reproductive system of the male rat. *Can J Biochem Physiol*, 1958, 36: 557-569.

14. Mandal A, and Bhattacharyya AK. Biochemical composition of washed human seminal coagulum in comparison to sperm-free semen from the same donors. *J Reprod Fertil*, 1990; 88: 113-118.

15. Wong WY, Flic G, Groenen PMW, Swinkels DW, Thomas CMG, Copius-Peereboom JHJ, Merkus HMWM and Steegrers-Theunissen RPM. The impact of calcium, magnesium, zinc and copper in blood and seminal plasma on semen parameters in men. *Reproductive Toxicology*, 2001; 15: 131-136.

16. WHO World Health Organization laboratory manual for the examination of human semen and sperm-cervical mucus interaction. Cambridge University Press, Cambridge, UK; 1999.

17. World Health Organization. WHO Laboratory Manual for the Examination of Human Semen and Semen–cervical Mucus Interaction, 3rd ed. Cambridge University Press, Cambridge, UK; 1992.

18. Lu JC, Chen F, Xu HR, Yu-Feng Huang YF, and Lu NQ. Standardization and quality control for determination of fructose in seminal plasma. *Journal of Andrology*, 2006. 29: 1-25.

19. Manivannan B, Bhande SS, Panneerdoss S, Sriram S, and Lohiya NK. Safety evaluation of long-term vas occlusion with styrene maleic anhydride and its non-invasive reversal on accessory reproductive organs in langurs. *Asian J Androl*, 2005; 7: 195-204.

20. Videla E, Blanco AM, Gall ME, and Fernandes-Collazo E. Human seminal biochemistry: Fructose, ascorbic acid, citric acid, acid phosphatase and their relationship with sperm count. *Andrologia*, 1981; 13:212.

21. Sheriff DS. Setting standards of male fertility in semen analysis in 1500 patients - a report. *Andrologia*, 1983; 15: 687.

22. Andrad-Rocha FT. Seminal fructose levels in male infertility: Relationship with sperm characteristic. *International Urology and Nephrology*, 1999; 31(1): 107-111.

23. Hasan A, Masood A, Mukhtiar B, and Moazzam A. Relationship of zinc concentrations in blood and seminal plasma with various semen parameters in infertile subjects. *Pak J Med Sci*, 2007; 23(1): 111-114.

24. Wong WY, Merkus HM, Thomas CM, Menkveld R, Zielhuis GA, and Steegers- TRP. Effects of folic acid and zinc sulphate on male factor subfertility: A double-blind, randomized, placebo-controlled trial. *Fertile Steril*, 2002; 77: 491-498.

25. Prasad AS. Zinc: an overview. *Nutrition*, 1995; 11: 93-99.

26. Stephenson JL, and Brackett BG. Influences of zinc on fertilization and development of bovine oocytes in vitro. *Zygote*, 1999; 7: 195-201.

27. Mohammad EH, Alixides FA, and Mohammed FH. Reactive oxygen species and antioxidant in seminal plasma and their Impact on male fertility. *International Journal of Fertility and Sterility*, 2009; 3: 87-110.

28. Bedwal RS, and Bahuguna A. Zinc, copper and selenium in reproduction. *Experientia*, 1994; 50: 626-640.

29. Rohr G, Zwick EM, Knopf D, Batschulat K, Armbruster FP, Strowitzki TH and Eggert-Kruse W. Are zinc levels associated with semen quality? Abstracts of the 17th Annual Meeting of the ESHRE, Lausanne, Switzerland 2001.

30. Irvine DS. Glutathion as a treatment for male infertility. *Rev Reprod*, 1966; 1: 6-12.

31. Lu L, Changsong W, Gao X, Xu P, Wang J, Wang Q, Cheng J and Xiao H. Effects of Copper on T-Type Ca^{2+} Channels in mouse spermatogenic cells. *J Membrane Biology*, 2009; 227: 87-94.

32. Roblero L, Guadarrama A, Lopez T, and Zegers, Hochschild F. Effect of copper ion on the motility viability, acrosom reaction and fertilizing capacity of human spermatozoa in vitro. *Reprod Fertil Dev*, 1996; 8: 871-874.

Correspondence to: Dr. Nawal Kh. Hussain
E-mail: nawalkhiry@yahoo.com
Received: 7th Feb. 2010, Accepted: 27th Oct. 2010.