



Scholars Research Library

Annals of Biological Research, 2014, 5 (10):35-39  
(<http://scholarsresearchlibrary.com/archive.html>)



## Estrus synchronizing potential of luchis estrus milk in wad sheep and wad goats

Nwankudu Oluchi Nnenna

Department of Veterinary Physiology, Pharmacology, Biochemistry and Animal Health and Production, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria

### ABSTRACT

This study investigated the estrus synchronizing potentials of Luchis Estrus Milk (LEM), made from different varieties of *Arachis hypogaea* namely: Tennessee white, Tennessee red, Valencia and the Nigerian varieties in WAD goats and sheep. Forty animals were divided into 5 groups of 8 animals each with each group consisting of 4 goats and sheep were treated with LEM at a dose of 5ml/kg body weight. Results obtained revealed a significant level ( $p < 0.05$ ) of estrus synchrony in all groups treated with LEM made from Tennessee white, Tennessee red, Valencia and the Nigerian varieties with 87.50, 100, 100 and 87.50% estrus inductions and 87.50, 75, 87.50 and 100% conceptions respectively. The result of the study suggest that LEM may contain active pharmacological substances capable of inducing estrus in goats and sheep and raises hope for the development of a new, readily accessible and cheap estrus synchronizing agent for all seasons production of goats and sheep as opposed to prostaglandin and other estrus agents which may not be easily available in local communities of Africa and takes longer duration to achieve estrus.

**Key words:** *Arachis hypogaea*, Estrus, Estrus synchronization, Luchis Estrus Milk, prostaglandin.

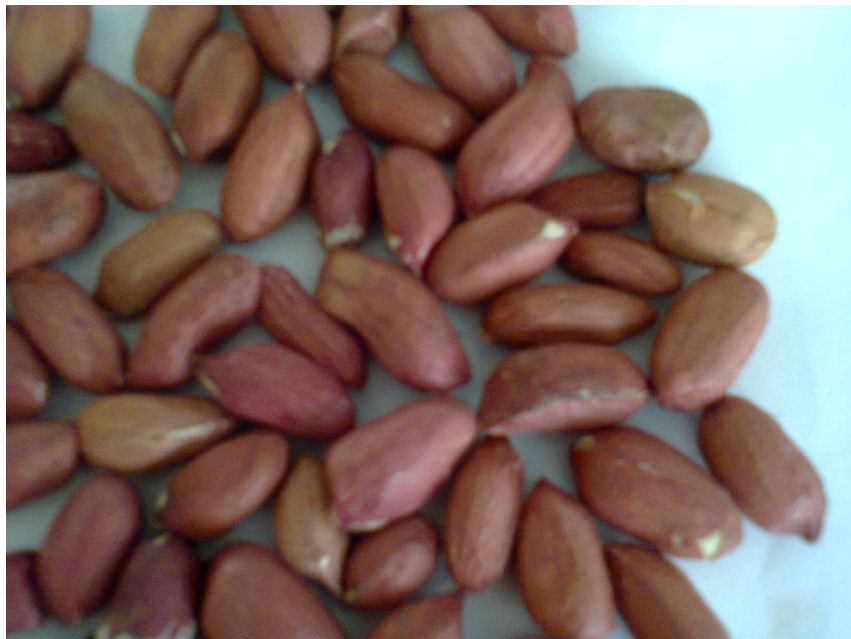
### INTRODUCTION

The geometric increase in human population means that more animal protein is needed to effectively service this ever increasing population. This development has resulted to the demand for increased animal production, so as to meet this animal protein requirement. Goat production indeed is experiencing a period of worldwide growth and has intensified in recent decades particularly in developing countries which hold the largest herds [1]. The seasonal breeding often experienced in goats and sheep coupled with the need to obtain good results of kidding distribution through- out the year informs the need for the induction of estrus in anoestrus [1] season. The induction of estrous in animals is one of the approaches that are currently being employed to boost animal production and is indeed one of the techniques been used in this era of Assisted Reproductive Technologies (ART) [2]. Estrous in animals is the periodic state of sexual excitement in the female that immediately precedes ovulation and during which the female is most receptive to mating and most likely to achieve fertilization [3]. Estrous in does and sheep is usually marked by frequent urination with squatting, elevation of the tail, swelling and winking of the vulva, rhythmic extrusion of the clitoris, redness and swelling of the vulva with a clear mucous discharge [2]. Ewes are not demonstrative other than positioning themselves close to the rams or teasers. Goats bleat a lot during this period and tend to rub themselves against fixed objects with their tails held high [4].

