Journal of Genetic and Environmental Resources Conservation, 2013,1(2):67-70.
www.jgerc.com

Effect of different level of *Zingiber officinale* and *Salvia officinalis* on semen diluents for Awassi ram

Hayder M.H. Al-Malaly[1], Amal F. Al-Abedy[2] and Fakher M. Al-Zubaidy[3]

[1,2]College of Agriculture, University of Al-Qasim Green and [3]College of Science, University of Babylon, Iraq

Abstract

This work was performed to evaluate the effects of hot water extracts of two medicinal plants *Zingiber officinale* and *Salvia officinalis* on Awassi ram sperm activity. Three different concentrations of the two plants were used (0.001, 0.005, and 0.1 mg) and the activity of the sperm were evaluated at the time: 0, 24, 48, 72 hours of experiment. Results showed significant decreased in sperm activity associated with the 0.01mg of *Salvia officinalis* in compare with the other concentrations of the same plant and the second plant. The effect of time also revealed progressive decrease in sperm activity with the time in both plants especially (significantly) in the 48 and 72 hours of experiment. In conclusion, the extract of the two plants decreased sperm activity in proportion with the progression of time and concentration.

Key words: *Zingiber officinale*, *Salvia officinalis*, Water extracts, Awassi ram, Sperm activity.

Introduction

About 15% of couples do not achieve pregnancy within 1 year and seek medical treatment for infertility. Eventually 5% remain unwillingly childless. Infertility affects both men and women. In 50% of involuntarily childless couples a male infertility associated factor is found together with abnormal semen parameters. A fertile partner may compensate for the fertility problem of the men and thus infertility usually becomes manifest if both partners have reduced fertility (Dohle *et al.,* 2010).Many medicinal plants were used for the enhancement of male fertility (Sakr and Badawy , 2011; Kakel and Ahmed, 2008; Santos-Filho *et al*., 2007; Mbongue *et al*., 2005).

Medicinal plants are increasingly recognized worldwide as an alternative source of efficacious and inexpensive medications to synthetic chemo-therapeutic compound, and high proportion of the world's population rely on plants for their primary Health care (Putheti and Okigbo, 2008; Omogbadegun *et al*., 2011). The most important active substances in these plants are alkaloids, tannins, terpernoids, glycosides, phenolics, saponins, flavonoids, quinines, lectins and polypeptides, and many others (Cowan, 1999; Okigbo and Igwe, 2007).

Ginger *Zingiber officinale* L. belong to the family Zingiberaceae is widely used as a digestive aid for mild stomach upset and is commonly recommended by health care professionals to help prevent or treat nausea and vomiting associated with motion sickness, pregnancy (Chittumma, 2007; Nanthakomon and Pongrojpaw, 2006). Also ginger has effective antioxidant and anticancer activity (Cai *et al*., 2003) and known to significantly increase sperm percentage, viability, motility and serum total testosterones (Khaki *et al*., 2009). The important active components of the ginger are thought to be volatile oils and pungent phenol compounds such as gingerols, shogaols, zingerone, and gingerols, zingiberene, turmerone, methyl chavicol, and γ-terpinene (Norajit *et al.*, 2007; Sekiwa *et al.,* 2000). *Salvia officinalis* L. (Lamiaceae) is a perennial woody sub-shrub native to the Mediterranean area, used in the food-processing industry but also in the area of human health. It is well known for its fungistatic, virustatic and tannin-based antimicrobial properties. Anti-inflammatory activities were reported to be caus-

ed by some constituents of plants such as triterpenes, oleanolic and ursolic acids, or the diterpene carnosol (Baricevic *et al.* 2001). In Wistar rats there are several phytoconstituents like triterpinoids, tannins, saponins, alkaloids and flavonoids that known to promote wound healing process due to their antioxidant and antimicrobial activities (Estakhr and Javdan, 2011), also *Salvia* species have been used to improve male reproductive functions in traditional medicine (Estakhr and Javdan, 2011). Another species was found to affect liver function, administration caused significant reduction in alkaline phosphatase (ALP) and total bilirubin comparing to control group, while aspartate aminotransferase (AST), alanine aminotransferase (ALT) and total protein were non-significantly changed indicating that Salvia administration support the function of liver (Tohamy *et al.,* 2012).

Materials and Methods

Hot water Extract Preparation: The Powder of *Zingiber officinale* and *Salvia officinalis* were mixed with hot water after cooling water to temperature less 50 C. The mixing was done by using a vibrator for 15 minutes. Then the mixture was left for 24 hours. The filtration process was done by using four layers of gauze. Then the leaky was put in a dishes which is heated to 40 C inside an oven for drying the extract. The dry raw solid material for extract then waited and the required concentrations were prepared.

