Efficacy of Ozone and Other Alternative Intrauterine Therapies in Infectious Repeat Breeder Cows

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ABSTRACT

The study was undertaken to evaluate the therapeutic efficacy of Ozone, E. Coli LPS, Autologous plasma, Neem oil, and Lugol’s iodine in 100 infectious repeat breeder cows. The animals were divided in 5 different groups viz. Group-I, Group-II, Group-III, Group-IV and Group-V treated with Ozone @ 55µg/ml in 60ml distilled water, E. Coli LPS @100mcg in 30 ml sterile PBS, Autologous plasma @ 30 ml, Neem oil @ 10µg/ml in 30 ml distilled water, Lugol’s iodine 1:25 in 30ml normal saline, intrauterine route in 20 cases, respectively, Group-V of 20 animals was kept as control. AI was done in recovered cases. On follow up, recovery rate in treatment group were found as 75.00, 80.00, 65.00, 75.00 and 50.00 per cent in groups I to V , respectively. The conception rate was found as 68.42, 73.68, 55.00, 63.15 and 53.33 per cent in cows in Group-I to V , respectively after one month on the basis of animal not shown the oestrus signs. Pregnancy rate calculated after two months by per rectal examination and was observed 65.00, 70.00, 50.00, 60.00 and 40.00 per cent cows from groups I to V , respectively. On conclusion, infectious repeat breeder cows treated with E. Coli LPS showed highest recovery rate, conception rate and pregnancy rate than the other treatment groups in this research study.

Key words: Intrauterine, repeat breeder, ozone.


INTRODUCTION

Several herbs have antimicrobial potential, such as Neem, Garlic, Ginger, Tulsi, Turmeric and Aloe Vera. Neem (Azadiracta indica) has been widely used in India to treat multiple illnesses as a traditional ayurvedic medicine. In infectious repeat breeder animal neem oil is used for intrauterine infusion (Brahmanand, 2017). In the diagnosis of infectious repeat breeder cows, various therapeutic methods for managing infection and even inflammatory illness may be attempted. In contagious repeat breeder cows, the use of separate antibiotics and their combinations has been
widely used for many years (Mali et al 2020). The development of antibiotic resistance is a major challenge reduced phagocytic activity of polymorph nuclear (PMN) cells. Alternatively, antiseptics, ecblons, chemicals, herbls, hormones were also tested. So, there is an urgent need to find out an alternative therapy for treatment of uterine infections by using natural substances as a means of activation of natural defence mechanism in the uterus. Use of certain plant products as a therapeutic agent has become a subject of recent scientific investigations.

Invasion of infection in the vaginal tract is a sign of a weak uterine defence system, and infection treatment focuses on strengthening the uterine defense system. In a biological sense, using antibiotics to fight infection is more expensive, but alternative strategies can greatly improve the body's immunological response. It is possible to improve natural body immunity with the help of immune modulators (Pupalwad 2021.) Recently, the alternative therapy proposed for the treatment of infection includes ozone preparations in the form of boluses, injections, foams, pearls, cream, palettes etc. (Djuricic et al., 2015). According to recent publications, intrauterine ozone therapy may also be carried out in animals (Djuricic et al., 2014; Polat et al., 2015). The present study is intended to study the efficacy in infectious repeat breeder cows of ozone, E. Coli LPS, autologous plasma, neem oil, and Lugol's iodine to suggest alternative, effective therapy.

MATERIALS AND METHODS

A total 100 repeat breeder cows were chosen for this research by per rectal examination with a history of normal oestrus cycles, apparently no palpable abnormalities of the reproductive tract, however they failed to conceive after three inseminations or natural services.

An eighty post-partum repeat breeder cows with more than five regular cycles were considered as chronic repeat breeders for current research. However, fourteen heifers repeating for less than five were treated as fresh experimental cases. Grouping and different treatment protocols were used as per Table-1.