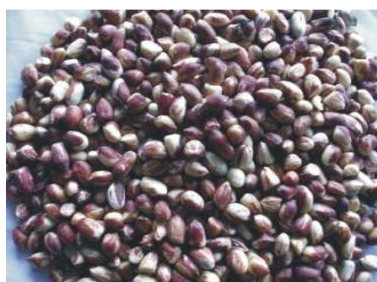
Estrous synchronization in livestock is concerned with the manipulation of either the luteal or the follicular phase of the estrus cycle to induce ovulation. In does and ewes, the opportunity for control is greater during the luteal phase, which is of longer duration and more responsive to manipulations [5]. A complete and scientifically detailed understanding of an animal's reproductive physiology is therefore vital for its successful manipulation. In goats and sheep, estrus synchronization is achieved through the administration of biologically active agents which are either based on or are hormones that occur in the female goat or doe at various times during her cycle [2]. Estrous synchronization is indeed a valuable management tool for increasing optimum production in does and ewes [6]. Several agents have been used to induce estrous in goats and sheep, some of which include a combination of GnRH, Progestagen and Prostaglandin F<sub>2</sub> alpha [7], prostaglandins, impregnation with intravaginal sponges (medroxyprogesterone or fluorgestone), intravaginal plastic device impregnated with progesterone, bovine norgestomet ear implant, progestagen, injection of progesterone in oil etc [6].



Tennessee white variety



Tennessee red variety



Nigerian variety



Valencia variety

Luchis Estrus Milk (LEM) is an aqueous extract of *Arachis hypogea* seeds. *Arachis hypogea* belong to *Fabaceae* (bean family). It is an annual herbaceous plants that grows almost to ground level with very slender stems, leaves that are opposite and pinnate with four leaflets, flowers that are pear shaped, and fruits (legumes) that sprout and mature underground [8]. *Arachis hypogea* seeds play important role in many parts of Africa due to their high protein and healthy fats content, making them a readily available source of protein with minimal demand on the part of the consumer. Indeed it is reported that each 28g of *Arachis hypogea* seeds contain calories (166 cal.), protein (7.8g), carbohydrates (4.3g), calcium (17.1mg), potassium (203mg), magnesium (49.3mg), phosphorus (111mg), sodium (89.6mg), folate (33.6µg), dietary fiber (2.6g), total fat (14.7mg) and niacin [8]

Different varieties of *Arachis hypogea* have been identified and include Tennessee white, Tennessee red, Valencia and the Nigerian variety.

This study was designed to evaluate the estrus synchronizing potential of Luchis Estrus Milk (LEM), made from different varieties of *Arachis hypogea* in west African dwarf goats and ewes with a view to find a potent, easy and cheaper alternative to the more expensive current techniques.

## MATERIALS AND METHODS

### 2.1 Preparation of Luchis Estrus Milk (LEM)

Four different varieties of *Arachis hypogea* seeds were obtained from local dealers in Umuahia central market, Umuahia north Local Government Area of Abia State. The nuts were carefully sorted to remove diseased and damaged ones. About 500g of each variety was washed, dried in an enclosure and ground into fine powder. One Liter of water was then added to the powdered nuts. The mixture was stirred vigorously and allowed to stand for 15 minutes and then stirred again before being filtered with a sieve. The filtrate named Luchis Estrus Milk (LEM) was collected and kept refrigerated until needed.

## 2.2 Animals

A total of 40 animals were used for the experiment. The animals were picked at random with some being sexually matured but not bred for the first time, some were old and scarcely cycling, some were runts and some were actively breeding. They were divided into 5 groups of 8 animals each with each group consisting of 4 West African dwarf ewes and 4 West African dwarf goats kept in different pens. The animals were obtained from the livestock farm of Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria and were fed with *Panicum maximum* (Elephant grass) and feed concentrate consisting of Carbohydrate (maize offal) 60%, protein (soya) 30%, fat (Palm kernel cake) 6%, calcium (Bone meal) 3% and salt 1%. The animals were fasted for twelve hours before commencement of experiment.

## 2.3 Estrus induction effects of Luchis Milk in goats and sheep

Animals in group 1 were given normal feed and water and served as the control. Groups 2, 3, 4 and 5 received 5.0ml/kg body weight of LEM. The treatment was such that each group received LEM made from *Arachis hypogea* of a particular variety as shown below:

Group 2: Tennessee white variety

Group 3: Tennessee red variety

Group 4: Nigerian variety

Group 5: Valencia variety

Treatments were done per os using an automatic syringe. The animals were then kept for one hour post treatment before being allowed their daily doses of concentrate and forage.

## 2.4 Estrus detection and natural mating

Observation of the treated animals was made over a period of 24 hours for the development of the signs of estrus which included congestion of vulva, swollen vulva, mucus discharge from vagina, intense bleating, restlessness, redness of vulva. Each of the experimental ewes and does was taken into a pen with one sexually experienced male to be mated. Standing freely to be mounted was used to determine estrus response and estrus activity occurring within 120 hours post administration of LEM treatment were classified as synchronized. Estrus response was calculated as the number of animals that showed standing estrus and subsequently mated over the total number in each treatment group, expressed as a percentage.

## 2.5 Statistical Analysis

All data were expressed as actual values and analyzed using student's t-test. P values less than 0.05 at 95% level of significance for tests versus control were adjudged significant.

