



The Influence of Granting Ngor Eggplant (*Solanum Indicum*) Extract inhibiting of Spermatogenesis in Mice (*Mus Musculus*)



Nyoman Suarjana ^a; I Nyoman Mangku Karmaya ^b; Bagus Komang Satriyasa ^c;
J. Alex Pangkahila ^d; Ni Putu Widya Astuti ^e

Article history: Received 14 February 2017 ; Accepted in revised form 10 July 2017 ; Approved 5 August 2017 ; Available online 30 August 2017

Correspondence Author ^{*a}

Abstract



Keywords

Spermatids 7 & 19;
Spermatogonium A;
Ngor Eggplant Extract;
Spermatocyte Primary;
Pakhiten;

The study about contraceptive for adult especially for men that the numbers were limited, so needed the ingredients contraceptive is derived from a plant. One of the plants that potentially becomes contraceptive is ngor eggplant because contains antifertility substances. The research has been done about granting of ngor eggplant extract inhibiting spermatogenesis in mice. The design of research used random post-test control group design by one group control, three groups by treatment and six times doing treatment again. (T0 = control group, T1 = granting extract 15%, T2 = granting extract 20%, T3 = granting extract 25%). This treatment has been done in 36 days. The result of this research showed the granting ngor eggplant extract to T1 could reduce the number of cells spermatocyte primary pakhiten and cells spermatids 7 & 19 by meaningful ($P < 0,05$). In T2 and T3 could reduce the number spermatogonia A cells, spermatocyte primary pakhiten cells and spermatids 7 & 19 cells ($P < 0,05$).

e-ISSN: 2550-696X, p-ISSN: 2550-6978 © Copyright 2017. The Author. SS Journals Published by Universidad Técnica de Manabí. This is an open-access article under the CC BY-SA 4.0 license (<https://creativecommons.org/licenses/by-sa/4.0/>) All rights reserved.

^a Public Health Study Program, Dhyana Pura University, nyomansuarjana794@yahoo.com

^b Faculty of Medic and Health Science, Udayana University

^c Faculty of Medic and Health Science, Udayana University

^d Faculty of Medic and Health Science, Udayana University

^e Public Health Study Program, Dhyana Pura University

Contents

Abstract	12
1. Introduction.....	13
2. Research Method.....	14
Material.....	14
Instrument.....	14
Method	14
How to Work	14
Making of ngor eggplant extract	14
Treatment	14
Making histology testis preparations	14
Data Collection.....	14
3. Results and Analysis	14
The Frame of Histology Testis	14
Spermatogonia A	15
Pakhiten Spermatoocyte Primer	15
Spermatid 7 and 19	15
Discussion	15
4. Conclusion	16
Suggestion.....	17
Acknowledgements	17
References	18
Biography of Authors.....	19

1. Introduction

To solve the population growth, the central government of Indonesia implements the program family planning as a national program. One of the efforts that used is providing the contraceptive device but the most devoted to women. Besides the women, men should participate in the implementation of the family planning. According to the data of BKKBN, the role of man in the implementation of the family planning program is still relatively low is 5.6 %. It shows there should have been a contraceptive device man as a support of the program (Arsyah, 1986).

Researches toward contraception man invention are a challenge for Andrology scientist. Eggplant (*Solanum sp*) is a kind of plant that is very useful to Indonesian people. Solanus is a plant as an antifertility source that classified of group “estrogenic agent”. Ngor eggplant (*Solanum indicum*) contains solasodine which is glycoalkaloid, the aglikol has steroid nucleus. Glikoalkaloid steroid framework based cholestane C27 as material for producing steroid hormones to contraception (Desai et al, 2011). Alkaloid Solanum spatially competitive against Follicle Stimulating Hormone receptors. FSH that comes out of the anterior pituitary bind with a receptor FSH into the Sertoli cell membrane, to stimulate Sertoli cells to increase synthesis and secretion Androgen Binding Protein (ABP). As a result of this solasodine bound with a receptor FSH so the formation of ABP in the Sertoli cells will be reduced. When Andogen Binding Protein (ABP) declined the process spermatogenesis is obstructed. Mechanism apoptosis compound solasodine held by means of disturbing a cell membrane by special relationship the branch of sugar bound and disturbing integrity cancer cells by means of change morphology cells and the DNA so as to cause apoptosis (Hsu et al.2016, Chang et al, 2008). The results of Yolanda's research (2011) showed the provision of seeds extract ethanol eggplant *pokak* motility be able to decrease and increase the number of spermatozoa abnormal, and decrease the total spermatoocyte primary.

