

# Effect of Different Levels of Dietary Hemp Seed Powder on the Profiles of Reproductive Hormones of Awassi Ewes

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**Annotation:** The present study aimed to investigate the effects of Russian hemp seeds on some reproductive hormones in the Iraqi Awassi ewes. Four Awassi ewe with a mean live weight twelve local Awassi ewes between three and four years were selected (BWObserved Experimental), were grouped into three experimental groups of four ewes each of comparable body weight. Each ewe represented a unique replicate. Participants were randomly grouped into one of the three treatment conditions (Group 1 - Control - T1 which received no further supplements; Group 2 - T2 which was given the supplementation of 200mg powdered hemp seeds (in gelatin capsules) and corn flour daily; Group 3 - T3 which was given the identical supplement to T2, but a higher daily precautionary dose (300 mg). The course of treatment extended to 45 Days. The serum levels of estrogen, LH, FSH, and prolactin did not show any statistically significant differences ( $P>0.05$ ) between groups. The levels of hemp seed powder used (200 and 300 mg/ewe/day) are physiologically safe for the Awassi ewes used in this study based on the results

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obtained.

**Keywords:** Hemp seed, estrogen, LH, FSH, prolactin.

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## Introduction

An annual herbaceous plant of the Cannabaceae family that originates from Central Asia: Hemp (*Cannabis sativa* L.) Hemp is the old drug that has been in here for about 5 millenniums, and has been utilized as food, medicine, drug and narcotic drug. Due to the outstanding nutritional properties and bioactive compounds of the hemp seeds, this kind of foodstuff at the same time very nutritionally valuable but also medicinally valuable as well, have attracted a lot of scientific interest over the years. A multitude of previous studies has similarly established the ability to incorporate hemp seeds or their oils into animal particular feed regimes as a high fat- and protein-containing feed alternative to improve animal product quality, especially milk and meat [1]. Oh there are high levels of THC when it comes to hemp seeds, so while cannabis is commonly associated with psychoactive effects, hemp seeds are fine for human and animal consumption [2]. Hemp seeds have a favourable being of ratio omega-3 and omega-6 unsaturated fatty acids, omega-6 to omega-4 ratio being 1:3, called to improve cardiovascular health and decrease the level of inflammation [3] as well as balanced amino acid profile [2], being a source of high quality complete protein. In addition, these seeds are a significant source of bioactive compounds, namely, tocopherols (vitamin E), polyphenols, and phytosterols, which have been described as showing important antioxidant and anti-inflammatory activities TSS-1 [4]. Also, certain phytochemical components of hemp seeds have been identified, including hepatostatic phytoestrogens that interact with ER $\alpha$  and ER $\beta$  estrogen receptors, which could impact female and male reproductive health. Indeed, estrogenic compounds (with some of them binding estrogen receptor) have been reported in industrial hemp extracts and could thus affect reproductive physiology [5].