# RESULTS

## 3.1 Estrus induction effect of Luchis Estrus Milk in wad sheep and goats

Luchis estrus Milk made from the four varieties of *Arachis hypogea* successfully induced estrus in the treated wad sheep and wad goats. The observed effects of LEM was very significant ( $p < 0.05$ ) when compared to the control with 100 percent estrus synchronization achieved for LEM made from Tennessee red and Valencia varieties (Table 1).

Table 1: Estrus induction effects of LEM made from different varieties of *Arachis hypogea*

Group	Treatment, 5ml/kg of LEM	Number of animals in estrus	% of animals in estrus
1	Control	1.00	12.50
2	LEM from Tennessee white variety	7.00	87.50
3	LEM from Tennessee red variety	8.00	100.00
4	LEM from Valencia variety	8.00	100.00
5	LEM from Nigerian variety	7.00	87.50

\* $P < 0.05$  for test versus control

## 3.2 Number of conceptions in the induced sheep and goats

Conception was achieved significantly ( $p < 0.05$ ) in animals in which estrus was induced when compared to the control group with the group treated with LEM from the Nigerian variety of *Arachis hypogea* achieving 100% conception (Table 2).

Table 2: Number of conceptions in the induced sheep and goats

Group	Treatment, 5ml/kg of LEM	Number of animals with pregnancy	% of animals with pregnancy
1	Control	0.00	0.00
2	LEM from Tennessee white variety	6.00	87.50
3	LEM from Tennessee red variety	6.00	75.00
4	LEM from Valencia variety	7.00	87.50
5	LEM from Nigerian variety	7.00	100.00

\* $P < 0.05$  for test versus control

## DISCUSSION

Results obtained from this study has shown an increase in the number of does and ewes expressing estrus in all groups treated with LEM made from the four varieties of *Arachis hypogea* with almost all the animals in which estrus was synchronized achieving pregnancy after mating. This suggests that LEM contains active pharmacological substances capable of manipulating the events associated with goats and sheep reproductive physiology. Although the mechanism through which LEM achieved estrus synchronization may not be fully known, it is reasonable to suggest that it enhanced the body hormonal activity that initiates estrus, particularly prostaglandin, Follicle stimulating and luteinizing hormones [6] had reported that prostaglandin control the estrus cycle by shortening the luteal phase of the estrus cycle due to its effects on the corpus luteum. The events of the estrus cycle are controlled by the relationships of the hypothalamic releasing hormones, gonadotropins and ovarian hormones. Gonadotropin releasing hormone (GnRH) comes from the hypothalamus of the brain and causes the pituitary gland to release follicle stimulating hormone (FSH) and luteinizing hormone (LH). FSH stimulates the production of estrogen and promotes follicular growth while LH stimulates ovulation and also promotes the formation of the corpus luteum which becomes responsible for the secretion of progesterone following ovulation. Failure to establish pregnancy results in the secretion of the hormone prostaglandin F2 alpha from the uterus that causes regression of the corpus luteum and allows a new estrus cycle to begin [1, 9, 10]. LEM may have induced the activity of a luteolytic prostaglandin to eliminate potential corpora lutea leading to an end in a phase of an estrus cycle and the commencement of another such that both estrus and ovulation now occur at a predictable period of time. This indeed is indeed the mechanism through which prostaglandin and its analogues achieve estrus synchronization [1]. This preliminary investigation has revealed a high level synchrony of estrus in the does and ewes treated with Luchis Estrus Milk (LEM) with about over 75% conception noted in all treated groups and raises hope for the development of a new, readily accessible and cheap estrus synchronizing agent for all seasons production of goats and sheep.

## REFERENCES

- [1] Cunha, A.C., Pietroski, A., Brandao, F.Z., Souza, M.G., Fonseca, F. R. *Bras. Zoolec*, **2013**, 42(3)
- [2] Rahman, A.N.M.A., Abdullah, R.B. and WAN-khadjah, W.E. *Journal of Biological Sciences*, 8, 1129-1137
- [3] Houghton, M. The American Heritage Dictionary. Published by Houghton Mifflin Company, **2007**..
- [4] Miller, K. Miller Keane Encyclopedia and Dictionary of Medicine, Nursing and Allied Health, 7<sup>th</sup> edition. Saunders Publishers, Elsevier imprint, **2003**.
- [5] Wildeus, S. *J. Anim. Sci.*, **2009**, 75 ( 1): 16
- [6] Omontese, B.O., Rekwot, P.I., Rwuha, J.S., Ate, I.U. and Makun, H.J. *Livestock Research for Rural development*, **2013**, 25(2).
- [7] Titi, H.H., kridii, R.T., Alnimer, M.A. *Reprod. Domest. Anim.*, **2010**, 45(4), 594-599.
- [8] en. wikipedia.org/wiki/peanuts), accessed 6<sup>th</sup> October, **2014**.
- [9] Bray, J.J., Cragg, P.A., Macknight, A.D.C., Hills, R.G. Lecture notes Human Physiology, 4<sup>th</sup> edition, Blackwell Science Publishers, U.S.A, **1999**, pp275-276
- [10] Oyeyini, M.O., Akusu, M.O., Adeniji, O.A. *Isreal Journal of Veterinary medicine*, **2012**, 67(1), 48