Semen treatments: Semen was collected from one of the rams Awassi 3 years old and weight 70 kg then diluted the semen by Tris- egg yolk diluent (1:10) .then distributed randomly into three groups first one control seconded group contain *Zingiber officinale* extract and the third group contain *Salvia officinalis* extract on three concentration (0.001, 0.005, and 0.1 mg) each.

Refrigerated the samples gradually to 5 Celsius and placed in glass flask contain water in 37 Celsius then keeping the samples in refrigerator. The activity of the sperm were evaluated at the time: 0, 24, 48, 72 hours of experiment. Depending on individual motility of the sperm (0-100) (Walton, 1933).

Statistical analysis: was conducted by using general leaner model for SAS (SAS, 2004) and the comparative between means was conducted by using Duncan's Multiple Range Test (Duncan, 1955).

Results and Discussion

The effects of the different concentrations of both plants were shown in the table 1, which revealed significant decrease in sperm activity with the increase of concentrations. The effect of time on sperm activity also showed significant decrease in sperm activity with the progression of time as in the table 2, while table 3 represent the comparison between the effects of the two plants on sperm activity.

The effects of the different concentrations of both plants were shown in the table-1, which revealed significant decrease in sperm activity with the increase of concentrations. The effect of time on sperm activity also showed significant decrease in sperm activity with the progression of time as in the table-2, while table-3 represent the comparison between the effects of the two plants on sperm activity.

Our results showed undesired decrease in sperm activity associated with the treatment by *Zingiber officinale* and *Salvia officinalis* extracts and these are not the only plants that showed similar effects on male fertility (Priya *et al*., 2012; Revathi *et al*., 2010), also these results are contrary to others that showed significant enhancement in male fertility (Sakr and Badawy , 2011; Santos-Filho *et al*., 2007; Mbongue *et al*., 2005). These effects may be related to the direct effects on spermatogenesis like the results of Kakel and Ahmed, 2008 , that revealed a significant decrease in the weight of testes, body of epididymis, percentage of live/dead sperms and epididymyal sperm count, with a significant increase in the percentage of morphologically abnormal sperms. Another study explained the antifertility of some plants may related to immunoinfertility and the formation of antisperm antibodies (ASA), which can be a major factor of male fertility (Gupta and Sharma, 2006).

Table (1): The effects of different concentrations of *Zingiber officinale* and *Salvia officinalis* on sperm activity.

Plant	Concentration	Sperm activity
Zingiber officinale	0.0	75.0 A
Salvia officinalis	0.0	75.0 A
Zingiber officinale	0.001	75.0 A
Salvia officinalis	0.001	70.0 A
Zingiber officinale	0.005	58.75 A
Salvia officinalis	0.005	58.75 A
Zingiber officinale	0.01	18.75 B
Salvia officinalis	0.01	75.0 A

Means on columns with different superscripts are significantly different (p>0.05) .

Table (2): The effects of the time of treatment on sperm activity.

Plant	time	Sperm activity
Zingiber officinale	0.0	81.250 AB
Salvia officinalis	0.0	88.750 A
Zingiber officinale	24	67.500 BC
Salvia officinalis	24	81.250 AB
Zingiber officinale	48	42.5 DE
Salvia officinalis	48	56.25 DC
Zingiber officinale	72	36.250 E
Salvia officinalis	72	36.250 E

Means on columns with different superscripts are significantly different (p>0.05) .

Table (3): Comparison between the effects of *Zingiber officinale and Salvia officinalis* on sperm activity.

		Time			
Plant	Concentration	0.0	24	48	72
Zingiber officinale	0.0	95 A	85 C	70 F	50 I
	0.001	90 B	80 D	65 G	45 J
	0.005	80 D	75 E	50 I	30 L
	0.01	90 B	85 C	40 K	20 M
Salvia officinalis	0.0	95 A	85 C	70 F	50 I
	0.001	90 B	85 C	65 G	60 H
	0.005	90 B	85 C	30 L	30 L
	0.01	50 I	15 N	5 O	5 O

Means on columns with different superscripts are significantly different (p>0.05) .

References

Baricevic, D., Sosa, S., Loggia, D.R., Tubaro, A., Simonovska, B., Krasna, A., Zupanic, A., 2001. Topical anti-inflammatory activity of Salvia officinalis L. leaves: the relevance of ursolic acid. J. Ethnopharmacol., 75: 125-132.

Cai, Y., Luo, Q., Sun, M. and Corke, H., 2003. Antioxidant activity and phenolic compounds of 112 traditional Chinese medicinal plants associated with anticancer. Life Sci., 74: 2157–2184.

