
EFFICACY OF SELECTED POLYHERBAL PRODUCTS TO IMPROVE REPRODUCTIVE PERFORMANCE IN RABBIT DOES

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ABSTRACT

The efficacy of selected of *Janova*[®] and *Exapar*[®] on the reproductive performance of rabbit does was investigated. Forty rabbit does mixed breeds (1.8-2.4 kg body weight) with 0-2 parities were randomized into four treatments (T1-T4) of ten does each, in a Completely Randomized Design (CRD). T1 animals received no herbal supplementation (control); T2 animals were drenched with 0.67 g *Janova*[®]/kg body weight (kg/BW); T3 animals were drenched with 0.2 g/kg/BW *Exapar*[®], while the T4 animals were drenched 0.67 g/kg/BW of *Janova*[®] + 0.2 g/kg/BW of *Exapar*[®]. Data on kindling rate (KR), gestation length (GL), litter size (LSK) and litter weight at kindling (LWK), average kit weight at kindling (AKWK), and sex ratio (SR) were collected. The data collected were statistically analysed using One-way ANOVA of SAS[®] software, the significant level for the group comparisons was set at $p < 0.05$. Results from the experiment revealed that T1 does had the highest KR of 44%, followed by T2 and T3 does with 33.3% each, while the does in T4 had the least KR of 25%. The GL obtained in the T1 ($33.25 \pm 0.63d$) was significantly higher ($p < 0.05$) than the values obtained in treatments T2, T3 and T4 does with mean GL of $31.33 \pm 0.33d$, $31.33 \pm 0.33d$ and $30.50 \pm 0.50d$, respectively. Polyherbal products (*Janova*[®] and *Exapar*[®]) brought about shortened gestation length in the does supplemented as compared to the control group.

Keywords: *Janova*[®], *Exapar*[®], Supplementation, Rabbit does, Gestation length.

INTRODUCTION

The population of the world is expected to surpass eight billion by 2030 and most likely surpass nine billion by 2050 due to the exponential growth that it is currently experiencing. This equates to an almost 50% increase in food production. By implication, the world will require over 50% increase in animal production, to be able to meet its meat demand (da Costa *et al.*, 2011). Rabbit (*Oryctolagus cuniculus*) is one of the most productive domesticated meat animals. Furthermore, the small size, short generation interval, and relatively short gestation period of 30-31 days that rabbits have are all advantageous to subsistence farming systems. They sexually mature at a younger age compared to other animals, because of their rapid pace of development and relatively high daily weight increase to body weight ratio (Odeyinka *et al.*, 2008). Despite the reported ability to induce ovulatory oestrus and improve reproductive health and general performance in different livestock species by both *Janova*[®] and *Exapar*[®], respectively (Patil *et al.*, 2010; Bawaskar *et al.*, 2017; Sutaria *et al.*, 2019; Jyothi *et al.*, 2020), there is no known use of the two polyherbal products in rabbit production. Therefore, this study aims at investigating the potency of *Exapar* for improvement of some reproductive performance traits rabbit in does.

MATERIALS AND METHODS

The study was conducted at the Teaching and Research Farm and Animal Reproductive Physiology Laboratory, Department of Animal Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. Ile-Ife is ecologically classified as a hot and humid tropical forest zone. Ile-Ife is situated between longitude 7^o 28¹N and 7^o 45¹N, latitude 4^o 30¹E and 4^o 30¹E, and an altitude of 286m above sea level (www.googleearthfinder). The experiment was conducted with a total of 40 heterogenous rabbit does of zero-two parities with body weight ranging from 1.8-2.4kg. Mature and proven bucks (2.30-2.80kg) were used for mating. Pelletized rabbit ration containing 2500kcal/DE/kg, 16% crude protein and 12% crude fibre was fed, and clean water was supplied *ad libitum*. Cage tags for primary records were hung on the frontal side of the cage. Each doe was weighed using an electronic digital weighing balance, with a minimum calibration of 1g.

Description of Exapar[®]

Exapar[®] is composed of 0.40g *Plumbago zeylanica* (ceylon leadwort/doctor bush), 0.30g *Gloriosa superba* (flame lily), 0.20g *Aloe barbadensis* (aloe vera), 0.05g *Citrillus colocynthus* and some other herbs. Exapar[®] has been used for cows, buffaloes, mares, sows and small ruminants (ewes and does), for the expulsion of retained placenta, regulation of lochial discharge, delayed involution of uterus, as a cleansing agent after manual removal of retained placenta, for timely expulsion of placenta after parturition.

Experimental design

Forty rabbit does were distributed into four treatments, T1 did not receive any of the herbal supplements (control); T2 was drenched orally with 0.67 g of *Janova*[®] per kg body weight (kg/BW); T3 animals were drenched with 0.2 g/kg/BW of *Exapar*[®], while the T4 animals were drenched with a combination of 0.67 g/kg/BW of *Janova*[®] and 0.2 g/kg/BW of *Exapar*[®]. The dosage was arrived at by extrapolating from the dosage of the products administered to small ruminants (ewes and does), using an average weight of 30kg as a reference point. The animals were mated naturally immediately after 3 days after the administration of herbal supplement. Data were collected on the following parameters: gestation length, kindling rate, litter size, litter weight at kindling, average kit weight at kindling and sex ratio.

RESULTS

Kindling rates

Table 4.1 reveals that T1 does which were not given any of the polyherbal supplements had the highest percentage of kindling rate, which was 44%, while T2, T3 and T4 had kindling rates of 33.3, 33.3 and 25%, respectively.

