Protective Role of Honey on Sperm Indices and Testis in Sucrose-fed Rats

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SUMMARY

The study aimed at investigating the effect of high sucrose diet on male reproductive function and if honey could exert a protective role.

Twenty-four rats were randomly divided into four equal groups of six animals and given water (control); honey (H); high sucrose solution (30%w/v) (HSS); and both high sucrose solution (30%w/v) and honey (HSS+H). The H and HSS+H rats received a daily dose of 10ml honey/kg/5ml of distilled water. Fasting blood glucose, male hormones, sperm functions and oxidative studies were assessed.

Results revealed that sperm motility and count increased in the HSS+ H and H- fed rats compared with HSS fed and control rats. Testosterone level was increased in H-fed compared to HSS-fed rats. The level of lipid peroxidation in the testes was significantly increased in the HSS fed rats compared with control while superoxide dismutase activity was significantly increased in HSS+H rats compared with the HSS fed rats.

The results indicate that sucrose feeding negatively affected sperm function while honey supplementation confers protective function on male reproduction.

INTRODUCTION

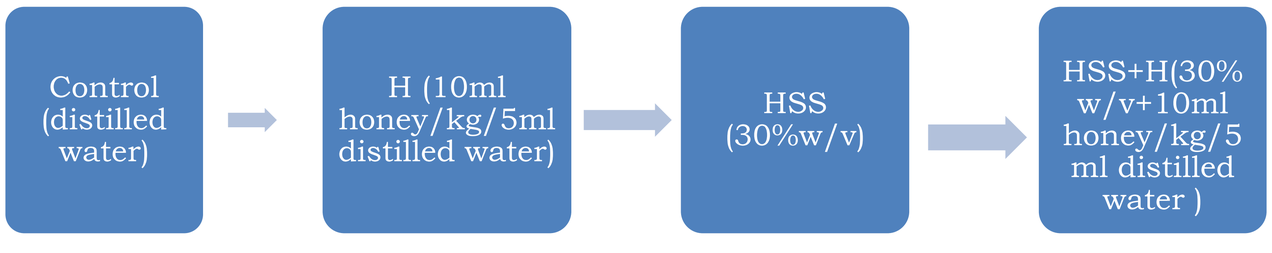
The available information on the effect of high sugar on male reproductive function is inadequate, though consumption of sweetened foods is not uncommon in many areas of the World (Stanhope & Havel 2010). Studies have shown that reproductive function can be affected by dietary manipulation (Fernandez *et al.,* 2011).

Honey had been the only available sweetener until its replacement by industrial sugar after 1800 (Crane 1975). The physiological importance of honey includes its antioxidant, anti-inflammatory properties (Fasanmade and Alabi 2008). It has also been shown to increase sperm count as well as vaginal wall epithelium and muscle thickness in mammals.

In lay press, sucrose is assumed to have negative implications on the male reproduction, this study attempts to investigate the impact of high sucrose intake on male reproductive function and the likely protective role of Nigerian honey.

METHODS

Experimental groups



Glucose levels were measured using a blood glucose monitoring system (Accu-Chek Glucometer, Roche, Germany).

Sperm analysis and hormonal assays were also analyzed.
Rats were anaesthetized with ketamine (90mg/kg b.w) and Xylazine (10mg/kg b.w) as a single intraperitoneal injection and the rats' testis were removed for oxidative studies.

Lipid peroxidation and antioxidant activities assessed include
Malondialdehyde (MDA) (Uchiyama and Mihara 1978)
Superoxide dismutase (SOD) activity (Sun & Zigman 1978)
Catalase (CAT) activity (Aebi (1984) and
Glutathione (GSH) activity (Van Doorn et al 1978)

Data are expressed as mean ± standard error of mean (SEM) and analyzed using the ANOVA followed by SNK post-hoc test. $P < 0.05$ was accepted as significant.