Chittumma, P., 2007. Comparison of the Effectiveness of Ginger and Vitamin B6 for Treatment of Nausea and Vomiting in Early Pregnancy: A Randomized Double-Blind Controlled Trial. J. Med. Assoc. Thai., 90 (1): 15-20.

Cowan, M.M., 1999. Plant products as antimicrobial agents. Clin. Microbiol. Rev.,12(4):564-582.

Dohle, G.R., Diemer, T., Giwercman, A., Jungwirth, A., Kupa, Z. and Krausz, C., 2010. Guidelines on Male infertility. European Association of Urology.

Duncan, D.B., 1955. Multiple range and multiple F tests. Biometrics, 11:1-42.

Estakhr, J. and Javdan, N., 2011. Changes in the spermatogenesis and cAMP- responsive element modulator (CREM) gene expression in rat treated with *Salvia hypoleuca.* Pharmacol., 2: 853-858.

Gupta, R.S. and Sharma, R., 2006. A review on medicinal plants exhibiting anti-fertility activity in males. Natural Products Radiance, 5(5): 389-410.

Kakel, S.J. and Ahmed, S.M., 2008. Effect of *Thymus vulgaris* oil on some reproductive characters in adult male rats. Iraqi J. Vet. Sci., 2(22): 83-87.

Khaki, A., Fathiazad, F., Nouri, M., Khaki, A.F., Ozanci, C.C., Ghafari-Novin, M. and Hamadeh, M., 2009. The effects of ginger on spermatogenesis and sperm parameters of rat. Iranian J. Rep. Med., 7(1): 7-12.

Mbongue, F.G.Y., Kamtchouing, P., Essame, O.J.L., Yewah, P.M., Dimo, T. and Lontsi, T., 2005. Effect of the aqueous extract of dry fruits of Piper guineense on the reproductive function of adult male rats. Indian J. Pharmacol., 37:30-32.

Nanthakomon, T. and Pongrojpaw, D., 2006. The efficacy of ginger in prevention of postoperative nausea and vomiting after major gynecologic surgery. J. Med. Assoc. Thai., 89(4): S130-6.

Norajit, K., Laohakunjit, N. and Kerdchoechuen, O., 2007. Antibacterial effect of five zingiberaceae essential oils. Molecules,12: 2047-2060.

Okigbo, R.N., Igwe D.I., 2007. The antimicrobial effects of *Piper guineense* 'uziza'and *Phyllantus amarus* 'ebe- benizo'on *Candida albicans and Streptococcus faecalis.* Acta Microbiologica et Immunologica Hungarica, 54 (4): 353-366.

Omogbadegun, Z., Uwadia, C., Ayo, C., Mbarika, V., Omoregbe, N., Otofia, E. and Chieze, F., 2011. Multimedia-based medicinal plants sustainability management system. Inter. J. Comp. Sci., 8(3): 1694-0814.

Priya, G., Saravanan, K. and Renuka, C., 2012. Medicinal plants with potential antifertility activity. A review of sixteen years of herbal medicine research (1994-2010). Inter. J. Pharm. Tech. Res., 4(1): 481-494.

Putheti, R. and Okigbo, R.N., 2008. Effects of plants and medicinal plant combinations as anti-infective. African J. Pharm. Pharmacol., 2(7): 130-135.

Revathi, P., Vani, B., Saratechanderan, I., Kadalmani, B., Shyam, K.P. and Palnivel, K., 2010. Reproductive toxicity of *Capparis aphylla* (Roth.) in male albino rats. Int. J. Pharm. Biome.d Res., 1(3):102-112.

Sakr, S.A. and Badawy, G.M., 2011. Effect of ginger (*Zingiber officinale* R.) on met ram-inhibited spermatogenesis and induced apoptosis in albino mice. J. Appl. Pharm. Sci.,1(4):131-136.

Santos-Filho, S.D., da Fonseca, A. and Bernardo-Filho, M., 2007. The male reproductive system and the effect of an extract of a medicinal plant (*Hypericum perforatum*) on the labeling process of blood constituents with technetium- 99m. Brazilian Arch. Biol. Technol., 50: 97-104.

SAS, 2004. SAS User's Guide: Statistics. SAS Inst. Inc., N.C., USA.

Sekiwa, Y., Kubota, K., Kobayashi, A., 2000. Isolation of novel glucosides related to gingerdiol from ginger and their antioxidative activities. J. Agric. Food Chem., 48:373-377.

Tohamy, A.A., Ibrahim, S.R., Abdel Moneim, A.E., 2012. Studies on the effect of *Salvia aegyptiaca* and *Trigonella foenum graecum* extracts on adult male mice. J. Appl. Pharm. Sci., 2 (5): 36-43.

Walton, A., 1933. The Technique of Artificial Insemination. Imperial Bureau Animals Genetics. Oliver and Boyd, Edinburgh.UK.