



## Improvement in Semen Quality and Occurrence of Pregnancy Treated with an Herbal Medication: A Case Report

Fatemeh Kolangi<sup>1,2</sup>, Hamid Shafi<sup>3</sup>, Zahra Memariani<sup>4,5</sup>,  
Mohammad Kamalinejad<sup>6</sup>, Maryam Naeimi<sup>5</sup>, Seyyed Ali Mozaffarpur<sup>4,5\*</sup>

<sup>1</sup>Department of Traditional Medicine, School of Persian Medicine, Golestan University of Medical Sciences, Gorgan, Iran

<sup>2</sup>Counseling and Reproductive Health Research Centre, Golestan University of Medical Sciences, Gorgan, Iran

<sup>3</sup>Fatemezahra Infertility and Reproductive Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran

<sup>4</sup>Traditional Medicine and History of Medical Sciences Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran

<sup>5</sup>Department of Traditional Medicine, School of Persian Medicine, Babol University of Medical Sciences, Babol, Iran

<sup>6</sup>School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Received: 26 Apr 2019

Revised: 5 Jun 2019

Accepted: 11 Jun 2019

### Abstract

Male infertility is one of the most important subjects in medical sciences. It can cause private, social, and economic problems. Idiopathic male infertility is a situation where abnormal sperm parameters are created due to no specific cause and without definite standard treatment. Some herbal antioxidants can improve semen quality and assist infertile patients. We here report a case with idiopathic infertility who had been trying to have a child for 4 years, but he failed. A 33-year-old non-smoker, overweight man referral from urologist due to idiopathic infertility to the traditional medicine clinic. He had been trying to have a child for 4 years, and the first three years received antioxidant supplements but he was unsuccessful. *Alpinia officinarum* (Lesser galangal) rhizome in powder form was prepared and administered to the patient for three months. After the intervention, all the semen parameters were improved. *A. officinarum* has a high amount of galangin that has antioxidant effects. In this study, we showed that the spouse of an idiopathic infertile male becomes pregnant after receiving *A. officinarum* rhizome

**Keywords:** Antioxidan; Galangin; Male infertility; Sperm; Semen parameters

**Citation:** Kolangi F, Shafi H, Memariani Z, Kamalinejad M, Naeimi M, Mozaffarpur SA. **Improvement in Semen Quality and Occurrence of Pregnancy Treated with an Herbal Medication: A Case Report.** Trad Integr Med 2019; 4(3): 123-129.

\*Corresponding Author: Seyyed Ali Mozaffarpur

Department of Traditional Medicine, School of Persian Medicine, Babol University of Medical Sciences, Babol, Iran

Tel:+98 (11) 32194728-30 (Ext: 104)

Fax:+98 (11) 32194728-30 (Ext: 107)

E-mail: dr.mozaffarpur@mubabol.ac.ir

## Introduction

Male infertility is the inability to cause pregnancy in a fertile female after 1 year [1]. Infertility can cause psychosocial-economic effects in couples [2]. Researchers have demonstrated that male factors account for 40-50% of infertility in human. It is estimated that 60% of married couples will get pregnant after 6 months of sexual intercourse, 90% will get pregnant by 12 months. In more than 50% of male infertility patients, the etiology is still unknown, and the infertility is named as idiopathic [3]. Any distinct standard treatment is still unknown to improve sperm parameters in idiopathic infertility [4].

Recently, due to some limitations in conventional medicine, plants have been re-considered for treatment of various diseases in different parts of the world [5].

The treatment methods in conventional medicine seem to be inadequate in patients with infertility [6]. Therefore, new treatment strategies are needed to solve this problem. Reactive oxygen species (ROS) are significant factors in sperm dysfunction that affect the quality of sperm and natural antioxidants have been demonstrated to improve semen quality [7].

*Alpinia officinarum*, the herb belong to Zingiberaceae family is used for male infertility treatment in traditional Persian medicine for more than 10 centuries [8]. It has been reported to show several biological activities such as antioxidant, anti-inflammatory, and antimicrobial properties

[9,10]. Several chemical compounds have been identified in this herb including phenolics, alkaloids and saponins [9,10]. Galangin, the main bioactive constituent of *A. officinarum*, has been demonstrated to show remarkable antioxidant and anti-inflammatory effects [9-12].

Natural antioxidants such as galangin [13] in *A. officinarum* rhizome can theoretically be effective in spermatogenesis dysfunction. This study reports the effect of *A. officinarum* rhizome on semen factors in a man with idiopathic infertility which led to pregnancy for his wife.

## Case presentation

A 33-year-old non-smoker, overweight man (body mass index; BMI = 40) referral from urologist due to his primary infertility. His infertility diagnosed as idiopathic infertility in conventional medicine. According to Persian medicine, the diagnosis was based on coldness and wetness dystemperament in his body.

