APRW -09

Effect of Panax Ginseng Extracts on Milk Yield of New Zealand White Rabbits

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Abstract
This study was carried out to ascertain the effect of *Panax ginseng* extracts (PGEs) on the milk yield of New Zealand White (NZW) rabbit does. The PGEs were orally administered between the hours of 7.00 and 9.00 GMT for 28 days and in 3 treatments of T_1, $T_2$and T_3; containing 0.0, 200.0 and 400.0 mg/ml PGEs, respectively. Eighteen (18) rabbit does (7 – 8 months old) were used and each treatment was made up of 6 rabbits which were further divided into 3 replicates of 2 rabbits each. The experiment was carried out in a Complete Randomized Design (CRD). Rabbit does on T_1 had significantly ($p<0.05$) higher daily, weekly, peak and total milk yields than those of rabbits on T_2, which were significantly ($p<0.05$) higher than values obtained in T_3 rabbits. The results of this study show that PGEs significantly ($p<0.05$) decreased milk yield of NZW rabbits in a dose-dependent manner.

Keywords: *Panax ginseng*, extracts, effects, rabbits, milk yield.

Introduction

Various non-synthetic materials are being studied for their possible effects or benefits in the animal production industry. This is occasioned by the advocacy for an organic farming sequel to the deleterious effects of synthetic materials used in animal production (Iwuji *et al*., 2016). One of the non-synthetic materials widely studied for use in animal production is *Panax ginseng*; a perennial fleshy root plant, which its description and properties have been extensively documented (Jeong *et al*., 2012). Studies on the effects of *Panax ginseng* on several animal models abound, but very few are known and reported on rabbits.

The rabbit as a micro-livestock has been adjudged to be a possible means of filling the niche in the animal protein needs of developing countries like Nigeria (Iwuji *et al*., 2016); therefore, expanding research in rabbit production is a veritable option. In numerous animal model studies, various properties of *Panax ginseng* have been reported (Iwuji, 2016) and they include antioxidant, protein anabolic, hormonal/endocrine, reproductive, immune regulation and hepato-protective properties.

Based on the reported properties of *Panax ginseng*, this study was therefore designed to ascertain the effect of *Panax ginseng* extracts on milk yield of New Zealand White rabbits.

Materials and Methods

This experiment was carried out at the Rabbitry Unit, Teaching and Research Farm, School of Agriculture and Agricultural Technology, Federal University of Technology, Owerri, Imo State, Nigeria. The geographical location and meteorological conditions of Imo State have been documented (Ibeawuchi *et al.,* 2005). The test material used for this study was *Panax ginseng* extracts (PGEs). A commercially available capsulated pure *Panax ginseng* extracts (Mason natural® Korean Ginseng 518 mg) produced by Mason Vitamins, INC. USA, was purchased from a reputable pharmacy in Imo State, Nigeria. The *Panax ginseng* extracts capsule was dissolved in distilled water at the rate of 0, 200 and 400 mg/ml and administered orally to the experimental rabbit bucks.

A total of eighteen (7 – 8 months old) New Zealand White (NZW) rabbit does were used. Eight matured NZW rabbit bucks were available for mating. The rabbit does were divided into 3 treatment groups of 6 does per treatment, replicated thrice with 2 does each. During mating, the does were presented to the bucks in their cages. Nest boxes with beddings were provided for the pregnant does in their cages 3 – 4 days before their expected day of parturition. After 24 hours of parturition, the does were separated from the kits and subsequently allowed 3 minutes access to their kits for monitored suckling twice daily (morning and evening). Proper hygiene, feed and water were adequately provided for the lactating does.

The estimated quantity of milk produced by each doe was measured daily using a combination of the "weigh-suckle-weigh" and weight of the kits approach as described by Al-Sobayil *et al.* (2005). The does and kits were weighed before and after suckling. Each time, change in weight of the kits before and after suckling was employed to keep track of the milk yield or to confirm the value obtained from the weight change of the does. Milk yield data were recorded weekly. Average daily litter weight gain and milk yield for each week was calculated by dividing each week's total litter weight gain and total milk yield by 7 days, respectively. Average daily litter weight gain and milk yield for the total period of 4 weeks (1 – 28 days) was calculated by dividing the total litter weight gain and total milk yield by 28 days, respectively. The peak milk yields of the treatment groups were also

recorded. The kits were suckled two times daily (morning and evening); each time the does were made to suckle the kits for 3 minutes.

The experiment was carried out in a Complete Randomized Design (CRD) and comprised 3 treatments; FT_1 (control), FT_2 and FT_3, containing 0.0, 200.0 and 400.0 mg/ml *Panax ginseng* extracts, respectively. Data collected were subjected to analysis of variance according to Steel and Torrie (1980) and significantly ($p<0.05$) different treatment means were separated using Duncan's New Multiple Range Test (Obi, 1990).

