

Dept. of Surgery & Theriogenology,
 Fac. of Vet. Med., Alex. University,
 Head of Dept. Prof. Dr. M.Y. Abboud.

L-TYROSINE AND OVARIAN ACTIVITY IN EGYPTIAN BUFFALOES

(With 2 Tables and One Figure)

By

G.A. EL-AMRAWI; A.D. ZAKARIA* and M.T. NASR**
 (Received at 26/5/1991)

تأثير التيروسين على نشاط البويضات في الجاموس المصري

جمال العمراوي ، عبدالدايم زكريا ، محمد نصر

أُجريت هذه البحوث على عدد ٥٣ جاموس (كانت تعاني من خلل البويضات) لم تظهر عليها علامات الشبق بعد ١٥٠ - ١٩٠ يوم من الولادة الطبيعية . وأعطيت ٨ جاموس منهم جرعة واحدة من التيروسين (١٠٠ ملجرام لكل كجم من وزن جسم الحيوان) عن طريق الفم وتركزت خمسة جاموس بدون علاج كعينة ضابطة . وأوضحت النتائج أن ٤٢ جاموس من الحيوانات المعالجة ظهرت عليها علامات الشبق بعد ٦ - ٩ أيام من العلاج و٢٨ حالة أصبحت عشار عند فحصها عند اليوم ٤٢ بعد الوثبة الأولى . وجد أن تركيز البروجستيرون في الدم في جميع الحيوانات قبل العلاج كان أقل من ٥ و. ن. ج/ ملي ، أما في الحالات التي استجابت للعلاج وظهر عليها الشبق وجد أن البروجستيرون أصبحت ٧ و. ن. ج/ ملي بعد ثمانية أيام من ظهور الشبق مما يدل على أن التغيير حدث نتيجة لوجود الجسم الأصغر على الشبق . مما سبق يستدل على أن إعطاء جرعة واحدة من التيروسين تكفي لحدوث الشبق في الجاموس الذي يعاني من خلل البويضات .

SUMMARY

The effect of L-tyrosine on anestrus buffalo-cows were examined. A single oral dose of L-tyrosine (100 mg/Kg b.w.) were given for 48 buffaloes suffering from ovarian inactivity, beside another five animals, kept untreated (control). The results revealed that 42(87.5%) buffalo-cows came to heat within 6-9 days after treatment. Twenty-eight of them proved to be pregnant at day 42nd post service.

The progesterone level in anestrus buffalo-cows pretreatment was lower than 0.2 ng/ml. Higher values for progesterone were estimated in the treated buffaloes (1.7 ng/ml) than in the control ones (0.16 ng/ml) ($P<0.01$). Highly significant difference ($P<0.01$) was found in the progesterone level in the pregnant buffaloes than in the control at the same period (3.40 ng/ml and 0.16 ng/ml respectively).

The results indicated that a single oral dose (100 mg/Kg b.w.) of L-tyrosine could induce the estrus in anestrus buffaloes.

*: Dept. of Physiology, Fac. of Vet. Med., Alex. Univ.

** : Dept. of Theriogenology, Fac. of Vet. Med., Benha Univ.

INTRODUCTION

Buffalo plays an important role in agricultural economy in Egypt and many other countries in the world. Reports of FRCU (No. 830109, 1984) indicated that the incidence of infertility in buffaloes is very high and mainly attributed to postpartum ovarian inactivity. The main cause of ovarian inactivity in buffalo-cows under our climate condition in Egypt is mainly due to hormonal dysfunction (EL-GANDOUR, 1981).

Tyrosine is semi-essential amino-acid. It could initiate the cyclicity of the ovaries by increasing catecholamine-synthesis which stimulates the hypothalamus to release GnRH (HAMMER and RUSSE, 1987 and ARTHUR, 1989). Lack or reduction in GnRH release would lead to ovarian inactivity in cows (STEVEN, 1986). GnRH could be used to induce post-partum estrus in Egyptian buffaloes and cows (NASR, SHARAWY, EL-AZAB and LABIB, 1983). Oral application of L-tyrosine to the dairy cows during the follicular growth phase has a clear positive effect on the following heat (MUNSTER, 1987). Cows had post-partum ovarian inactivity showed signs of estrus within 3-4 days, when received a single oral dose (40 gm/cow) of L-tyrosine (WETZEL, 1985).