He was a municipal worker and had low physical activity. The patient had no history of exposure to toxins, radiation, and over-working with computers.

He had been trying to have a child for 4 years, and in the first 3 years, received HCG and supplements such as vitamins E and C, L-carnitine and zinc but he was unsuccessful. The sonography did not show varicoceles. In his past medical history, mumps in childhood, smoking, alcohol, drugs, and surgery were negative. He had an ordinary medical history

except for infertility. There was no change in the patient's diet during this period of time. Before and after three months of treatment; semen analysis conducted both in same laboratory with same method and technicians (Table 1). The evaluation of the semen parameters was evaluated according to the criteria for normal semen parameters of the World Health Organization (WHO) from 2010, that the normal values are defined as:

Semen volume  $\geq 1.5$  mL

Sperm concentration  $\geq 15 \times 10^6$ /mL

Total movement  $\geq 40\%$

Sperm morphology (normal forms)  $\geq 4\%$  (14)

The results of previous spermatograms from other treatments are shown in Table 1. Other laboratory tests, such as prolactin, testosterone, follicle-stimulating hormone (FSH), luteinizing hormone (LH), and thyroid-stimulating hormone (TSH) were normal (table 2). All medications were discontinued for 3 months before beginning of traditional medicine. Monthly clinical examinations and drug side effects were evaluated in this patient. Furthermore, liver function tests were performed at baseline and at the end of the intervention. We observed that liver function tests were within the normal range at the end of the intervention.

Despite the fact that the ovulation process was carried out for the woman and the ovums were kept at "Fateme-Zahra center of the infertility", the couple decided to receive a course of traditional medicine.

The rhizomes were washed and dried using the procedure as explained by Liu Dahui et

al [15]. The microbial limit tests were performed in accordance with the British pharmacopeia for herbal preparations [16], In the Food and Drug Administration laboratory in Gorgan University of Medical Sciences. Microbiological activity in the *A. officinarum* extract was below the EU standards for herbal medicine.

The patient received powdered *A. officinarum* rhizome, filled in 1 g capsules [8], three capsules, three times a day for 3 months. This period of medication was considered, because normally spermatogenesis takes 75 days [17]. Written consent from the subject has been taken. No adverse effects were reported during the treatment.

The patient had significant improvement in sperm parameters and pregnancy occurred naturally without reproductive techniques such as in vitro fertilization (IVF).

## Discussion

This study reports a case of infertility treatment with *A. officinarum* rhizome in a male patient with idiopathic infertility. Sperm motility, count, and morphology were also improved in this case and his spouse became pregnant without any assisted reproductive techniques such as in vitro fertilization (IVF).

Some studies were revealed to considerably improve semen quality of infertile patients in spermogram by treatment with the herbs and natural supplements [18] such as vitamins C and E, carnitine, selenium [19,20] and also some herbals rem-

**Table 1:** Semen assessment before Treatment and after 3 months' consumption of *Alpinia officinarum*

Semen Parameters	Before Treatment			After traditional medicine
	2016.29.5	2016.31.10	2017.3.2	2017.6.5
date	2016.29.5	2016.31.10	2017.3.2	2017.6.5
Ejaculate Volume (ml)	2	1.5	1.5	2
Total Sperm Count ( $\times 10^6$ /ml)	8	7	4	30
Sperm motility (%)	0	3	3	50
Motility grade a (%)	3	0	0	20
Motility grade b (%)	1	0	0	30
Normal morphology (%)	0.5	5	0	11

**Table 2.** *A. officinarum* effects on plasma sex hormones

Markers	Unit	Before Treatment	After Treatment	Normal Range
TSH	mlu /ml	4.1	2.11	0.3 - 4
Testosterone	ng/mL	3.85	2.85	2.27 – 10.30
FSH	mlu /ml	2.50	3.20	1.7 - 12
LH	mlu /ml	2.49	2.70	1.1 - 7
Prolactin	ng/ml	8.6	5.64	2.1 – 17.7

edy including sesame [21], saffron [18] and *Withania somnifera* [22] have been reported to be effective on sperm parameters with focus on their antioxidant activities. There is no standard treatment to improve sperm parameters in idiopathic infertility [23]. However, use of empiric medical therapies such as hormone therapy [24] and antioxidant therapy [24-26] have an important role in treatment of idiopathic male infertility [26].

Use of herbal medications such as *A. officinarum* for treatment of infertility has a historical background in traditional Persian medicine [27]. We published one paper [28] to propose a relationship between *A. officinarum* and infertility. So, it seems this is the first report of sperm quality improvement via *A. officinarum* in a male patient with idiopathic infertility, and pregnancy achievement in his wife.

