

Testes and body weight alteration related cardamom extract administration in mice

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ABSTRACT: Cardamom is known as a plant with millions of benefits and it is known to contain aphrodisiac substances. The role of cardamom as an aphrodisiac need to be studied more deeply from the scientific point of view. The experimental object is a 3-month-old male white mice (*Mus musculus albinus*) with an average weight of about 30-35 grams. After being acclimatized for approximately 2 weeks, 35 mice were divided into 3 groups based on the dose of cardamom extract. At the end of the experiment, the mice will be sacrificed and then the testes were weighed and cauda epididymis were isolated to collect the sperm. Our findings suggested that the dose of administration has important role in affecting the weight of testes and bodies of mice. However, further studies on sperm profiles and optimal administration doses of cardamom extract are highly recommended.

Keywords:

Cardamom extract, testis, body weight, spermatozoa, mice.

■ INTRODUCTION

Cardamom is included in Zingiberales, family Zingiberaceae (Ginger tribe) genus (*Amomum*) and species *Amomum compactum* Sol ex. Maton (Hartono, 1996). This plant can grow up to 2 meters high, with rhizomes that grow underground. The shape is round, 1-2 cm wide, yellowish white, covered with reddish brown hairless scales (Wolf & Hartutiningsih, 1999). Cardamom is known to contain aphrodisiac substances such as cineole, camphor, borneol and geraniol. Cineole contained in cardamom is a type of 1,8-cineole and is known to be the most element contained in cardamom seeds. In essential cardamom oil reviewed by Bandhariani *et al.* (2013), containing at least 73.27% of 1,8-cineole. Cineole is known to increase blood flow and relax muscles (Klein, 2018). In addition, cardamom is proven to contain zinc and minerals and functions as cellular building element in the reproductive organs. Cardamom also contains androgenic components like borneol, cineole, citronellol and geraniol which can overcome erectile problems and decreased sexual arousal (Dukes, 1993).

The role of cardamom as an aphrodisiac need to be studied deeper from the scientific point of view. The limited available information was the reason for us to conduct this research. Even though cardamom contains many chemical elements, but it is not yet known what compounds have more or dominant effects on the system central nerve so that affect the male reproductive organs.

■ MATERIALS AND METHODS

The experimental object was a 3-month-old male white mice (*Mus musculus albinus*) with an average weight of about 30-35 g. After being acclimatized for approximately 2 weeks, 27 mice were divided into 3 groups based on the dose of cardamom extract i.e. Control (n=9), Group 1 (n=9): mice given cardamom extract for 30 days at a dose of 3.9 mg/30 gBW, and Group 2 (n=9): mice given cardamom extract for 30 days at a dose of 4.5 mg/30 mgBW. The mice were given feed and drink *ad libitum*. At the end of the experiment (30th day), the mice sacrificed and then the testes were weighed and cauda epididymis was isolated to collect the sperm. The suspension of spermatozoa from cauda epididymis will be used for observations of sperm motility and their number as carried out by Partodihardjo (1992). The data will be statistically analyzed using One-way ANOVA.

■ RESULTS

As informed before, the treatment was held for about a month and the results showed any differences among groups based on the variable observed. The both side testicular weight between negative control group and the group 1, showed the same average weight, where the right and left

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testis average of Group 1 were 0.12 ± 0.01 grams each and the right and left testis average of Control Group were 0.09 ± 0.00 and 0.08 ± 0.01 . While the group 2 showed significance difference with the previous groups, 0.13 ± 0.00 and 0.12 ± 0.00 grams for the right and left testicular. The comparison of the testicular weight differences is well described in Fig. 1.

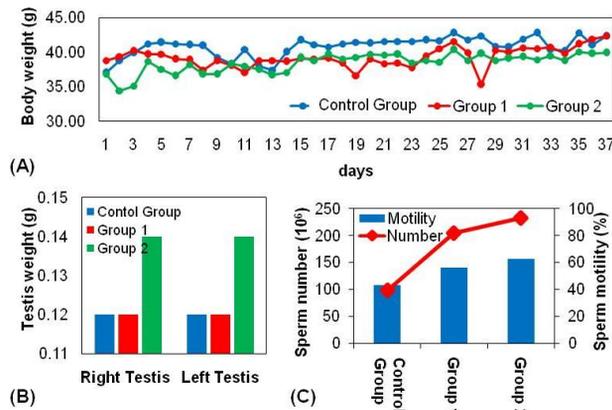


Figure 1 (A) body weight, (B) testis weight, and (C) number and motility of mice spermatozoa among groups.

