

Effect of exogenous hormones on ovulation synchronization and conception rate of achai cattle

Abstract

The study was conducted to evaluate OvSynch protocol for synchronization of ovulation in Achai cows at Livestock Research and Development Station Surezai, Peshawar. A total 40 Achai cattle were subjected to OvSynch protocol. All the selected animals exhibited normal subsequent genital health as assessed by clinical examination of reproductive organs. Treated animals were inseminated at fixed time of 16 hrs after 2nd injection of Gonadotropic Releasing Hormone (GnRH) with or without estrus detection. The animals were classified as Nulliparous (n= 2), Primiparous (n= 9) and Pluriparous (n=29) based on previous history of pregnancies and parturitions. Results suggested that overall conception rate achieved was 45 % with 18 animals conceiving with this protocol. One of 2 animals classified as Nulliparous was declared pregnant giving a conception rate of 50 %. Three out of nine animals, classified as Primiparous, conceived giving a conception rate of 33.33%, while 48.27% conception rate was achieved in animals classified as Pluriparous with 14 animals conceiving among 29 animals.

Keywords: achai cattle, ovsynch protocol, synchronization

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Introduction

Achai are small-sized cattle breed found in Khyber Paktunkhwa province and are famous for its high resistant to extreme environmental conditions. The home tract of Achai cattle are district Dir, Swat, Bajaur Agency and extend on the west to adjoining parts of Afghanistan. These cows are suitable for mountainous terrain and can resist cold as well as warm climate. It has a small body and thus needs little feed. It is a dairy and light draught breed that can thrive under scarce fodder availability and can produce adequately under a hilly and sub-hilly subsistence production setup.¹ Achai is yet undocumented but well-adapted *cattle* breed of the Hindu Kush Mountains of northern Pakistan.² Achai cows also have a better reproductive performance than other cattle breeds in Pakistan.³ The goal to develop a hormonal synchronization program that could overcome the problems and limitations associated with visual detection of estrus in dairy cattle was realized in 1995 with the publication of a hormonal synchronization protocol that combined GnRH and PGF2 α to control ovarian physiology and is now commonly referred to as the OvSynch protocol.⁴ The OvSynch protocol synchronizes follicular development, luteal regression and ovulation so artificial insemination can be conducted at a fixed-time without the need of estrus detection, commonly referred to timed artificial insemination (TAI). Subsequent studies that repeated this work soon verified the results of the original publication,^{5,6} and dairy producers and veterinarians began to implement the OvSynch protocol as a tool for reproductive management on commercial cattle farms.

Optimum fertility in Achai cows can be achieved by a holistic approach including improved management, nutrition and application of advanced reproductive technology such as OvSynch protocol. OvSynch is one of the most classical and widely known systems of breeding for reproductive management in postpartum cows.⁶ The protocol consists of two injections of GnRH analogue separated

by a single administration of PGF2 α . The ovulation is precisely synchronized in dairy cows and usually occurs approximately 26-32 hrs after second GnRH injection. Thus, a timed insemination at 14-20 hours after second injection of GnRH results in a high probability of successful conception.⁷ In most of ovulation synchronization schemes GnRH is used to control follicular development and induce ovulation of a dominant follicle with PGF2 α as a mean for luteal regression.

Materials and methods

A total of 40 Achai cows maintained at Livestock Research & Development Station Surezai, Peshawar including 10 Achai cows of Livestock Research & Development Station Swabi was utilized for the present study. All experimental animals were fed under stall feeding with green fodder, wheat straw and concentrate feed (shandar Vanda) throughout the year as per routine practices at the station. All the selected animals exhibited normal subsequent genital health as assessed by clinical examination of reproductive organs and found apparently free from genital infection. The animals were classified as Nulliparous, Primiparous and Pluriparous based on previous history of pregnancies and parturitions. The experimental animals were treated with initial intramuscular injection of 50 μ g Lecirelin acetate, a synthetic analogue of GnRH (Dalmaralin® 2 ml) on the first day of the trial (Day 0 of OvSynch protocol), 7 days later 25mg Dinoprost, a naturally-occurring prostaglandin F2 α (Inj. Lutalyse™ 5ml) was injected intramuscularly. One or two days later (day 9 or 10 of OvSynch protocol) animals received second injection of 50 μ g Lecirelin acetate (GnRH). All the experimental animals were inseminated at fixed time (FTAI) 16 hrs after second GnRH injection with or without estrus sign detection. Pregnancy diagnosis was carried out through examination per rectum between day 60 and 75 after artificial insemination. Differences of significance in variables were determined using sample T-TEST using SPSS version 19.0. The conception rate was determined as the proportion of animals that got

conceived from those that were inseminated using the synchronization protocol.

Results and discussion

Overall conception rate achieved was 45 % with 18 animals conceived with this protocol. One of 02 animals, classified as Nulliparous (N), was declared pregnant giving a conception rate of 50 %. Three out of 9 animals, classified as Primiparous (PR), conceived giving a conception rate of 33.33%, while 14 animals conceived among 29 classified as Pluriparous (PL), with 48.27% conception rate. The response of cyclic animals to OvSynch treatment and conception was positive as compared to acyclic animals. This finding is in line with Klindworth et al.,⁸ who reported similar positive effect of OvSynch treatment in cyclic cows based on plasma progesterone concentration. Present findings are in accordance with previous findings of Pursley et al.,⁹ Cordoba & Fricke,¹⁰ who reported conception rate ranging from 29 to 60% after OvSynch treatment. However, many workers^{8,11}, reported lower conception rate in dairy cows after OvSynch treatment.

Using the conventional artificial insemination in cyclic Achai cows upon estrous detection in our previous trials¹²⁻¹⁶ the first service conception rate recorded was 63.12 percent and numbers of services per conception were 1.45±0.11, which was in line with Seleem et al.,¹⁷ who reported the first service conception rate 71.01 percent and 1.48±0.05 numbers of services per conception. Any synchrony protocol should be used considering that reflects the complexities of interactions among management skills, milk production, environment and nutrition. Estrous synchronization is an important tool for increasing the rate of implementation of artificial insemination in cattle¹⁸⁻²³ the methods for estrous synchronization should be relatively simple to employ and should be robust so that they can be applied under a variety of management conditions.

Conclusion

From the present study OvSynch protocol has positive effect on the conception rate of Achai cattle under better management condition. Achai is a small cattle breed in Pakistan. It is a multipurpose animal genetic resource, being reared both as dairy and draught animal. The constant threat to Achai breed is found in its indiscriminate breeding due to lack of Achai breeding bulls, less attractive milk production and lack of information about their other qualities such as excellent fertility, short service period, short calving interval, persistent milk production, less feed requirement and disease resistant, thus causing dilution of Achai and its adaptive characteristics. Documenting the productive, reproductive characteristics and selecting Achai cattle with better productive and reproductive performances can help in further improving the breed's traits and increase its outputs.¹²

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Conflict of interest

Author declares there is no conflict of interest.

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