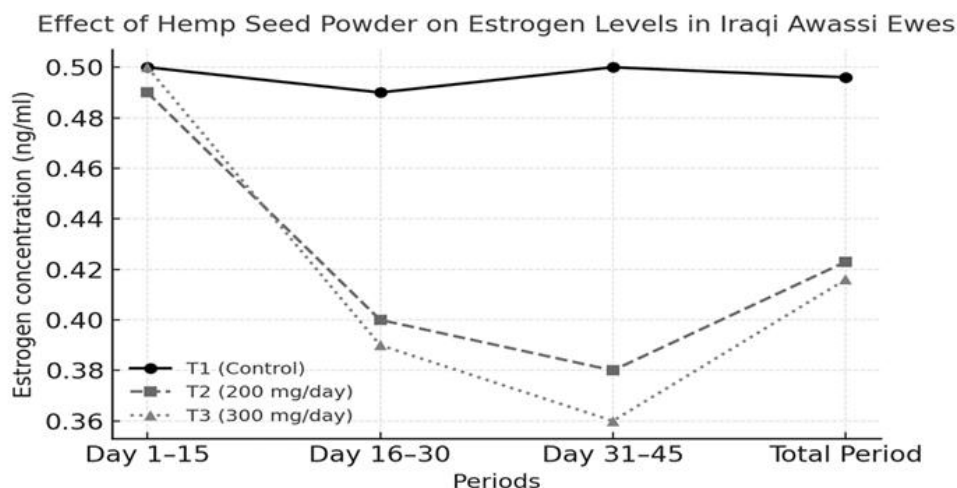
## Materials and Methods

Thus, this study and the present experiment were conducted at the College of Agriculture, University of Kirkuk, Department of Animal Production. The experiment included 12 ewes in healthy condition and mated from 3 to 4 years of age of the Awassi breed. In 2025, the experiment was performed during February and March for 45 days, where the ewes were divided into three groups, when there 4 ewes / group. Ewes were kept in closed cages of the same measure, where they had ad libitum access to water and dry hay. All ewes were maintained under the same environmental condition and free access for a standard diet was furnished to all the experimental animals. All groups received the same standard feed based on the nutritional requirements for the ewes with no supplements added. The control group was T1 (without additives), Group 2 (T2) received a dose of 200 mg per ewe per day and Group 3 (T3) received a dose of 300 mg per ewe per day. Hemp seed powder was administered daily to all of ewes, ground and mixed with corn flour in gelatin capsules. Those materials were kept during the experimental period (45 d). 5 ml syringes were used to collect blood samples from Awassi ewes. Blood was collected, mixed with anticoagulants and placed in glass tubes. After that, blood serum was collected into 1 ml tubes and kept in freezed until prolactin, ovulation hormone, follicle stimulating hormone and estrogen tests were done and required by the experiment. Once the laboratory analysis was done the results were analyzed based on the random design. Duncan's multiple range test was employed (Duncan, 1955) to test differences between treatments [6]. The behavior of this definitive model is defined as:  $Y_{ij} = \mu + T_i + e_{ij}$  Where:  $Y_{ij}$  = observation value j for treatment i,  $\mu$  = overall mean for the trait studied,  $T_i$  = effect of treatment I, and  $e_{ij}$  = experimental error assumed to be independent and normally distributed with the mean zero and equal variance  $\sigma^2 e$ .

## Results

### Estrogen:

The results of the experiment shown in **Figure (1)** did not find a significant change ( $P>0.05$ ) in the concentration of the hormone estrogen between the standard group (T1) and the two groups to which Russian hemp seed powder was added (T2 and T3) through the whole experimental period from 15-45 days, with estrogen levels between 0.36 and 0.50 ng/ml, indicating that different doses (200 and 300 mg/day) of hemp seed powder did not physiologically affect estrogen concentrations from the standard group. Due to the small size of the effect and lack of differences in statistical parameters between the two groups supplemented with hemp seeds (T2 and T3) for the periods of 30 and 45 days, their average decrease also differed slightly.

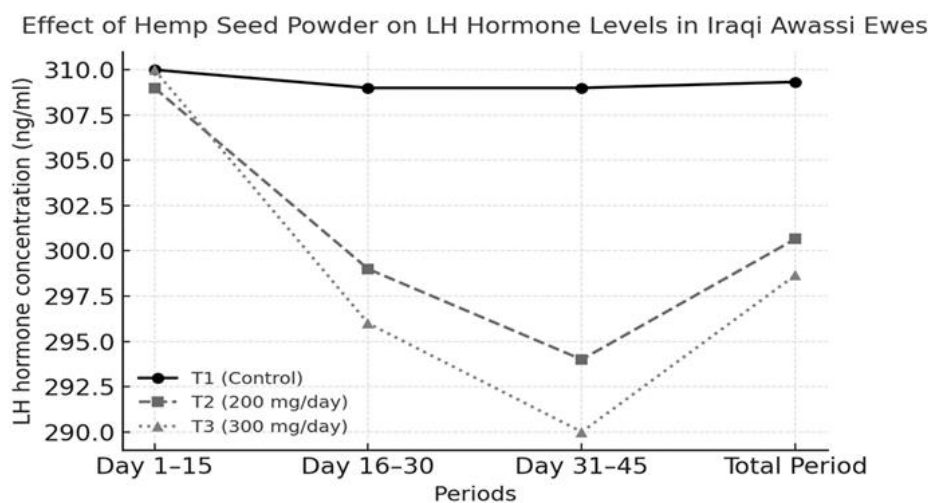


**Figure (1).** Effect of treatment with hemp seed powder on the concentration of estrogen hormone (ng/ml) in Iraqi Awassi ewes during different experimental periods.

### LH Hormone

**Figure (2)** in terms of time till first incubation etc. and comparing both use none of significant differences ( $P > 0.05$ ) between the both standards