Other parameter from our findings is the serial body weight of mice from all groups did not change significantly in weight gain. In the Control Group, when mice experienced an increase in body weight of approximately 1 gram, then a period of 6 days later, their body weight will decline again. The average body weight of Control Group was 40.80 ± 2.43 grams. Not much different from the Control Group, mice in Group 1 also experienced increases and decreases in body weight in a relatively shorter time. In approximately 4 days after experiencing a 1-2 gram increase, the body weight of mice will decrease by 1.5-2.0 grams. Data obtained from Group 2 tends to stagnate day by day with the average body weight of mice 38.42 ± 2.65 grams, which is the smallest average compared to the other two groups.

DISCUSSION

It has been stated that three of several parameters of sperm profile has strongest correlation with testicular volume, they are sperm density, total sperm count per ejaculate, and percentage of motile sperm (Arai *et al.*, 1998). Testis size is closely related to the sperm and testosterone contained (Takahara *et al.*, 1987). The more the testes volume, the more sperm and testosterone produced. Group 2 received the highest dose of administration, 4.5 mg/30 mgBW. Surprisingly, the average of total testis weight was significantly become the highest among other groups, 0.14 grams for both side testes. The correlation also found in the other two groups where Group 1 was in the next decreasing order with lower testicular weight in average (0.12 grams for both side). The dose administration of cardamom extract was 3.9 mg/30 mgBW, lower than the second treated group. The negative Control Group has never administered with any cardamom extract. Its variable was the same with the Group

1 which accepted the smallest dose of cardamom extract were 0.12 grams for the both-side testicular weight.

Cardamom is declared as a safe herb for the body. Some non-scientific based information states that cardamom can be healthy for the body and can accelerate fat burning so that it can reduce body weight without side effects. This is because the melatonin contained in it can increase the burning of fat in the body. Melatonin increases the stimulation of important fat cells (beige fat) and helps in burning calories in white adipose tissue (Jiménez-Aranda *et al.*, 2013).

CONCLUSION

The highest dose of administration in our study has proven the effect of cardamom in raising the testis and body weight in mice. Further study about the sperm profile and optimum administration dosage are highly recommended.

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REFERENCES

- Arai T, Kitahara S, Horiuchi S, Sumi S, Yoshida K. 1998. Relationship of testicular volume to semen profiles and serum hormone concentrations in infertile Japanese males. *International Journal of Fertility and Women's Medicine*, 43(1): 40-47.
- Bandhari AK, Bisht VK, Negi JS, Baunthiyal M. 2013. 1, 8-Cineole: A predominant component in the essential oil of large cardamom (*Amomum subulatum* Roxb.). *Journal of Medicinal Plants Research*. 7(26): 1957-1960.
- Dukes JA. 1993. CRC Handbook of Alternative Cash Crops. Florida: CRC Press.p240-241.
- Hartono S. 1996. *Tumbuhan Monokotil*. Cetakan I. Jakarta: Penerbit Swadaya. p 77.
- Jiménez-Aranda A, Fernández-Vázquez G, Campos D, Tassi M, Velasco-Perez L, Tan DX, Reiter RJ, Agil A. 2013. Melatonin induces browning of inguinal white adipose tissue in Zucker diabetic fatty rats. *Journal of pineal research*. 55(4):416-23.
- Klein L. 2018. 22 Aphrodisiac Foods: Boost Your Sex Drive, Deliciously! Let's Get it On...in the Kitchen!! <http://www.organicauthority.com/mojo-foods/11-foods-that-get-your-sex-drive-going-naturally.html>. (18 Januari 2018).
- Partodiharjo S. 1992. Ilmu Reproduksi Hewan. Mutiara Sumber Widya. Jakarta
- Takahara H, Cosentino MJ, Sakatoku J, Cockett ATK. 1987. Significance of Testicular Size Measurement in Andrology: II. Correlation of Testicular Size with Testicular Function. *The Journal of Urology*, 137(3):416-419.
- Wolf XY, Hartutiningsih. 1999. *Amomum compactum* Soland. ex Maton, dalam C.C. de Guzman and J.S. Siemonsma (eds.). *Plant Resources of South-East Asia 13: Spices*. PROSEA. Bogor. p68-71.