Suarjana, N., Karmaya, I. N. M., Satriyasa, B. K., Pangkahila, J. A., & Astuti, N. P. W. (2017). The influence of granting ngor eggplant (*solanium indicum*) extract inhibiting of spermatogenesis in mice (*mus musculus*). *International Journal of Health Sciences*, 1(2), 12-19.
<https://doi.org/10.21744/ijhs.v1i2.35>

2. Research Method

Material

Wistar mice adult male strains balb-c in the age 1.5 months with a weight 25 - 30 grams, mice feed, ethanol 96 % ngor fresh fruit eggplant, ether, formalin 10 %, paraffin.

Instrument

An instrument used the animal pet cage, sonde equipment, beker glass, weight electronic scale, small scissors, anatomy tweezers, sirurgik tweezers and the razor knife.

Method

The design of research used in this research is experimental design with randomized post-test only control group design.

How to Work

Making of ngor eggplant extract

Ngor eggplant fresh cutting small and dried after that blended then sifted with sifting equipment B 40. The powder extracted with a solution of ethanol 96 % using soxhlet. Extract evaporated to get ngor eggplant extract viscous. Then, make the concentration extract 15 %, 20 % and 25 %.

Treatment

The mice are divided into 4 group each group consists of 6 mice. The first is the control group and the others are the treatment. Every group treatment giving ngor eggplant ethanol extract with 15%, 20%, and 25% doses by 0,3 cc every day with orally.

Making histology testis preparations

The testis that has been taken put into a fixative (formalin 10 %) for 24 hours. After that, in successive has done dehydration with alcohol. Then incorporated into the toluene to clearly and is blocked by paraffin. Seyatan histology made with the microtome and tinged with hematoxylin-eosin (HE).

Data Collection

The data was taken from the investigation 60 the seminiferous tubules (30 tubules in the testes left and 30 tubules in the testes right) for each sample. The qualitative data is obtained from the description of microscopic tests after treatment by determining the seminiferous tubules the damage caused by obstacles spermatogenesis in determining damage the seminiferous tubules used four categories are antrofi tubuler, necrosis tubuler, lost of intermedia cells, and reduced spermatogenesis. The quantitative data is obtained from the count of spermatogonium cells with the Abercrombie.

3. Results and Analysis

The Frame of Histology Testis

Category of tubules damage that occurs based on the criteria tubules damage. The level of tubules damage can be seen in the table below:

The level of damage the seminiferous tubules mice at 60 the seminiferous tubules to every sample.

Table 1. The level of the seminiferous tubules damage mice at 60 the seminiferous tubules to every sample

Treatment	Level of seminiferous tubulus damage					Total
	1	2	3	4	5	
T0 (Control)	0	0	0	0	100	100
T1 (15%)	0	0	15	74	11	100
T2 (20%)	0	6	67	24	3	100
T3 (25%)	6	11	71	12	0	100

Statistical testing by test with non-parametric correlation Spearman-Rank shows that the higher the concentration of fruit extract the eggplant ngor, so the level of damage tubulum seminiferous mouse has escalated ($p < 0,05$) with correlation coefficient $r = 1$.

Spermatogonia A

The number of spermatogonia cells in every treatment group is shown in table 2

Table 2. The average of point in the number of spermatogonia after granting the ngor eggplant extract

Treatment	N	Rate of Spermatogonia numbers
T0 (Kontrol)	6	2,3633
T1 (15%)	6	2,2300
T2 (20%)	6	2,1333
T3 (25%)	6	1,4633
Total	24	2,0475

Based on normality test, the distributed normal data ($p > 0,05$). The result of the statistic test with one way ANOVA test showed that granting ngor eggplant extract could reduce spermatogonia A cells numbers by meaningful ($p > 0,005$). Decreasing of spermatogonia A cells numbers by meaningful happened by granting 20% and 25% ngor eggplant extract. While in 15% treatment doses, it did not happen to decrease by meaningful.

Pakhiten Spermocyte Primer

The result of counting Spermocyte primer pakhiten cells number in table 3.

Table 3. The average point of spermocyte Pakhiten cells number

Treatment	N	The rate of Spermocyte Primer Pakhiten numberfissi
T0 (Kontrol)	6	72,6483
T1 (15%)	6	43,0083
T2 (20%)	6	38,3767
T3 (25%)	6	28,0750
Total	24	45,5271

The result of research showed that decreasing of spermocyte primer pakhiten cells number by meaningful ($p > 0,05$).

Spermatid 7 and 19

The results of counting spermatid cells number in table 4.

