

The Effect of Multi-floral Honey and Royal Jelly on Spermatogenesis in old Rats



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INTRODUCTION

Honey is the natural sweet substance processed and produced by honey bees (*Apis mellifera*) from the nectar of plants. It is one of the most important bio-products that is characterized by high nutritional value (330 kcal/100g) and fast absorption of its carbohydrates upon consumption. Royal jelly (RJ) the Queen bee food contains considerable amounts of proteins, amino acids, testosterone hormone lipid and sugars (Conti et al., 2007). RJ also contains vitamin A, C, D and E, mineral salts (K, Ca, Na, Zn, Cu and Mn) and enzymes. Moreover, it contains abundance of nucleic acids -DNA and RNA (Yarsan et al., 2007).

RJ and honey has been prescribed as a useful food in traditional medicine for increasing fertility and longevity in the Middle East, Europe and Asia.

The present study aims at evaluating effects of multi-floral honey and royal jelly on spermatogenesis in old albino rats.

MATERIALS

A total of ten kilograms of multi-floral honey sample from the Central Mountains region, south of Nablus, West Bank, Palestine were collected directly from honey beekeepers during April–June of 2009. The honey samples were kept in glass containers in the laboratory under room temperature for later use. Also, the RJ sample was collected from the same geographic region, and were kept in glass containers frozen at -40°C until used.



Experiment

Forty Sprague-Dawley albino rat males of 14 weeks old were obtained from the animal unit of the Department of Biology and Biochemistry, Birzeit University. Rats were numbered, weighed and randomly allocated to one of the following treatments :

- 1- control (C),
- 2- 4% honey solution (H),
- 3- 4% honey solution with 2 mg RJ/ml (RJ1)
- 4- 4% honey solution with 4 mg RJ/ml (RJ2).

Rats were maintained at $25 \pm 2^{\circ}\text{C}$ and given free access to rodent feed and drinking (treatments) till 27 weeks of age.

Body weights were recorded at 14, 16, 18 and 27 weeks old animals. At dissection, from each rat the prostate gland, seminal vesicles, and the left and right testes and epididymis were extracted and weighed directly. For sperm count, the epididymis from the right side of each rat was weighed and homogenized in 3 ml Tyrode solution and collected into Eppendorf tubes, and stored at 4°C for later sperm count. Sperms were counted using Neubauer Hemocytometer. Spermatid count was performed under a compound light microscope using the prepared cross sections of each rat testes according to Dostal et al. (1988) method, from 5 randomly chosen seminiferous tubules (magnification 40x) for each of the testicular tissues, the number of spermatids were counted separately in each of the five seminiferous tubules of each testes/rat, as a measure of the intensity of spermatogenesis viability.

RESULTS

No significant differences between treatments in live body weights of rats and dissected reproductive organs at 27 weeks old.

Effects of honey (H) and royal jelly (RJ) on mean sperm and spermatid count (\pm SEM) for 27 weeks old rats.

Treatment	Number	Spermatid count /ST at 18 weeks	Spermatid count /ST at 27 weeks	Epididymis sperm count $\times 10^6/\text{ml}$ at 27 weeks
Control	4	$70.4^a \pm 16.0$	$45.0^a \pm 5.0$	$34.5^a \pm 1.443$
H	4	$67.6^a \pm 4.4$	$67.5^b \pm 6.4$	$84.5^b \pm 5.866$
RJ1	4	$89.0^a \pm 7.6$	$95.0^b \pm 12.9$	$116.0^b \pm 8.660$
RJ2	4	$77.0^a \pm 3.7$	$76.0^b \pm 8.2$	$84.5^b \pm 5.485$

ST: seminiferous tubules; RJ1:2 mg RJ/ml; RJ2: 4 mg RJ/ml

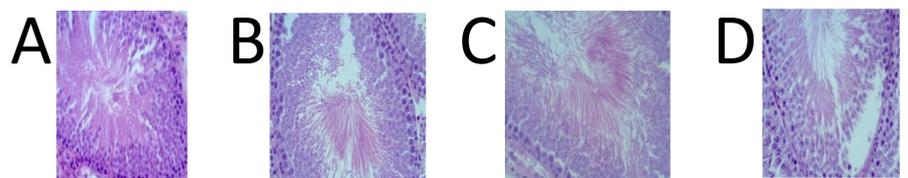


Figure 1. Cross sections of seminiferous tubules of rats testes at 27 weeks old.

A: control; B: Honey; C: RJ1; D: RJ2

CONCLUSIONS

Treatments with honey and royal jelly (H, RJ1 and RJ2) caused a significant ($P < 0.05$) increase in sperm count in 27 old weeks rats when compared to control group. The RJ1 treatment increased sperm count more ($116 \times 10^6/\text{ml}$) than H and RJ2 ($84.5 \times 10^6/\text{ml}$) treatments. Our results demonstrated that long term feeding of honey and RJ minimized the decline of male rat testicular function at 27 weeks of age.

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