A certain level of reactive oxygen spe-

cies (ROS) is required for normal sperm function and fertilizing capacity. Increasing ROS in seminal fluid may be one of the main causes of damages in spermatogenesis and male reproductive system [7] resulting in male infertility and also as a factor in failure of assisted reproductive techniques [29].

One of the main active components of *A. officinarum* is galangin which has been indicated in several studies to have a potent antioxidant activity [30]. The plant material was standardized by using HPLC method via determination of galangin content as the main bioactive constituent of *A. officinarum* rhizome. So, semen parameter improvement by *A. officinarum* might be attributed to its scavenging activity against the ROS which affect the lipid and protein content of sperms [31]. Galangin can reduce apoptosis via caspase inhibition, up-regulation of Bcl-2, down-regulation of Bax expression [32], cPARP reduction and inhibitions of the ERK and NF- $\kappa$ B signaling pathways resulting in increased sperm quality and reduced DNA damage [33]. As we could not measure the ROS levels of the semen, ROS content before and after treatment should be measured in future studies. In addition, as this study was a case report, further studies in form of clinical trials with more cases are needed to confirm the effect of *A. officinarum*.

## Conclusion

In this case we reported improvement in

semen parameters in terms of motility, sperm count, and sperm morphology after *A. officinarum* treatment in a male patient; his spouses also become pregnant. Other than potential herbal remedies such as *A. officinarum*, it seems that combination therapy (herbal therapy with conventional medicine) could be considered more in researches for seeking beneficial remedy and obtaining better results in treatment of male idiopathic infertility.

## Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

## Conflict of Interest

None.

## Acknowledgements

The authors would like to thank Mohammad Ali Shams, PhD of TEFL and assistant professor of English at Medical University of Babol for his help during the study.

## References

- [1] Miyamoto T, Tsujimura A, Miyagawa Y, Koh E, Namiki M, Sengoku K. Male infertility and its causes in human. *Adv Urol* 2012;2012.
- [2] Aitken R, Finnie J, Muscio L, Whiting S, Connaughton H, Kuczera L. Potential importance of transition metals in the induction of DNA damage by sperm preparation media. *Hum Reprod* 2014;29:2136-2147.
- [3] Krausz C. Male infertility: pathogenesis and clinical diagnosis. *Best Pract Res Clin Endocrinol Metab* 2011;25:271-285.
- [4] Speroff L, Fritz MA. Family planning, Sterilization, and abortion. *Clinical Gynecologic Endocrinology and In-*