Results and Discussion

The weekly milk yields of the rabbit does are presented in Table 1, while the total, peak and average daily milk yields are presented in figures 1 and 2. The weekly milk yields from week one to week four were significantly ($p<0.05$) higher in rabbit does on FT_1 than in rabbit does on FT_2, which were significantly ($p<0.05$) higher than the weekly milk yields of rabbit does on FT_3. The total, peak and average milk yields of rabbit does on FT_1 (3021.53, 850.63 and 107.91 g, respectively) were significantly ($p<0.05$) higher than values recorded for does on FT_2 (2745.28, 756.37 and 98.05 g, respectively), which were significantly ($p<0.05$) higher than the total, peak and average milk yields of rabbit does on FT_3 (2580.97, 722.47 and 92.18 g, respectively).

Table 1: Weekly milk yield (g) of rabbit does administered PGEs

Weeks	FT_1	FT_2	FT_3	SEM
1	682.23^a	659.57^b	605.23^c	7.75
2	735.87^a	686.84^b	642.80^c	9.24
3	850.63^a	756.37^b	722.47^c	8.32
4	752.80^a	642.50^b	610.47^c	7.99

^{abc}: Means within a row with different superscripts are significantly ($p<0.05$) different. FT = Female treatment; SEM = Standard error of means.

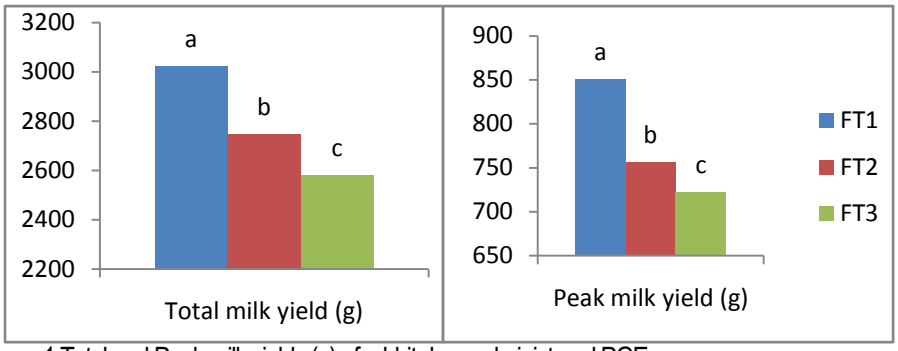
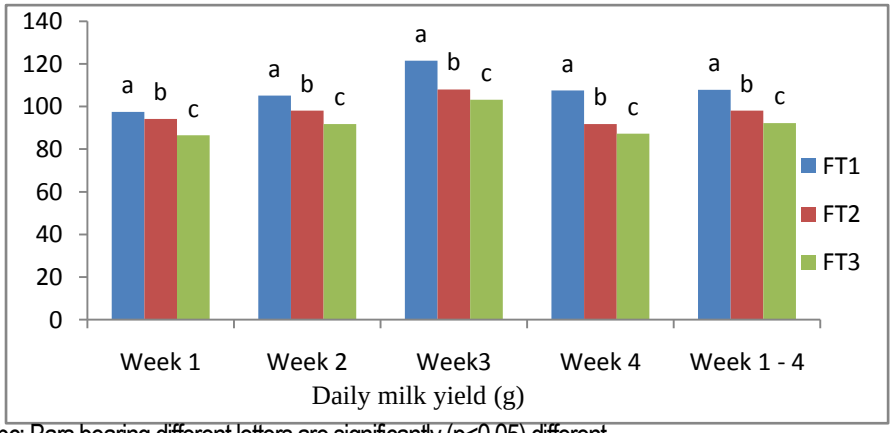


Figure 1 Total and Peak milk yields (g) of rabbit does administered PGEs
abc: Bars bearing different letters are significantly ($p<0.05$) different



abc: Bars bearing different letters are significantly ($p<0.05$) different
Figure 2 Average daily milk yield (g) of rabbit does administered PGEs

Panax ginseng extracts (PGEs) induced a dose dependent decrease in the daily, weekly, total and peak milk yields of the lactating rabbit does. This resulted in significantly ($p<0.05$) higher milk production by lactating rabbit does on the control treatment (FT_1). The significant decrease in milk yield of PGEs treated rabbit does may be probably due to low serum levels of prolactin caused by the inhibitory effect of PGEs on the release of prolactin by the anterior pituitary gland (Murphy and Lee, 2002).

Prolactin is a hormone produced by the anterior pituitary which plays a major role in milk production and mammary gland development (Frandson *et al*., 2009).

Conclusion and Recommendation

Administration of *Panax ginseng* extracts (PGEs) to lactating New Zealand White (NZW) rabbit does was not beneficial because it significantly ($p<0.05$) decreased milk yield in a dose-dependent pattern. Therefore, we recommend that PGEs should not be administered to lactating NZW rabbit does.

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