In anestrus buffaloes (due to ovarian dysfunction) the progesterone level was less than 0.5 ng/ml. This level was constant when estimated after 10 days (EL-BELELY, 1984). While in normal cycling buffalo-cow, progesterone level was at the lowest level during estrus and remained low during metestrus (day 1-3) and increased gradually during early diestrus (4-8 days) (EL-AMRAWI and ZAKARIA, 1990). In the first trimester of pregnancy in buffalo, the progesterone level was 4.61 ng/ml (ALY; TAWFIK; ESSAWY and FARAHAT, 1990).

The aim of the present investigation was to study the effect of oral application of L-tyrosine on ovarian activity and serum progesterone levels in buffaloes during the summer season.

MATERIAL and METHODS

This study was carried out during the period from July to August 1990, on 53 clinically healthy buffalo belonging to two farms in Alexandria Governorate. The age of the examined buffalo-cow ranged from 6-7 years old and their weight ranged from 480-540 Kg.

Routine gynecological examinations were carried out to diagnose animals suffered from ovarian inactivity. All examined buffalo-cows did not show signs of estrus over a period of 150-190 days after normal parturition. A single oral doses of L-tyrosine* (100 mg/Kg b.w.) dissolved in 200 ml water were given to 48 buffalo-cows (treated group) by using drenching gun and the other 5 buffalo-cows were kept without treatment as control. Daily visual, rectal and vaginal examination were done to detect the signs of estrus and the ovarian changes. Buffalo-cows (n=6) that did not come in estrus after 10 days from the treatment were given a second dose of L-tyrosine. Buffalo-cows came in heat were bred naturally and examined for detection of pregnancy at day 42nd post service.

Blood samples were taken from treated and nontreated animals before treatment and at 8th and 42nd day post estrus. Serum progesterone level was estimated according to the technique reported by BROWN (1977) using Ab coated tubes of progesterone RIA kits provided by Diagnostic System Lab., Texas U.S.A.

Statistical analysis was carried out with SPSS.X statistical programme in a VAX750 computer (SPSS, Inc. 1983).

RESULTS

The results of this study were represented in tables 1 & 2 and graphically in figure 1.

Table (1): Effect of L-tyrosine on ovarian activity.

Group of animals	No. of animals	No. and % of animals in heat	Time interval between treatment and heat	No. and % pregnant animals after 1st service
Group I : (treated)				
First dose	48	42 (87.5%)	6 - 9 days	28 (66%)
Second dose (animals not responded to 1st dose)	6	5 (83.3%)	5 - 6 days	3 (60%)
Group II : (control)	5	0	-	-

Table (2): Serum progesterone levels before and after treatment by L-tyrosine in buffaloes.

