

The Effect of *Cantharellus Cibarius* Hidroalcoholic Extract on Fertility and Sex Determination in Rats

Asiye Karimi

Department of Biology, Mashhad Branch, Islamic Azad University
Mashhad, Iran

Maryam Tehranipour

Department of Biology, Mashhad Branch, Islamic Azad University
Mashhad, Iran
Corresponding author

Mahmud Zokaei

Department of Biology, Mashhad Branch, Islamic Azad University
Mashhad, Iran

Copyright © 2017 Asiye Karimi et al. This article is distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Having a healthy child is the dream of every couple, and the child's gender for many couples is very important. The effect of nutrition on gender in several studies evaluated and is one of the most popular methods which today, as the common form is recommended for embryo selection. The aim of this study was to investigate *Cantharellus Cibarius* hydroalcoholic extracts on fertility and sexing in rats. Twenty four wistar rats(female)with weighing approximately 200-250 grams were randomly divided into four groups, including control and treatment groups with the above mentioned mushroom hydroalcoholic extract (with doses of 100, 250 and 500 mg/ kg). The *Cantharellus Cibarius* extract were fed to rats in by gavage method seven consecutive days and then each rat in a separate cage in adjacent to the male of the same breed were mated, after 19-21 days of pregnancy, newborns being counting and sexing. Quantitative data analysis using the software minitab and by ANOVA and t-test was performed. According to the findings, the number of births in the treatment groups compared to the control group

there is no significant difference, but in the sexing, the female set in treatment groups compared to the control group showed a significant difference ($p < 0.05$) that increase in the treated groups with doses of 500 was higher. As a result, increase of gynogenesis in treated groups with the extract of the mushroom *Cantharellus Cibarius* is probably due to calcium and magnesium ions.

Keywords: *Cantharellus Cibarius*, Sex determination, fertility, Rats

Introduction

Child bearing is one of the most exciting moments in life couples, the strength of natural fertility, is one of the major problems of humanity [1]. Knowing the future baby's gender seems very pleasant and important. So, having a healthy child with the ideal gender is the biggest for each couple [2]. The history of diet use to determine fetus gender was come from centuries ago. The researchers believe that nutritional methods and diets can be effective 70 to 80 percent and may be just what you want your child. One of the most popular methods today, is recommended for the fetus gender, is special diets for change the ratio among the ions were used. In the method, for trait males on high proportion of sodium, potassium than calcium and magnesium ions and to the growth of trait females on high proportion sodium, potassium, than calcium and magnesium ions were stressed. High levels of sodium and potassium ions and low levels change of calcium and magnesium, the metabolism of the ovule as a manner that sperm containing the *Y* chromosome toward ovule is absorbed. In contrast, to absorption sperm containing *X* chromosome, it is necessary the levels of blood calcium and magnesium upward the levels of blood potassium and sodium downward [3, 4, 5, 6]. The Mushrooms Fungi have a big role in bio-technology and food and pharmaceutical industries have contributed since been identified. The Mushrooms as a supplement that has high nutritional value a long ago humans interest. The total edible mushrooms are a good source of nutrients and were counted low calorie food. The ratio of sodium and fat in them is very low. The Edible mushrooms are rich in thiamine (vitamin B₁), riboflavin (vitamin B₂), niacin (vitamin B₃), pantothenic acid (vitamin B₄), Vitamin B₆, vitamin D, folic acid, manganese, magnesium, potassium, zinc and selenium element. Selenium is an antioxidant that works with vitamin E and cells against free radicals, which are carcinogenic, keeps safe [7].

Cantharellus Cibarius is one of the most delicious and the most beautiful edible mushrooms is that northern forests of Iran. *Cantharellus Cibarius* in term of nutritional value with red meat is equality and has taste delicious. *Cantharellus Cibarius* as a rich source of antioxidants and phytochemicals with therapeutic value. It is claimed that the herbal therapeutic value in phytochemicals (photochemical) such as alkaloids, tannins, flavonoids and other phenolic compounds on the human body's physiological activity, these effects have been