**RESULTS & DISCUSSION**

**Group I**

In Group-I (OZ), eleven cows were found to be conceived in recovered cases that were inseminated during normal oestrus on a non-return basis; it was noted that 11 (73.33%) of cows were successfully conceived following the initial insemination. When comparing the treatment group to the control group, the overall conception rate was determined to be 13 (68.42%) in the treatment group and 08 (53.33%) in the control group.

After two months of post insemination, the confirmed pregnancy in conceived animals was identified, and 13 animals were found to be pregnant. In the current trials, the pregnancy rate was evidently 13 (65.00%), compared to 9 animals were found to be pregnant and pregnancy rate was (45.00%) results in the control group. This finding is in agreement with (Duricic et al., 2014) who reported higher conception rate in endometritic cows than control group after intrauterine ozone spray treatment. (Deori and Phookan, 2015) studied when ozone foam was administered to cows with metritis and endometritis, and found that the fertility of the cows improved. As a result, it may be an effective and alternative treatment for cows with metritis and endometritis. (Escandon et al.2020) reported first service conception rate increased (50.00%). In cross-bred dairy cows with bacterial infections, intrauterine treatment with ozone was more responsive (38/50, 76%) recovery rate respectively (Durrani et al. 2017). This finding was similar to present trial.

**Group II**

In the current study, E. coli LPS was utilised to treat new cases of infectious repeat breeder cows in Group-II (ECO). After treatment in next estrus 16 (80.00%) recovery observed. All recovered cases were inseminated properly. After two months of post insemination, the confirmed pregnancy in conceived animals was identified, and 14 animals were found to be pregnant. In the current trials, the pregnancy rate was evidently 14 (70.00%). This finding is in agreement with (Desai et al., 2018) observed that

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Group</th>
<th>Treatment</th>
<th>No. Of Animals</th>
<th>Dose</th>
<th>Route</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>OZ</td>
<td>Ozone</td>
<td>20</td>
<td>Ozone @55mcg/ml in 60 ml distilled water</td>
<td>IU</td>
<td>On the day of oestrus</td>
</tr>
<tr>
<td>II</td>
<td>ECO</td>
<td>E. coli. LPS</td>
<td>20</td>
<td>LPS@100mcg in 30 ml sterile PBS</td>
<td>IU</td>
<td>On the day of oestrus</td>
</tr>
<tr>
<td>III</td>
<td>AP</td>
<td>Autologous plasma</td>
<td>20</td>
<td>Autologous plasma @30 ml</td>
<td>IU</td>
<td>On the day of oestrus</td>
</tr>
<tr>
<td>IV</td>
<td>NO</td>
<td>Neem oil</td>
<td>20</td>
<td>Neem oil @10 mcg/ml in 30 ml distilled water</td>
<td>IU</td>
<td>On the day of oestrus</td>
</tr>
<tr>
<td>V</td>
<td>CON</td>
<td>Control</td>
<td>20</td>
<td>Lugol's iodine 1:25 in 30 ml normal saline</td>
<td>IU</td>
<td>On the day of oestrus</td>
</tr>
</tbody>
</table>

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following *E. coli* LPS infusion, 80.00% animals were recovered. These findings are slightly higher than present research. It might be due to different physiology of animals, nutritional status and managmental factor. (Singh *et al*., 2018) he reported that *E. coli* LPS used in intrauterine treatment, the cervico-vaginal mucus (CVM) found clear in 9 out of 12 cows 75% and showed no bacterial growth at the next estrus. This finding was slightly lower than present study. It might be due to physiology or nutritional changes. It was concluded that, administration of *E. coli* LPS as single intrauterine infusion in cows with bacterial endometritis, minimize the infection within one estrous cycle. (Bhuyan *et al*., 2015).

