mg/kgbw respectively have sedation activity.

B. Antidepressant test

In the maceration process of *A. graveolens* seed with 70% ethanol was obtained as viscous extract as much as 12.45 g of 500 g of dry seeds.

The result of antidepressant test by FST (Forced swimming test) method can be seen on Table 2.

Table 2: The result of duration of immobility pre and post treatment with Forced Swimming Test method

Groups	Doses	Duration of imobility (second) mean ± SD		Pre-post test (second) x ± SD	*p. value (vs negative control)
		Pre test	Post test		
Negative control(Akuades)	0.5 mL/20 grambw	97.6 ± 0.54	95.2 ± 1.09	2.4 ± 1.09	
Positif control (Amitriptilin 6,6 mg/Kgbw)	50 mg/kgbw	95.8 ± 1.09	88.8 ± 1.64	7 ± 2.73	0.006
The 70% Ethanolic extract of *Apium graveolens* L seed	200 mg/kgwb	97.4 ± 0.54	92 ± 2.73	5.4 ± 2.19	0.059
	400mg/kgbw	95.4 ± 2.19	89.2 ± 1.09	6.2 ± 1.09	0.002
	800 mg/kgbw	94 ± 2.73	84.2 ± 0.83	9.8 ± 2.04	0.000

*p.value by Mann whitney test

Based on table 2, there is significant difference between the 70% ethanolic extract of *Apium graveolens* L seed groups and negative control ($p<0.05$). It can be concluded that the ethanolic extract of *Apium graveolens* L seed have antidepressant effect by FST method.

DISCUSSION

This result of sedative test of this research is linear with previous study. The result shows that the stem extract of *L. sativa* can influence motoric activity. In higher dose, this extract causes flaccid paralysis[19]. The N buthanol L. sativa increases pentobarbital effect on mice[20]. The alcoholic extracts of L sativa have sedative effect on behavior of toads[21]. L sativa seed increased sleeping rate[22]. Extract of lettuce stem has sedative effects on motor activity of Bufo marinus[19]. Several compounds have been identified from *L. sativa* among others such as Polyphenols (quercetin & luteolin),[23] lactucin and lactucopicrin[24]. This lactone (Lactucin and lactucropicrin) from *L. Sativa* has been reported to have sedative effects in mice[25].

The antidepressant effect of this research is linear with previous research, among others: the root of *A. graveolens* Linn has analgetic activity and central antidepressant[26]. The methanolic extract of *A graveolans* seed had antidepressant activity in mice by FST & TST (Tail suspension test) method[27]. The mechanism of antidepressant of *A. graveolens* is not clear. The major component of *A. graveolens* are alkaloids, terpenoids, glycoside, tannin, flavonoid and polyphenols[28,29]. Results of other studies indicate that *Apium graveolens* extract contains luteolin (flavonoids) as an antidepressant[30]. The methanol extract of *Apium graveolens* containing flavonoids are useful as antidepressants[31]. Research by Yi et al. (2010) proved that flavonoids have an effect as antidepressant through central serotonergic and noradrenergic systems[32]. Flavonoids are receptor ligand GABA (Gamma Amino Butyric Acid) in the central nervous system that bind benzodiazepines which act as antidepressants[33]. The flavonoids (quercetin) contained in the leaves of A. graveolens Linn have anti-depressant effects[34,35].

CONCLUSION

The 70% ethanolic extract of *L. sativa* leaves have sedative effect. The 70% ethanolic extract of *A. graveolens* Linn seeds have anti depressant effect by FST method. Both have potential as tranquilizers.

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