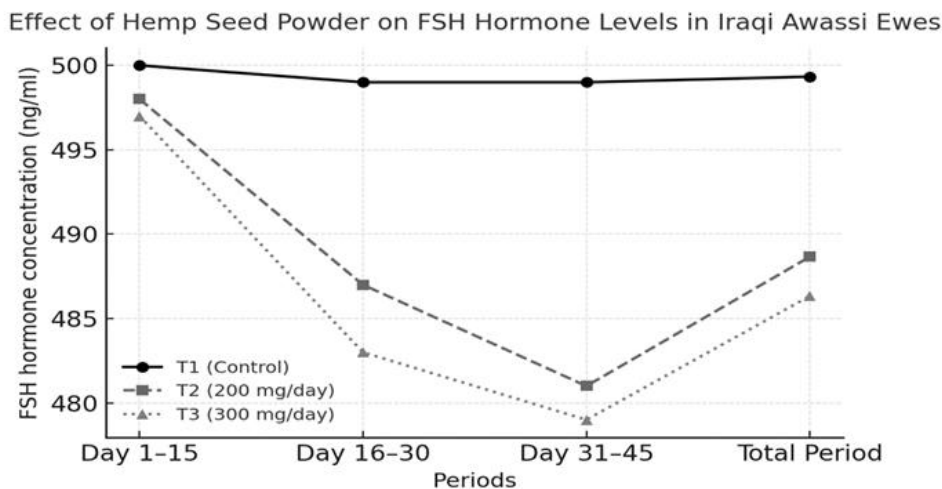
the stimulation of LH experienced by the control group and the two groups that had been supplemented with Russian hemp seed powder (T2 and T3) throughout the experimental period, respectively. Average LH concentrations on day 15 did not differ significantly between groups T1 (310), T2 (309), and T3 (310). Nevertheless, T2 and T3 groups fed with hemp seed showed a very small and trivial reduction at 30 and 45 days of the experiment in comparison to the control group, reaching an average of 45 day 309, 294, and 290, respectively.



**Figure (2).** Effect of treatment with hemp seed powder on the concentration of LH hormone (ng/ml) in Iraqi Awassi ewes during different experimental periods.

## FSH hormone

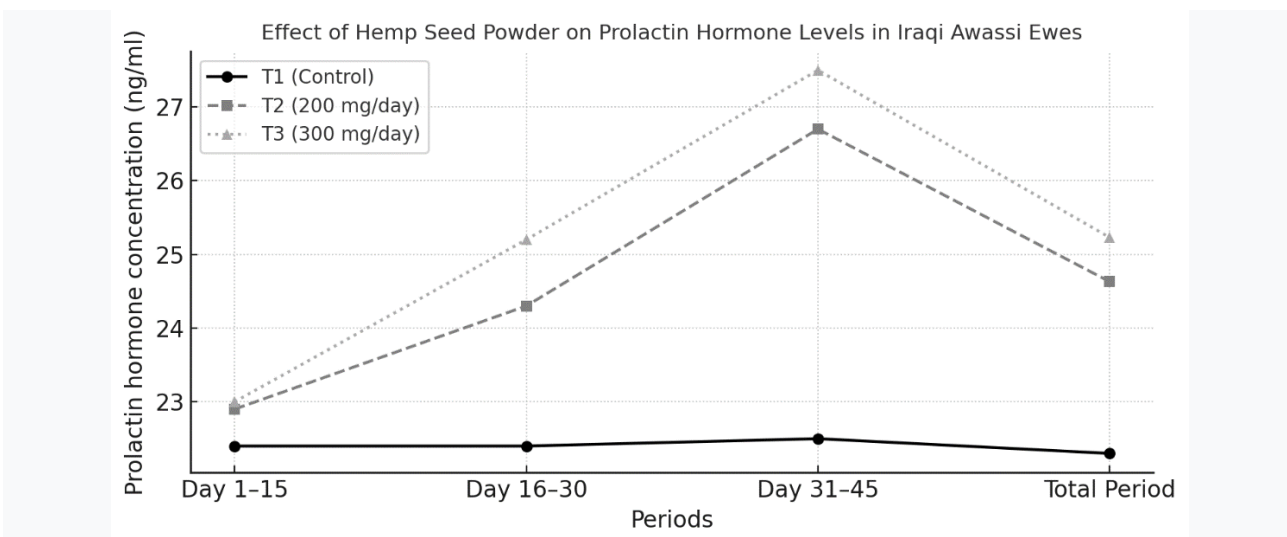
**Figure (3)** For the FSH levels, as seen in **Figure (3)** there is no a significant difference ( $P > 0.05$ ) between the control group (T1) and both hemp seeds supplement groups (T2 and T3). All groups had comparable FSH levels at the start of the experiment, but the two supplemented treatments had lower FSH levels at 30 and 45 days than the standard treatment.



**Figure (3).** Effect of treatment with hemp seed powder on the concentration of FSH hormone (ng/ml) in Iraqi Awassi ewes during different experimental periods.

## Prolactin hormone

As outlined in **Figure (4)**, no significant differences were observed between the control group and those treated with hemp seed powder at doses of 200 and 300 mg in terms of prolactin levels during the experimental period. Both groups increased, but the increase was not significant at the level of  $P > 0.05$ : levels were between 22.4–27.5 ng/ml. For the addition of hemp seed powder during the experimental period especially on the 45th day, the third (T2 = 26.7 ng/ml) and the second (T3 = 27.5 ng/ml) treatments (T1 = 23 ng/ml) shifted the value and the value of the third group was at a level similar to the control group.