**Group III**

Autologous plasma was treated in Group-III (AP). After treatment in next estrus 13 (65.00%) recovery observed. All recovered cases were inseminated properly. After two months of post insemination, the confirmed pregnancy in conceived animals was identified, and 10 animals were found to be pregnant. In the current trials, the pregnancy rate was evidently 10 (50.00%) and conception rate were 10 (55.00%). These finding is in agreement with (Sarma *et al*. 2013) who reported 60.00% recovery and 50.00% conception rate in endometritic cows, respectively. (Sarkar *et al*. 2018) who both reported 70.00 per cent conception rate in endometritic buffaloes and cow. This finding were slightly higher than present study, it could be due to physiological difference in cows.

**Group IV**

In group IV (NO), treated Neem oil resulted in the recovery of 15 (75.00%) of 20 cows from the treatment group, compared to 10 (50.00%) recovery in the control group. On a non-return basis, a total of 15 (75.00%) cows were discovered to be recovered cases that were inseminated at normal oestrus; it was documented that 12 (63.00%) were successfully conceived following the insemination. Twelve cows (60.00%) from the treatment group were discovered to be pregnant. (Chavan 2021) reported that the conception rate was 66.66% and (Pupalwad. 2021) reported that the recovery rate was 75.00%. These findings were similar with present study. Neem oil recovered 80.00% of buffaloes from uterine infections, with 67.00% conception rates, respectively. These findings suggest that neem oil could be used instead of antibiotics to treat endometriosis (Kumar *et al*., 2009). (Neeru *et al*., 2009) reported how effective neem oil were treating endometritis in buffalo animals were administered neem oil three times at a 24-hour interval via intrauterine route. 80% recovery observed. These findings were slightly higher than present study, it could be due to physiological difference in animals.

**Group V**

In control group V, 10 (50.00%) recovered, 08 (53.33%) conception and 08 (40.00%) pregnancy was seen. These finding is in agreement with (Asker *et al*., 2021) reported 57.00%, (Bhardwaz *et al*., 2018) stated that Lugol’s Iodine-treated repeat breeder cross-bred cows had 40.00% pregnancy rate but higher result was reported by (Singh *et al*. 2018) with recovery rate of 87.50% and conception rate of 42.86% and (Asfar *et al*., 2020) reported recovery rates of 83.30% and conception rate 50.00%, This might be due to variation in uterine defence mechanism stimulatory effect of different Lugol’s iodine concentration.

The efficacy of treatment was measured by the rate of recovery in infectious repeat breeding cows, as in all prior research cited, and it was observed that the efficacy of treatment was measured without distinguishing fresh and chronic grades. The details of comparative efficacy of different treatment protocols in repeat breeder cows (Table-2).

**Table 2:** Comparative details of efficacy of different therapeutic protocols in Infectious repeat breeding cows.

<table>
<thead>
<tr>
<th>Sr</th>
<th>Treatment groups</th>
<th>Recovery rate %</th>
<th>Conception rate %</th>
<th>Pregnancy rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>OZ</td>
<td>75.00</td>
<td>68.42</td>
<td>65.00</td>
</tr>
<tr>
<td>02.</td>
<td>ECO</td>
<td>80.00</td>
<td>73.68</td>
<td>70.00</td>
</tr>
<tr>
<td>03.</td>
<td>AP</td>
<td>65.00</td>
<td>55.00</td>
<td>50.00</td>
</tr>
<tr>
<td>04.</td>
<td>NO</td>
<td>75.00</td>
<td>63.15</td>
<td>60.00</td>
</tr>
<tr>
<td>05.</td>
<td>CON</td>
<td>50.00</td>
<td>53.33</td>
<td>40.00</td>
</tr>
</tbody>
</table>

Finally, it should be emphasised that *E. coli* LPS and Ozone is the most effective treatment for cases of infectious repeat breeding cows produces the best institutional outcomes.

**CONCLUSIONS**

According to the findings, ozone treatment was just as effective as *E. coli* LPS treatment in cows with infectious repeat breeder cows. Ozone treatment has various advantages, such as its non-irritant composition, safety for drug residue in milk, prevention of possible bacterial resistance, and low cost, it may be a viable alternative to intrauterine antibiotics in dairy herds.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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