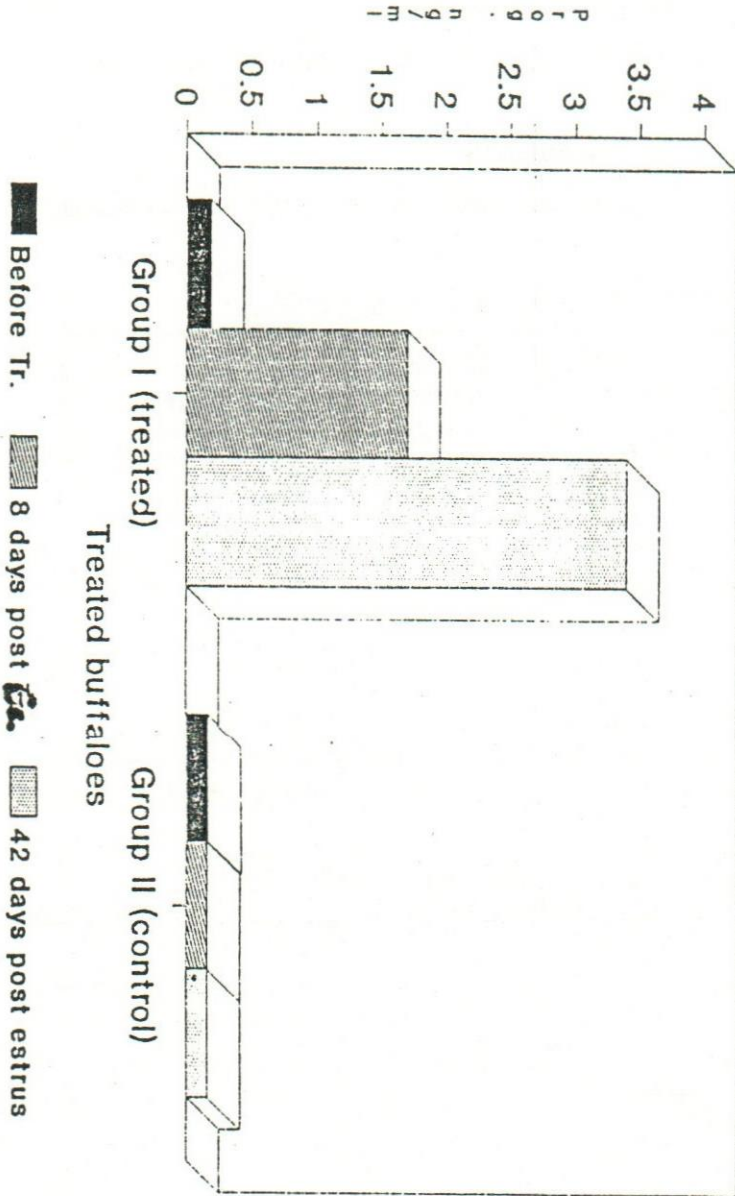
Groups	Progesterone levels ng/ml		
	before treatment	8 days post estrus	42 days post estrus
Group I : (treated)	0.19 \pm 0.06	1.70 \pm 0.26**	3.40 \pm 0.48***
Group II : (control)	0.17 \pm 0.03	0.16 \pm 0.07	0.16 \pm 0.02

** : Significant than control ($P/0.01$).

*** : Significant than control ($P/0.001$).

\pm : Standard error.

Fig. (1)
 Serum progesterone levels before and
 after treatment by L-Tyrosine



DISCUSSION

The results of this study revealed that, out of 48 treated buffaloes, 42(87.5%) came in heat within 6-9 days following a single oral application of L-tyrosine. All forty-two buffaloes ovulated and 28 of them proved to be pregnant at day 42nd post service (table 1). WETZL (1985) found that administration of 40 gm L-tyrosine per os to 19 acyclic cows, 15 out of them showed normal physiological cyclic activity within 4-5 days after treatment. Similarly, MUNSTER (1987) reported that 90% of anestrus cows showed signs of heat and ovulation occurred after application of (100 mg/Kg b.w.) L-tyrosine and 70% of the treated cows became pregnant after first insemination. In the present study there was no response to the first dose of L-tyrosine on 6 buffaloes and five (83.3%) of them exhibited cyclicity after the second dose of L-tyrosine within 5-6 days; three (60%) out of them became pregnant. Similar findings were recorded by WETZEL (1986). YOUNIS (1991) cited that the priming dose of GnRH stimulates the gonadotropin receptors on the ovaries which increase the sensitivity of the ovaries to gonadotrophic hormones. The success of treatment with a releasing hormones in acyclic cows depends on endocrine response and as well as the presence of follicles more than 5 mm in diameter in the ovaries at the time of injection (KHAN, 1988). This may explain that a second dose was needed to exhibit ovarian activity among the 5 buffalo-cows.