RESULTS

Figure 1: Fasting blood glucose (FBS) of the experimental rats

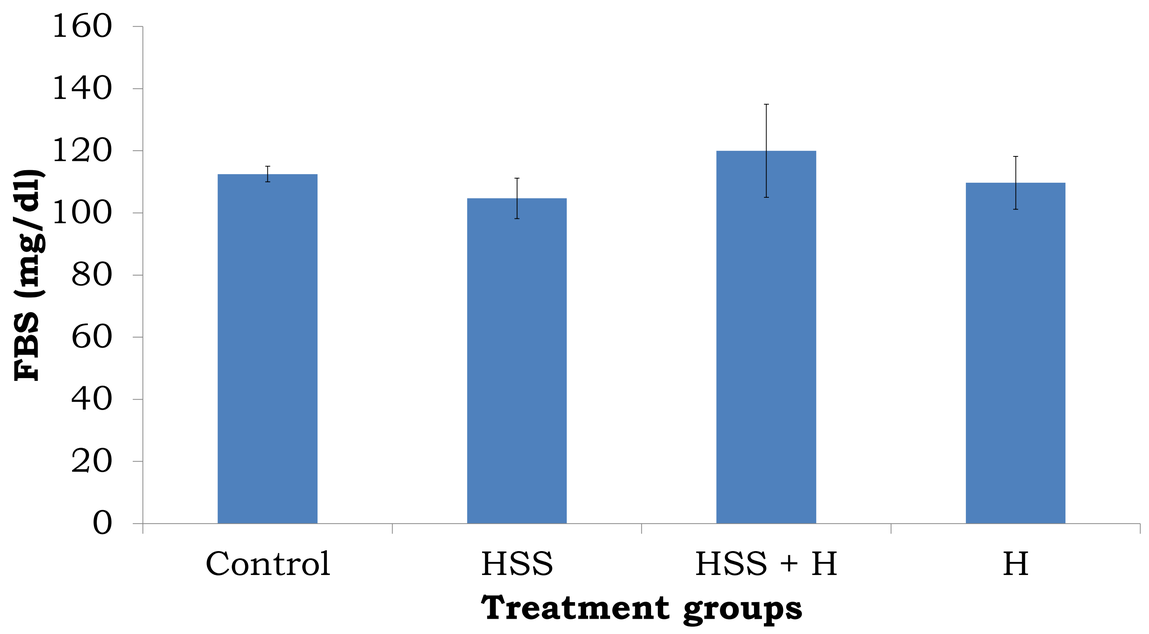


Table 2: Sperm indices of rats after administration of 4-week treatment

	Control	HSS	HSS+H	H
Motility (%)	86.30 ± 5.54	68.00 ± 6.63*	91.70 ± 1.67#	90.00 ± 3.54#
Live/Dead ratio	96.50 ± 0.87	92.20 ± 3.38	97.00 ± 1.00	96.50 ± 0.87
Epidydimal volume	5.18 ± 0.03	5.18 ± 0.02	5.17 ± 0.03	5.15 ± 0.03
Count	121.25 ± 5.38	96.5 ± 3.93*	120.67 ± 1.76#	131.00 ± 5.82#

Table 3: Hormonal levels of rats after administration of 4-week treatment

	Control	HSS	HSS+H	H
LH (iu/l)	0.87 ± 0.06	0.78 ± 0.12	0.34 ± 0.3#	0.3 ± 0.14*#
FSH (iu/l)	2.21 ± 0.24	1.47 ± 0.58	0.86 ± 0.64	0.54 ± 0.34*
T (nmol/l)	18.4 ± 3.6	21.9 ± 5.1	22.85 ± 1.15	27.55 ± 8.05*#

Table 4:MDA and antioxidant estimation in the testis after administration of 4-week treatment

	Control	HSS	HSS+H	H
MDA (µmol/l)	0.20 ± 0.17	0.38 ± 0.01	0.41 ± 0.10	0.23 ± 0.10
SOD (mmol/l)	2.02 ± 0.22	2.03 ± 0.19	3.77 ± 1.48#	2.31 ± 0.55
CAT (mol/l)	0.96 ± 0.11	0.69 ± 0.01*	0.70 ± 0.05	0.93 ± 0.66#π
GSH (µmol/l)	0.32 ± 0.03	0.40 ± 0.05	0.32 ± 0.04	0.43 ± 0.05

CONCLUSION

The reproductive capacity of the male rat is higher than that of man therefore, the decrease in sperm quality observed in the HSS- fed rats may be enough to alter fertility among male humans, thus contributing to the alarming incidence of male infertility. Nigerian honey conversely is an alternative sweetener and exhibits protective function against reproductive dysfunction via HS-feeding.

REFERENCES

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