seen in the fungi [8, 9, 10]. The total content of flavonoids containing catechin, Pyrogallol, Myrissen phenolic acids such as caffeic and, ferulic, gallic acid Homogentisic, gentisic, Py- hydroxy benzoic. *Cantharellus Cibarius* is also with high levels of good minerals such as potassium, magnesium and phosphorus characterized the most abundant levels are among other fungi. This mushroom is a source of protein and essential amino acids the body including protein 12.5%, 5% fat, 64% carbohydrate and 11.2% fiber. The fungus protein that have positive effects such as reducing anxiety and fear, hypotension and sedation, stimulate the immune system, maintain healthy skin and hair, prevent cancer and malignant tumors growth. According to studies *Cantharellus Cibarius* have organic acids [11], antioxidant [12] and antimicrobial property [13]. According to the specified information these funguses are rich in protein, magnesium and potassium [11]. The use of these fungal prevents eye inflammation, night blindness, and dry skin and mucous membranes due to reduced secretions and cause respiratory system resistance against infectious diseases; its extract is used to treat swelling and ulcers. Ethanol extracted from the fungus-inhibiting effect on malignant tumors in rats [14]. Due to determine a child's sex, the study in order to the effect of *Cantharellus Cibarius* extract on sexing in rats was performed.

Materials and methods

The current study is an experimental research at the Faculty of Islamic Azad University of Mashhad that in the summer 2015 was conducted. In this study, 24 female wistar rats, approximately three months old, weighing approximately 200-250 g was used. Rats were kept in animal room under standard conditions of 12 hours light, 12 hours darkness at (20-24 ° C) and fit humidity in the special cages for maintenance accessible to food and water were kept, and only for gavage were out of the cage. Rats fed by compression standard food (Javane Khorasan Co.) and water have been applied.

In this study used 24 wistar rats (200-250g). The provided Rats a few days before research, at the University Of Islamic Azad Of Mashhad were stored and then, randomly were divided into control group, dose 100 mg / Kg, dose 250 mg / Kg, 500 mg / Kg. Six rats in each group were considered. The control group was gavage treated by distilled water and the rest of the group based on dose administered dose were gavage treated for 7 days with mushroom extracts. [5]. after 7 days and completion of gavage, each rat was exposed in a separate cage for mating to male rats. Every morning the cages review for observing vaginal plaque (mating plaque) and rats that were mating, from the male rats were isolated and put in separate cages. Sexing based on the prominence of the genitals and distance to tail baby was carried. The stage the rats has less than 24 hours old, the prominence of male genitalia is more than newborn genital female, more reliable is distance between the prominence genitals and the anus. In 1962 in male 2.8 mm and in female 1.2 mm was determined. After the birth offspring, for determining gender and data statistical analysis used software Minitab 16.2 and Anova test and

t- test with significance level ($p < 0.05$) and for diagramming from software Excel was use respectively.

Results

The results related to the number of offspring. Post- birth, the percentage of delivery, number of male and female offspring. In the treatment and control groups in (Table 1) have been specified. The results of this study showed that. There is significant different in female offspring between control and treated with *Cantharellus Cibarius* doses ($P < 0.01$). In male offspring no significant difference in relation to the male gender was observed. It can be concluded that groups of mothers with *Cantharellus Cibarius* at a higher dose increased the number of female offspring.

Table 1: The comparison of male and female and pregnant the percentage in different groups

Groups	Number of mother	Total offspring	Female	Male	Female	Male	%
control	6	60	25	35	42%	59%	100%
Dose 100	6	54	36	18	67%	18%	100%
Dose 250	6	62	36	26	58%	42%	100%
Dose 500	6	61	42	19	69%	31%	100%