**Figure (4).** Effect of treatment with hemp seed powder on the concentration of prolactin hormone (ng/ml) in Iraqi Awassi ewes during different experimental periods.

## Discussion

The findings of the present study showed that the utilization of hemp seed powder in 200 and 300 mg/d doses cannot influence ( $P > 0.05$ ) sex hormones such as estrogen, luteinizing hormone (LH)

and FSH in the treatment groups in comparison to the control group. Instead, the control had these level of hormones remaining at or slightly lower.

At the doses employed, the bioactives hemp seed powder components (CBD and essential fatty acids, omega-3 and omega-6) are inadequate or unsuitable for the stimulation of the increase of secreted estrogen and therefore did not affect ovarian endocrine functions [7]. The latter finding may be partly attributed to hemp seed, which contains several cannabinoids (including CBD and THC), having been shown to propose secretion from the testes as well as the hypothalamus and pituitary gland that can inhibit different sex hormone release [8, 9]. Additionally, these reports also indicated that Cannabernis derivatives affect GnRH secretion modulation at mammalian model, resulting in lowering levels of LH and FSH in plasma [10].

Moreover, it is possible that the two lower doses of 200 mg/day and 300 mg/day are too low to elicit a response at humoral and/or &– we may need to consider the delicate balance between diet components and the interaction of plant bioactives to the hormonal response of Awassi ewes. A green plant extract was reported efficacious dependent on species of animal, physiological state, time of treatment, and processing [11,12]. However, though the succulent contents in fundamental unsaturated fats as linoleic corrosive and alpha-linolenic corrosive in hemp (which may even improve reproductive potential, saw previously, and which was unlikely to have influenced the acid fatty substance in secretes estragel[13,14]

that cannabinoids have a potent suppressive effect in regulation of FSH and LH, this findings indicated that CANNs potentially had no influence, It was also suggested that [15]. Prolactin level: A serum prolactin level slightly higher than the control treatment (T1). The levels of T2 and T3 increased vs T1, but the difference was not significant ( $P > 0.05$ ).

That is because nutrition is an extremely important controller of the endocrine secretion pattern in the ruminants. The role of polypharmacy in increasing the risk of BB has been attributed to drugs over the last 60 decades that include many antipsychotic medications along with the combinations of other medications, co-morbid medical diseases including [diabetes diabestic complications], hypertension, chronic kidney disease, fatty liver, hypothyroidism and the presence of hyperpituitarism aside from the fact that the components in hemp seeds which are polyunsaturated fatty acids, phenolic compounds and flavonoids may have an indirect effect on Hypothalamic-pituitary axisIt induces inhibition of the secretion of the hormone prolactin [16]. The observed slight increase in prolactin may also be related to the neuromodulator action of the compounds in CB seeds, especially non-psychoactive cannabinoids, such as CBD, which were shown to act on neuronal receptors associated with the release regulation of prolactin [17]. Previous research supports the idea that the CBD-induced enhancement of prolactin release may be associated with the modulation of serotonin and dopamine receptors [18], which are two of the principal neurotransmitters that regulate the secretion of prolactin. This is probably due to the presence of certain minerals such as selenium or zinc or a mixture thereof in high concentrations in hemp seeds [19] [20], in addition to the presence of fats at rates of 30 percent, which increases the level of some hormones. [21]. Similar to previous studies related to the effects of plant-derived supplements From hemp seeds and trace elements in ruminants, it can suggest the nature of the intricate nutritional and environmental interactions and influences on reproductive and metabolic health [22] [23] [24], even weekly supplementation with Russian hemp seed powder to Awassi sheep shows considerable variations in some behavioral traits of Awassi ewes. Despite this, our findings show modest elevations, thereby, unveiling the safe application and addition of Russian hemp seed in to feed additives.

### **Conclusions and Recommendations**

No effects of Russian hemp seed powder supplementation at a dose of 200 and 300 mg/ewe for 45 d on serum concentrations of estrogen, luteinizing hormone (LH), follicle-stimulating hormone (FSH), or prolactin compared to the control diet were found in the present study. These data indicate that these doses do not exceed physiological upper limits in non-preovulating Awassi ewes.

The results of the current experiment do not suggest that using Russian hemp seed powder in ewes' diets affects reproduction risk or reproduction hormonal balance, and that it can therefore be safely used as an antioxidant source for supplementation.

According to the result of our experiment, we cannot suggest for or against the consumption of Russian or Indian hemp seed powder among animals because, due to the presence of a little amount of cannabidiol in Russian hemp seeds, we need also to carry out experiments on higher doses, on both male and female animals, on the reproduction hormonal changes and on the safety of use to include them in ruminant feeds given their abundant content of Omega 3, Omega 6 and essential minerals.

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