Table 4. The average point spermatid cell number

Treatment	N	The Rate of Spermatid 7 and 19 Number
T0 (Kontrol)	6	130,9817
T1 (15%)	6	97,8900
T2 (20%)	6	53,7683
T3 (25%)	6	39,2583
Total	24	80,4746

Based on the normality test, it got the result of the distributed normal data ($p > 0,05$) and Homogeneity test showed homogenous variant ($p > 0,0\%$). The result of the analysis showed that granting of ngor eggplant extract could reduce spermatid 7 and 19 cells number by meaningful ($p < 0,05$).

Discussion

The eggplants group (*Solanum* sp.) is a plant that contains metabolite secondary is called solasodine. Solasodine is glycoalkaloid steroids that have basic of Cholestane C27 framework (Desai et al, 2011). Solasodine could be easier converted to 16 *dihydro pregnenolone*. A key intermediate in synthesis steroid drugs such as progesterone and cortisone. Solasodine obtained by the hydrolysis chemical or microbes solamargine. This is a passage that potential to be used as a substitute for diosgenin in the production of semi-synthetic of steroid hormones in pharmacy. Therefore, of steroid glycoalkaloid, night shade plant has become increasingly important as the initial material for the production of steroid hormones (Patel et al.2013). Based on table 1, there was a decrease in the number of spermatogonia on the treatment. Yolanda's research (2011) in *Rattus norvegicus* adult male mice were 24 a decline in testosterone levels of blood on variations solasodin gave doses. This decline is the effect solasodine that affects testosterone in the blood. Setiati (2011) did the research on the Quality of Spermatozoa Mice (*Mus musculus* L.) Strains BALB/C after granting the extract of pokak ethanolic eggplant seeds (*Solanum torvum* Swartz). The result showed that the extra of ethanolic pokak eggplant seeds can be lowered motility and increases the number of spermatozoa abnormal, and decreases the total primary spermatocyte. A decline in blood levels of testosterone in adult male mice due to the eggplant (*Solanum khasianum*) is the effect posed by solasodine that affects testosterone in the blood. Solasodine that is estrogenic this may be could inhibit of gonadotropin hormone balance by the hypothalamus and could inhibit secretion LH and FSH by the anterior pituitary. Decreasing of spermatogonia A cells numbers by meaningful happened by granting 20% and 25% ngor eggplant extract. While in 15% treatment doses, it did not happen to decrease by meaningful. It was because of nutrition supply from vascular testis system was not good. It was toxic effect by granting ngor eggplant extract. It occurs congestion that caused disorder nutrition supply by vascular tubulus seminiferous testis system. The decline in the number of spermatogonia A could be caused by this secondary metabolite that contained an extract of ethanol ngor eggplant was alkaloids and saponin. This secondary metabolite was assumed the antifertility (Aberoumand, 2012). Decreasing of cells number itself because of disorder of process of meiosis besides of disorder nutrition supply to tubulus seminiferus. The disorder of the early spermatogenesis process because of cell off spermatid to lumen tubulus and disorder food supply to tubulus seniferus. Testoteron has a role in meiosis spermatocyte primer fission becomes secunder spermatocyte, especially for the first meiosis is a diakinesis phase and after that produce spermatid (Weinbauerer et al, 2010). Solasodin were competitives against receptors inhibitor LH and FSH. Solasodin was inhibiting the spermatogenesis and decreasing testosterone. FSH has spurred synthesis ABP (Androgen Binding Protein) on the sertoli cells.

When ABP declined and spermatogenesis will be stunted of the process. LH roles in accelerated cells leydig to produce testosterone. When LH declined and testosterone is produced by Leydig cells declined also.

4. Conclusion

Based on the result of research could be concluded that ngor eggplant extract could reduce spermatogonium A, spermatocyte primer and spermatid 7 and 19 cells with value $P < 0,005$.

Suggestion

It is needed to do further research to know the impact of ngor eggplant extract with the level of testoteron, LH and FSH in blood serum.

Acknowledgement

Our deep and sincere gratitude were presented to God for having granted us the ability and the opportunity to complete this paper. As well as, We have much appreciated to our friends for their support, suggestion, contribution in finishing this research. We would like thanking Suryasa that has given me a good advisement. Last but not least, we dedicated our dreadful thank to our friend who those as editor in SS of International Journal.