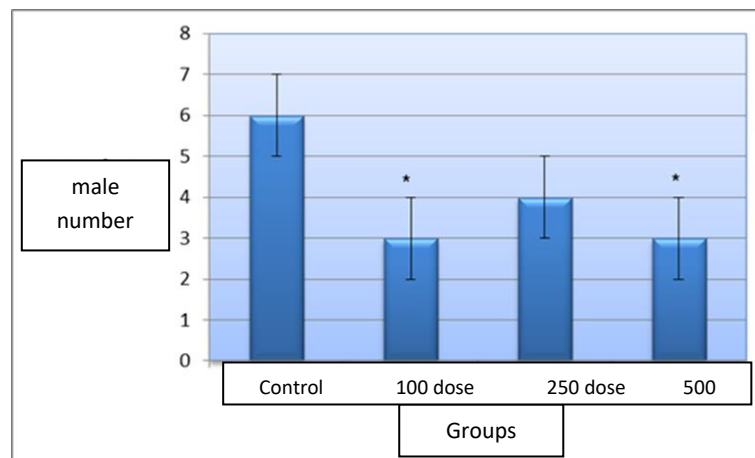


Fig 1: Comparison of male offspring average in different groups

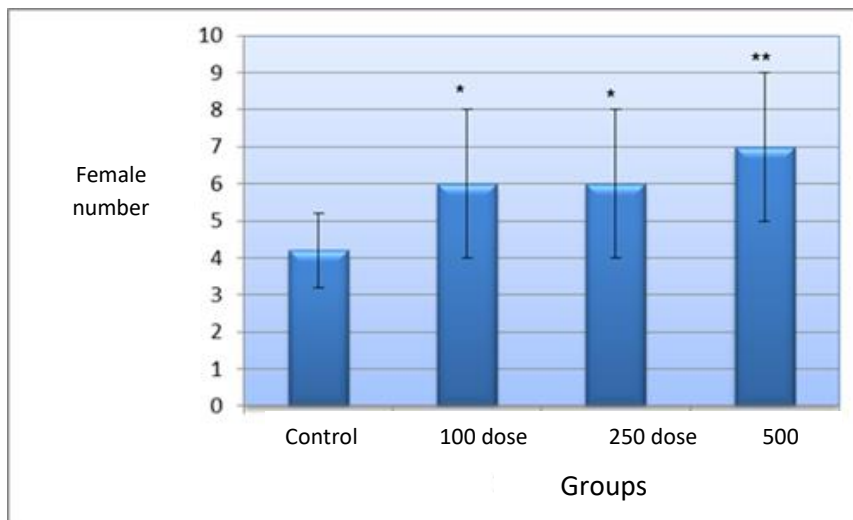


Fig 2: Comparison of female offspring average in different groups

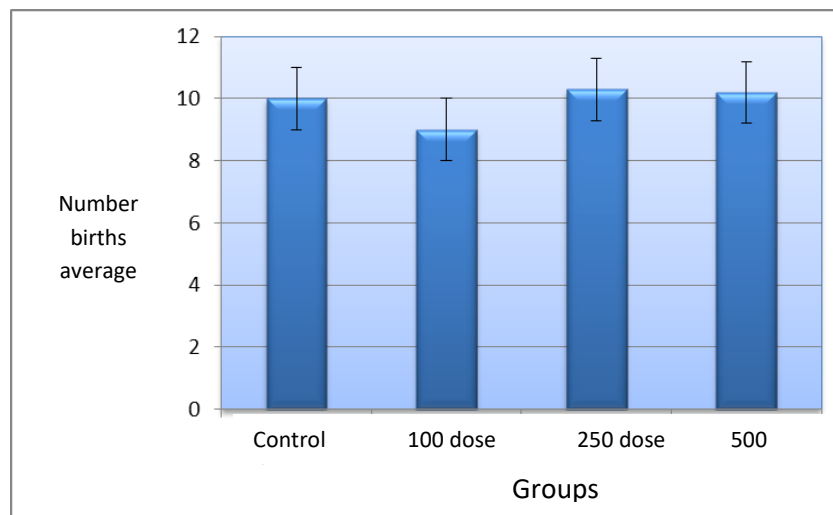


Fig 3: Comparison of births average number in different groups

Also the number of births in treatment groups compared with control group slightly is increased but this increase is not significant; as a result, it does not affect fertility. Data analysis revealed significant differences between male and female offspring. This significant is as a gain in birth for females in all groups treated with the *Cantharellus Cibarius* extract and as a significant reduction in male offspring in all groups treated with *Cantharellus Cibarius* extract compared to the control group.