- fertility. 8<sup>th</sup> ed. PA: Lippincott Williams and Wilkins. Philadelphia. 2011; pp 921-925.
- [5] Zhong Y, Menon MC, Deng Y, Chen Y, He JC. Recent advances in traditional Chinese medicine for kidney disease. *AJKD* 2015;66:513-522.
- [6] Safarinejad M. Effect of omega-3 polyunsaturated fatty acid supplementation on semen profile and enzymatic anti-oxidant capacity of seminal plasma in infertile men with idiopathic oligoasthenoteratospermia: a double-blind, placebo-controlled, randomised study. *Andrologia* 2011;43:38-47.
- [7] Adewoyin M, Ibrahim M, Roszaman R, Isa MLM, Alewi NAM, Rafa AA. Male infertility: The effect of natural antioxidants and phytochemicals on seminal oxidative stress. *Dis* 2017;5:9.
- [8] Avicenna. Canon of Medicine. Dar Ihyaa al-Turaath al-Arabi. Beirut 2005.
- [9] Srividya A, Dhanabal S, Misra V, Suja G. Antioxidant and antimicrobial activity of *Alpinia officinarum*. *Indian J Pharm Sci* 2010;72:145.
- [10] Honmore VS, Kandhare AD, Kadam PP, Khedkar VM, Sarkar D, Bodhankar SL. Isolates of *Alpinia officinarum* Hance as COX-2 inhibitors: Evidence from anti-inflammatory, antioxidant and molecular docking studies. *Int Immunopharmacol* 2016;33:8-17.
- [11] Zhang W, Luo J, Kong L-Y. The genus *Alpinia*: a review of its phytochemistry and pharmacology. *World J Tradit Chin Med* 2016;2:26-41.
- [12] Kim Y-u, Son HK, Song HK, Ahn M-J, Lee SS, Lee SK. Inhibition of 5 $\alpha$ -reductase activity by diarylheptanoids from *Alpinia officinarum*. *Planta Medica* 2003;69:72-74.
- [13] Wang H-X, Tang C. Galangin suppresses human laryngeal carcinoma via modulation of caspase-3 and AKT signaling pathways. *Oncol Rep* 2017;38:703-714.
- [14] World Health Organization (1999) Laboratory manual for the examination of human semen and sperm-cervical mucus interaction. 4th ed. CUP, New York.
- [15] Dahui L, Na X, Li W. Effects of different cleaning treatments on heavy metal removal of *Panax notoginseng* (Burk) FH Chen. *Food Addit Contam Part A Chem Anal Control Expo Risk Assess* 2014;31:2004-2013.
- [16] Commission, B. British pharmacopoeia 2015. Stationery Office. London.
- [17] Speroff L, Fritz MA. Clinical gynecologic endocrinology and infertility. lippincott Williams & wilkins 2011.
- [18] Wirleitner B, Vanderzwalmen P, Stecher A. Dietary supplementation of antioxidants improves semen quality of IVF patients in terms of motility, sperm count, and nuclear vacuolization. *Int J Vitam Nutr Res* 2012;82:391-398.
- [19] Safarinejad MR, Shafiei N, Safarinejad S. A prospective double-blind randomized placebo-controlled study of the effect of saffron (*Crocus sativus* Linn.) on semen parameters and seminal plasma antioxidant capacity in infertile men with idiopathic oligoasthenoteratozoospermia. *Phytother Res* 2011;25:508-516.
- [20] Haghghian HK, Haidari F, Mohammadi-asl J, Dadfar M. Randomized, triple-blind, placebo-controlled clinical trial examining the effects of alpha-lipoic acid supplement on the spermatogram and seminal oxidative stress in infertile men. *Fertil Steril* 2015;104:318-324.
- [21] Khani B, Bidgoli SR, Moattar F, Hassani H. Effect of sesame on sperm quality of infertile men. *J Res Med Sci* 2013;18:184.
- [22] Nasimi Doost Azgomi R, Nazemiyeh H, Sadeghi Bazargani H, Fazljou SM, Nejatbakhsh F, Moini Jazani A, Ahmadi AsrBadr Y, Zomorodi A. Comparative evaluation of the effects of *Withania somnifera* with pentoxifylline on the sperm parameters in idiopathic male infertility: A triple-blind randomised clinical trial. *Andrologia* 2018;50:e13041.
- [23] Fritz MA, Speroff L. Clinical gynecologic endocrinology and infertility. Wolters Kluwer Health/Lippincott Williams & Wilkins. 2011.
- [24] Tadros NN, Sabanegh ES. Empiric medical therapy with hormonal agents for idiopathic male infertility. *Indian J Urol* 2017;33:194.
- [25] Majzoub A, Agarwal A. Antioxidant therapy in idiopathic oligoasthenoteratozoospermia. *Indian J Urol* 2017;33:207.
- [26] Türk S, Mändar R, Mahlapuu R, Viitak A, Punab M, Kullisaar T. Male infertility: decreased levels of selenium, zinc and antioxidants. *J Trace Elem Med Biol* 2014;28:179-185.
- [27] Rezaeizadeh H, Alizadeh M, Naseri M, Ardakani MS. The Traditional Iranian Medicine Point of View on Health and Disease. *Iranian J Publ Health* 2009;38:169-172.
- [28] Kolangi F, Shafi H, Memariani Z, Kamalinejad M, Bios S, Jorsaraei SG, Bijani A, Shirafkan H, Mozaffarpur SA. Effect of *Alpinia officinarum* Hance rhizome extract on spermatogram factors in men with idiopathic infertility: A prospective double-blinded randomised clinical trial. *Andrologia* 2019;51:e13172.
- [29] Khosrowbeygi A, Zarghami N, Deldar Y. Correlation between sperm quality parameters and seminal plasma antioxidants status. *IJRM* 2012;2:58-64.
- [30] Kaushik D, Yadav J, Kaushik P, Sacher D, Rani R. Current pharmacological and phytochemical studies of the plant *Alpinia galanga*. *Zhong Xi Yi Jie He Xue Bao* 2011;9:1061-1065.
- [31] Mahfouz R, Sharma R, Lackner J, Aziz N, Agarwal A. Evaluation of chemiluminescence and flow cytometry as tools in assessing production of hydrogen peroxide and superoxide anion in human spermatozoa. *Fertil Steril* 2009;92:819-827.
- [32] Li S, Wu C, Zhu L. By improving regional cortical

blood flow, attenuating mitochondrial dysfunction and sequential apoptosis galangin acts as a potential neuro-protective agent after acute ischemic stroke. *Molecules* 2012;17:13403-13423.

- [33] Wang X, Sharma RK, Sikka SC, Thomas AJ, Falcone T, Agarwal A. Oxidative stress is associated with increased apoptosis leading to spermatozoa DNA damage in patients with male factor infertility. *Fertil Steril* 2003;80:531-535.