References

- Aberoumand, A. (2012). Assay of Nutritional Potential of the Fruits of *Solanum indicum* L. in Iran, 8(3), 923-929.
- Agarwal, R., Jain, P., Ghosh, M. S., & Parihar, K. S. (2017). Importance of Primary Health Care in the Society. *International Journal of Health Sciences (IJHS)*, 1(1), 6-11.
- Arsyad, K.M.1986, Possible Development of Male Contraceptives, MKI
- Billaiya, R., Jain, A., Agarwal, R., & Jain, P. (2017). Introduction about Child Health Status in India. *International Journal of Health Sciences (IJHS)*, 1(1), 12-22.
- Desai, A.B., Kagathara, V.G., Joshi, H., Rangani, A.T. and Mungra, H. 2011. Evaluation of the Antiamnesic effect of Solasodine in Mice. *International Journal PharmTech Research*. 3(2):732-740
- Hsu SH, Tsai TR, Lin CN, Yen MH, Kuo KW (2006) Solamargine purified from *Solanum incanum* Chinese herb triggers gene expression of human TNFR which may lead to cell apoptosis. *Biochem Biophys Res Commun* 229: 1-5.
- Jain, P. (2017). Effect of Online Education Trend on Quality Management. *International Journal of Health Sciences (IJHS)*, 1(1), 1-5.
- Malaiya, S., Shrivastava, A., Prasad, G., & Jain, P. (2017). Impact of Medical Education Trend in Community Development. *International Journal of Health Sciences (IJHS)*, 1(1), 23-27.
- Parihar, K. S., Dahiya, R., Billaiya, R., & Jain, P. (2017). Effect of Nuclear Family in Participation of Activities. *International Journal of Health Sciences (IJHS)*, 1(1), 28-35.
- Patel,K.,Ravi,B.,Dinesh.K.2013. Medicinal significance, pharmacological activities, and analytical aspects of solasodine: A concise report of current scientific literature. mathura. Department of Pharmaceutics, Institute of Technology, Banaras Hindu University.p:92-94
- Septy Yolanda. 2011. Influence of Peroral Solasodin on Testosterone Levels of Rat Blood (*Rattus novergicus*) Adult Male. Available at <http://pasca.unand.ac.id/id/wp-content/uploads>. accessed November 2014
- Suarjana, N., Karmaya, I. N. M., Satriyasa, B. K., Pangkahila, J. A., & Astuti, N. P. W. (2017). The Influence of Granting Ngor Eggplant (*Solanum Indicum*) Extract inhibiting of Spermatogenesis in Mice (*Mus Musculus*). *International Journal of Health Sciences (IJHS)*, 1(2), 12-19.
- Suiraoaka, I. P., Duarsa, D. P. P., Wirawan, I. D. N., & Bakta, I. M. (2017). Perception of Parents, Teachers, and Nutritionist on Childhood Obesity and Barriers to Healthy Behavior: A Phenomenological Study. *International Journal of Health Sciences (IJHS)*, 1(2), 1-11.
- Weinbauer, G.F., Luetjens, C.M., Simoni, M. and Nieschlag, E. 2010. Physiology of Testicular Function. In *Andrology: Male Reproductive Health and Dysfunction*. 3rd Edition. Editors Nieschlag, E. Behre, H.M., and Nieschlag, S. Springer-Verlag BerlinHeidelberg. New York
- Wong, R.S.Y., 2011, Apoptosis in Cancer, from Pathogenesis to Treatment, *Journal of Experimental & Clinical Cancer Research*, 30(87).

Biography of Authors

	<p>Dr. Nyoman Suarjana, M.Repro Nyoman Suarjana was born in Patas on June 3, 1969. He graduated his Bachelor degree in the Faculty of Medicine in Udayana University, 1997. He had completed his Master Degree in Reproductive Medicine Sciences in 2003. He had finished his Ph.D. education in Udayana University. He is a senior lecturer in the Public Health Studies Program, Dhyana Pura University.</p>
	<p>Prof. Dr. dr. I Nyoman Mangku Karmaya, PA (K) The Professor in the Faculty of Medicine, Udayana University.</p>
	<p><i>Dr. dr. Bagus Komang Satriyasa</i>, M. Repro A Senior Lecturer in the Faculty of Medicine, Udayana University.</p>
	<p>Prof. Dr. dr. <i>J. Alex Pangkahila</i>, MSc. Sp. The Professor in the Faculty of Medicine, Udayana University.</p>
	<p>Ni Putu Widya Astuti, S.Si., M.Si Lecturer in Public Health Department of Dhyana Pura University</p>

Suarjana, N., Karmaya, I. N. M., Satriyasa, B. K., Pangkahila, J. A., & Astuti, N. P. W. (2017). The influence of granting ngor eggplant (solanium indicum) extract inhibiting of spermatogenesis in mice (mus musculus). International Journal of Health Sciences, 1(2), 12-19. <https://doi.org/10.21744/ijhs.v1i2.35>