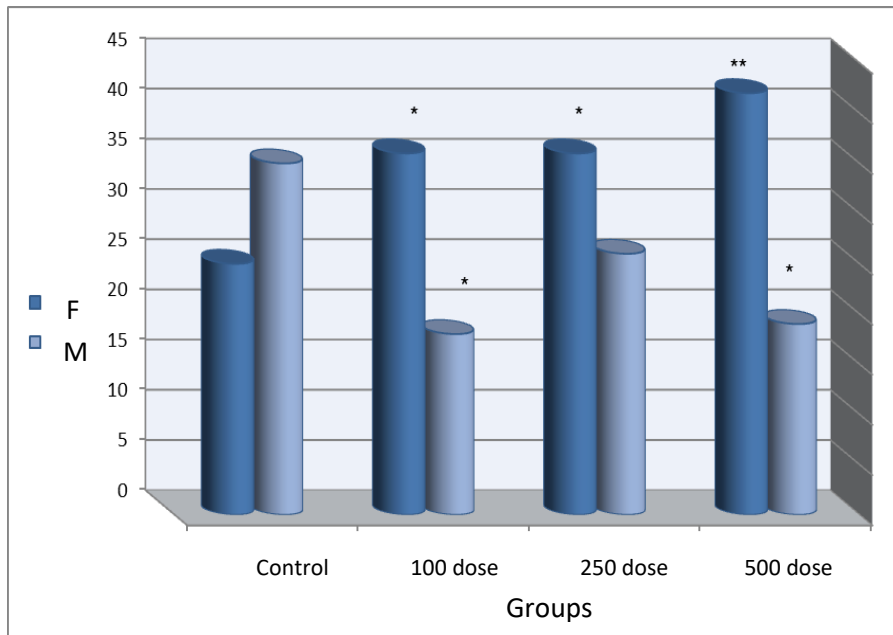


Fig 4: Comparison average of male and female births in different groups with the control group

The charts determine the data average \pm standard deviation.

$P \leq 0.001 = ***$

$P \leq 0.01 = **$

$P \leq 0.05 = *$

Discussion and conclusion

Motherhood is a high role in the women lives and dreams. Many factors on reproduction in women and their ability affect birth to healthy offspring. Among the environmental factors, nutrition can play a role in increasing or decreasing the likelihood of fertility. The current information contained in some of areas is contradictory. The foods are the most important factors that can be short or long-term sexual glands, pregnancy, ovulation, the sperm-sexing and affect fetal development. In this study, as can be seen in the result, *Cantharellus Cibarius* extract not affect the fertility rate and even at lower dose led to decrease in the fertility rate (Table.1).

In several years, the harmful role of excessive raw protein in reducing fertility has been proven [15]. This negative effect is mostly due to increased blood urea nitrogen in increments of 19 or 20 mg per deciliter and its effect on utero environment pH decrease occurred and reduces fertility rate [16]. So probably in the treated groups with the *Cantharellus Cibarius* extract reduction in fertility observed that due to excessive raw protein in the extract. Our results are in coope-

rated with the results of others. According to chemistry tests that was carried out and determining the important elements in *Cantharellus Cibarius*, the rate of potassium and magnesium ions significantly upward, but sodium and calcium ions is very low. According to data analysis, this fungus effect on sexing so that, the female of offspring has increased significantly than male. Table 3 shows the high birth rate of female offspring at doses of 100 and 250 in treatment group compared to the control group. This rate also increased with increasing dose so that in the treated group with dose of 500 the highest female births are capable. Biological effects of sodium, potassium, magnesium and calcium ions on sexing is also marked, the ions for fertilization, implantation and development of the natural fetus are necessary. According to the data analyzed, likely to change in the balance of minerals and gain magnesium ions, led to disrupt the ratio ovaries and ovule and ovule membrane potential changed and caused penetration the sperm containing x chromosome and gender toward being female had advanced.

By more dosage, this amount has also increased. With this potential change, and change ratio ions, the membrane for the sperm entry contains Y chromosome is resisted and prevented from entering. This result is in cooperated with the Rosen Feld theory and ovogenesis has occurred. As a result in the research, the fungus probably in sexing and female offspring will have a very important role. Of course, unique diet certainly cannot be effective in sexing. But all the studies have focused on it, the favorable conditions mother (nutritional and environmental), provides favorable conditions for the birth of the baby male and stress and unfavorable conditions, to increase the chances of having a baby girl [17]. Thus, we can conclude from the research that whatever the concentration of *Cantharellus Cibarius* extracts is more in the rats' diet, the probability of female offspring increases and it has no effect on the rates fertility.