Gestation length (GL)

The average gestation period for the experimental does is shown in Table 4.1. A significant difference ($p < 0.05$) was observed between the T1 (control) group of does and the other groups of T2, T3, T4. Mean gestation length of (33.25±0.63d) was recorded for T1, while 31.33±0.33d, 31.33±0.33d, and 30.50±0.50d respectively were recorded for the other treatments T2, T3, and T4.

Table 1: Body weight, kindling rate and gestation length of does treated with polyherbal products (*Janova*[®] and *Exapar*[®])

Table 2 shows that there was no significant difference in the mean litter size at kindling, litter weight

Parameters	T1	T2	T3	T4	p-values
Body weight (g)	1790.00±106.8	1827.78±110.30	1868.89±114.3	1815.00±100.52	0.96
Kindling rate (%)	44.0	33.3	33.3	25.0	0.00
GL (days)	33.25±0.63 ^a	31.33±0.33 ^b	31.33±0.33 ^b	30.50±0.50 ^b	0.026

at kindling, average kits weight at kindling and sex ratio among the three groups (T1, T2 and T3) of does given polyherbal supplements and T1 (control) ($p > 0.05$).

Table 2: Reproductive performance parameters of does treated with polyherbal products (*Janova* and *Exapar*)

Parameters	T1	T2	T3	T4	p-value
LSK	4.00±1.08	4.67±0.67	4.67±0.33	4.50±0.50	0.9190
LWK (g)	149.25±33.37	166.33±28.92	153.33±12.68	134.00±11.00	0.9090
AKWK (g)	44.88±9.91	35.40±1.70	33.47±4.68	29.55±0.55	0.5221
Sex Ratio (M:F)	1.17±0.29	0.78±0.22	1.50±0.76	1.00±0.00	0.7189

T1 = control, no drenching; T2= 0.67g *Janova*[®]/kgBW; T3 = 0.2g *Exapar*[®]/kgBW; T4 = 0.67g *Janova*[®]/kgBW + 0.2g *Exapar*[®]/kgBW. LSK = Litter size at kindling; LWK = Litter weight at kindling; AKWK = Average kit weight at kindling.

DISCUSSION

The highest kindling rate was observed in the T1 (control) of the experiment. It appeared that the polyherbal supplements did not have any positive effect at the supplemented dose, on the KR of the does. It was observed that the unsupplemented control group of does, had higher KR than the supplemented group. The above observation goes in tandem with the work of Celia *et al.* (2015), which observed that supplementing Digestarom[®] at 300mg/kg diet did not seem to be efficacious enough for the improvement of reproductive performance of rabbits.

The litter size in the current study does not accurately reflect how well rabbit does perform. Mohammed and Iyeghe-Erakpotobor (2019) reported a litter size range of 4.70 - 6.50 for crossbred rabbits served *Moringa oleifera* leaf meal (MOLM) fortified with garlic (GR), ginger (GG), or black pepper (BP), whereas the reported ranges in the current study is lesser than theirs. Findings of the current study is however closer to the work of Alemede *et al.* (2014) which evaluated the effect of mistletoe (*Tapiananthus bangwensis*) leaves from different host plants on reproductive performance of rabbits. It is therefore inferred that the supplemented polyherbal products are not potent enough at the supplemented dose to improve reproductive performance traits such as litter size.

The litter weight at kindling recorded in the current study does not represent the optimum litter weight obtainable. Tuma *et al.* (2010) and Kalaba and Abdul-Khalek (2011) reported figures as high as 601g and 354g litter weight at kindling, respectively in their studies. However, lower values of LWK in the current study can be linked to the lower litter size at kindling, due to higher LSK reported in the studies of Tuma *et al.* (2010) and Kalaba and Abdul-Khalek (2011) which reported a higher LWK.

Shorter gestation length in treatments 2, 3, and 4 of the experiment is in consonance with the findings of Abdul Azeem *et al.* (2012) and Nowak *et al.* (2020), that there is an inverse relationship between gestation length and litter size. In other words, the higher the litter size, the shorter the gestation length. The shorter gestation length in treatments 3 and 4 does could also be linked to the drenched Exapar. It was reported that Exapar contains some constituent herbs that are potent ecbolics, capable of inducing contractions of the uterus leading to the expulsion of the foetus (Shapira *et al.*, 1999; Bensky, 2004; Oyedapo, 2006).

The study clearly indicated that there is no significant difference in the average kit weight at kindling across the treatments. In rabbits, individual birth weight is about 60-70grams, but can range from 30-40g to 80-90g (Di Meo *et al.*, 2004; Dutta *et al.*, 2018) The present study showed that average kit weight at kindling decreases with increase in litter size. This was also confirmed by Ajayi *et al.* (2018) and Oseni & Bashiru (2022). It was revealed an almost even distribution of the kits sex in terms male to female ratio, as no significant difference was observed in the mean of their sex ratio. The breed, kindling season, age of the doe when mating, and parity can all have an impact on the value for sex ratio, according to (Ghoneim *et al.*, 2018).

CONCLUSION AND RECOMMENDATION

The polyherbal products (Janova[®] and Exapar[®]) brought about shortened gestation length (GL) in the does supplemented as compared to the control group. It may be necessary for further studies be conducted, to test higher levels of the polyherbal products (Janova[®] and Exapar[®]) on the reproductive performance of rabbit does.

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