A palpable ovarian follicle (1 cm in diameter) was detected in acyclic buffaloes at day five after application of L-tyrosine. This follicle was palpated for the following three successive days. NASR *et al.* (1983) found similar result, after treatment of ovarian inactivity in buffaloes by GnRH. On the other hand, there were no cyclical changes detected in non treated buffaloes.

The results of progesterone estimation revealed that, prior to the treatment, all animals had low circulating progesterone levels of 0.17 ± 0.03 ng/ml and 0.19 ± 0.06 ng/ml in control and treated groups respectively. EL-BELEY (1984) reported that the proesterone level in anestrus buffaloes was less than 0.5 ng/ml. Eight days post estrus, such values were 0.16 ± 0.07 ng/ml and 1.70 ± 0.26 ng/ml in control and treated groups respectively (Fig. 1 & Table 2). The latter value showed statistical difference ($P/0.01$). The increase of progesterone value in treated animals may indicated the development of functional CL. This result was supported by the findings of MUNSTER (1987) and coincides with the result of EL-AMRAWI and ZAKARIA (1990) who found that the progesterone level in normal cycling buffaloes at early diestrus (8 days post estrus) was more than 1 ng/ml. The progesterone level was 3.40 ± 0.46 ng/ml in pregnant buffaloes, while in control animals was 0.16 ± 0.02 ng/ml (table 2). This result is also confirmed by ALY *et al.* (1990).

It could be concluded that oral application of L-tyrosine to buffalo-cows suffering from ovarian inactivity could induce estrus within 6-9 days post treatment accompanied by high percentage of conception rate.

REFERENCES

- Aly, H.A.; Tawfik, M.S.; Essawy, S.A. and Farahat, A.A. (1990): Plasma progesterone and oestradiol 17B during pregnancy in Egyptian buffaloes. ESARF and Fac. Vet. Med. Suez canal Univ. Second Annual Cong. Ismailia Jan. 24-26. P. 1-10.
- Arthur, R.J. (1989): Veterinary Reproduction and Obstetrics. Bailliere Tindall, London 6th Edition.
- Brown, J.B. (1977): Timing of ovulation. Medical J. of Australia 33: 870-873.
- El-Amrawi, G. and Zakaria, A. (1990): Estrus synchronization in buffaloes by using diluted iodine solution. 4th Sci. Cong., Fac. Vet. Med., Assiut Univ. 18-20: 426-429.
- El-Belely, M.S. (1984): Hormonal state in buffalo-cows affected with ovarian inactivity and possible trials for estrus induction. Ph.D. Vet. Thesis, Cairo Univ.
- El-Gandour, S.M. (1981): Induction of estrus in buffaloes. Thesis. Fac. Vet. Med., Cairo University.
- Hammerl, J. and Russe, M. (1987): Reproduktionssteigerung bei Sauen durch perorale Verabreichung von-L-tyrosin Tierarzt. Umschau, 42: 551-554.
- Khan, J. (1988): Using of ultrasonic in reproduction. Personal communication.
- Munster, P. (1987): Zur Anwendoung der Aminosäure L-tyrosin in der Steriliats-Behandlung des Milehrindes. Diss. Med. Vet. Munchen.
- Nasr, M.T.; Sharawy, S. El-Azab; A.M. and Labib, F.M. (1983): Induction of estrus and improvement of fertility in anestrus cows and buffaloes with Receptal. The blue book. 32: 91-93.
- Report FRCU (1984): Clinical investigation of the buffalo under the Village condition. Report FRCU No. 830109. Vol., 4.
- SPSS, Inc. (1983): Technion Inst. Cooperation. Hill Book 2nd Ed. New York.
- Steven, M. (1986): Bovine Anestrus In: Current Therapy in Theriogenology. Edited by D. Morrow. B.W. Saunders Comp. Philadelphia and Tornta. 2nd Ed., 247-249.
- Younis, M. (1991): Induction of gonadotrophin receptors in the ovary, ESARF. Third annual Cong. Cairo Jan., 12-14.
- Wetzel, G. (1985): Zur Bedeutung der aminosäure tyrosin in reproductionsgeschen der rind. Diss. Med. Vet. Munchen.