Acknowledgments. This study was supported by Islamic Azad University of Mashhad, Iran.

References

- [1] N. Forozandeh, M. Delaram, F. Daris, Mental health status and factors influencing pregnancy in women referred to health centers in the city, *Journal of Reproduction and Infertility*, (2003), 24-34.
- [2] M. Arvic Deavid, Do you want boy or girl?, Translator: Abdul Khalil Hajati, Publication Sinai, 12, (1985), 71-92.
- [3] S. Chandraju, A. Beirami, C.S. Chidan Kumar, Role of sodium and potassium ions in identification of offspring gender in rats, *IOSR Journal of Pharmacy*, 2 (2012), 54-59. <https://doi.org/10.9790/3013-26105459>

- [4] J. Ganjloo, *Baby Gender Selection with Diet*, First edition, Ajand Publisher, 2008.
- [5] G. Hasanzadeh, M. Alipoor, M. Javadi, The effect of an additional Sodium diet on sex determination in rats, *The Journal of Qazvin University of Medical Sciences*, **5** (2002), 30-34. (In Persian)
- [6] F. Papa, R. Henrion, G. Breart, Preconceptional selection of sex using the ionic method. Dietary regime, Results of a 2 years' prospective clinical study, *J. Gynecol Obstet Biol. Reprod (Paris)*, **12** (1983), 415-422.
- [7] M. Zokaei, H. Sharghi, The medicinal properties of mushrooms, Islamic Azad University Mashhad Publications Wide speech, Vol. 1000, (1389), 9-34.
- [8] E. Danell, *Cantharellus Cibarius Mycorrhiza Formation and Ecology*, Acta Universitatis ups a liensis, comprehensive summaries of uppsala Differtations from faculty of science and technology, 1994, 1-75.
- [9] E.J Danell, W.G. Cairney, S.M. Chambers, Cantharellus, Chapter in *Ectomycorrhizal Fungi Key Genera in Profile*, Springer-Verlag New York, 1999, 253-267. https://doi.org/10.1007/978-3-662-06827-4_10
- [10] E. Danell, F.J. Camacho, Successful cultivation of the Golden Chanterelle, *Nature*, **385** (1997), 303. <https://doi.org/10.1038/385303a0>
- [11] G.C. Anisworth, A.S. Sussman, *The Fungi I-III*, Academic Press, New York, 1965-1968.
- [12] D.A. Ania, S.G. Jonathan, O.J. Olawuyi, D.O. Ojelabi, B.M. Durowju, Antioxidant, antimicrobial and phytochemical properties of alcoholic extracts of Cantharellus Cibarius a nigerian mushroom, *New York Sciences*, **5** (2012), no. 10, 114-120.
- [13] D. Basaran, G. Ahmet, G.Fahrethin, Antimicrobial activity of the macro fungus Cantharellus Cibarius, *Pakistan Journal of Biological Sciences*, **7** (2004), no. 9, 1535-1539. <https://doi.org/10.3923/pjbs.2004.1535.1539>
- [14] I. Ying, M. Xiaolon, Z. Yichen, W. Huaan, *Icones of Medicinal Fungi from China*, Koeltz Scientific Book, Koennigstein, Western Germany, 1997.
- [15] C. Gray, S. Long, C. Green, S.M. Gardiner, J. Craigon, D.S. Gardner, Maternal fructose and/or salt intake and, reproductive outcome in the rat: effects on growth fertility, sex ratio, and birth order, *Biology of Reprod.*, **89** (2013), 51. <https://doi.org/10.1095/biolreprod.113.109595>

- [16] E. Bird, R. J. Contreras, Maternal dietary sodium chloride levels affect the sex ratio in rat litters, *Physiol Behavior*, **36** (1986), 307-310.
[https://doi.org/10.1016/0031-9384\(86\)90021-1](https://doi.org/10.1016/0031-9384(86)90021-1)
- [17] M. Kuka, I. Cakste, R. Galoburda, M. Sabovics, Chemical Composition of latvian wild edible Mushroom cantharellus cibarius, *Food Technology*, (2014), 248-251.

Received: January 3, 2017; Published: January 25, 2017