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# Efficacy of feeding of Omega-3 fatty acids and vitamin A, D3, E supplement and Ovsynch protocol in Repeat breeder crossbred cows

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**Abstract**
Repeat breeding is an important factor affecting economic success in dairy management. A repeat-breeder is defined as a clinically normal cow which, other factors being optimal, shows a reduced probability of conception. Both fertilization failure and embryonic loss are major causes of repeat-breeding. Hormonal therapies with good nutritional status have good therapeutic value to enhance the conception rate in repeat breeder cows. The present study was conducted in commercial dairy farm near Bikaner to investigate the effect of feeding Omega-3 fatty acids and vitamin A, D3, E supplement on reproductive efficacy using Ovsynch protocol in repeat breeder cows. A total of 18 cows with the history of 3 or more inseminations, were selected for this study and divided in two groups. Control group (n=9) was treated with standard Ovsynch protocol and treatment group (n=9) with Ovsynch protocol supplemented with Omega-3 fatty acids and vitamin A, D3, E supplement (ReproMIN$^{TM}$) for 20 days. All the cows were subjected to FTAI at 12-16 hours post second GnRH administration. Cows not returning to estrus were confirmed for pregnancy by rectal palpation on day 45$^{th}$ post-AI. The conception rate was 33.33% (3/9) and 55.55% (5/9) in control and treatment group respectively. From the study, it is concluded that feeding of Omega-3 fatty acids and vitamin A, D3, E supplement during Ovsynch protocol is resulted in higher rate of conception.

**Keywords:** Repeat breeding, cows, omega-3 fatty acids, ovsynch protocol

## Introduction
The repeat breeding syndrome continues to be a major problem in cattle and buffalo breeding, leading to large economic losses to the dairy producers (Bartlett *et al*., 1986; Lafi *et al*., 1992) [3, 9]. Recently, repeat breeding cows have been defined as a heterogeneous group of subfertile cows with no anatomical abnormalities or infections that exhibit a variety of reproductive disturbances in a consistent pattern over three or more consecutive heat cycles of normal duration (17–25 days) (Perez-Marin and Espana, 2007) [14]. There are different etiological factors, responsible for the repeat breeding syndrome and nutritional deficiency of vitamin A (Ascarelli *et al*., 1985; Lotthammer, 1979; Synder and Stuarr, 1981; Wang *et al*., 1988) [2, 10, 19, 20], vitamin E (Julien *et al*., 1976; Harison *et al*., 1984) [8, 6] and fatty acids are considered important contributing factors for repeat breeding. The objective of this study was to evaluate the effect of feeding Omega-3 fatty acid and vitamin A, D3, E supplement on reproductive efficacy using Ovsynch protocol in repeat breeder dairy cows.

## Materials and Methods
**Animals and animal management:** This study was carried out on crossbred cows (n=18), which failed to conceive after three or more inseminations at a regular interval during a period from May to September 2018. The animals were examined by transrectal palpation and visual and vaginoscopic inspection to exclude any abnormality. The animals were kept at commercial dairy farms located near the Bikaner district of Rajasthan.
The experimental cows were divided into two groups (n=9 cows/group), *viz*., treatment and control. Each cow was given access to fodder, concentrate and water ad-libitum. Animals of treatment group were supplemented with Omega-3 fatty acid and vitamin A, D3, E supplement (ReproMIN$^{TM}$) at dose rate of 25 gram per day by oral means along with mineral mixture mixed with concentrate from 0 to 20 days (where 0 is day of first dose of GnRH administration) to individual animal. Cows in the control group were given equal amount of mineral mixture produced by same manufacturer.

**Synchronization protocol and A.I.**

Each animal was administered Ovsynch protocol (Purohit *et al*., 2019) [16] consisting of 10 µg GnRH analogue i.m. (Buserelin acetate, Receptal®) at Days 0 and 9 and 500 µg synthetic PGF2 i.m. (Cloprostenol sodium, VETMATE®) at Day 7. The Ovsynch protocol was administered regardless of the stage of estrous cycle in cyclic animals. Cows were inseminated 12-14 h after administration of the second dose of GnRH with frozen-thawed semen. Cows not returning to estrus were confirmed for pregnancy by rectal palpation on day 45th post-AI.

**Results and Discussion**

In the treatment group, five cows were pregnant out of nine cows. The conception rate for the treatment group was 55.55%. In the control group, three cows were pregnant out of nine cows. The conception rate for the control group was 33.33%. The conception rate in the treatment group was higher by 22.22% compared to control group.

Following AI, pregnancy rate were higher and pregnancy losses were lower when dairy cows were fed diet high in omega-3 fatty acids (Ambrose *et al*., 2006; Santos *et al*., 2008; Wathes *et al*., 2007) [1, 17, 21], this is because these cows have greater mean diameter of the ovulatory follicle (Ambrose *et al*., 2006; Mendoza *et al*., 2011) [1, 12] and corpus luteum (Petit *et al*., 2002) [15]. McCracken *et al*. (1972) [11] described that inhibition of PGF by high omega-3 fatty acid prevent regression of CL resulting in sustained release of progesterone.

Vitamin A is crucial for reproductive performance because severe vitamin A deficiency prior to mating lead to reproductive failure prior implantation (Evans, 1928) [5] and Vitamin D also contributes to successful embryo implantation (Curtis Hewitt *et al*., 2002) [4]. Maternal vitamin A status appear to play a role in placental development and/or maintenance (Howell *et al*., 1964) [7]. Vitamin E act as cellular antioxident that protect cells from the harmful effect of hydrogen peroxide and other peroxides formed from fatty acids (Noguchi *et al*., 1973) [13].

The improved conception rate in the treatment group may be due to beneficial effect of feeding omega-3 fatty acids and vitamin A, D3, E supplement in maintenance of corpus luteum and successful embryo implantation. On the basis of this limited study, it may be concluded that feeding of feeding omega-3 fatty acids and vitamin A, D3, E supplement during Ovsynch protocol in repeat breeder cows resulted in higher conception rate.

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