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Study of pregnancy diagnosis by germination inhibition method in cattle in field conditions

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Abstract

Pregnancy diagnosis and its confirmation is a very crucial in field conditions where experts and modalities are not available at ease. This old Egyptian method of seed germination inhibition can be a breakthrough of almost 60-70% efficacy in field conditions.

Keywords: Pregnancy diagnosis, seed germination inhibition

Introduction

The pregnancy diagnosis at early stages is the requirement to improve production of milk for fast growth of dairy sector ^[1]. Ancient Egyptian method of Pregnancy Diagnosis termed as seed germination inhibition test was extended to diagnose pregnancy in cattles and buffaloes. Detailed chemical examination of pregnant animal shows presence of Abscisic Acid (ABA) a plant hormone which has main effect on seeds to maintain dormancy ^[2]. A high concentration of ABA found in pregnant cow 170.62 nanomoles/ml as compared to 74.46 nanomoles/ml in non-pregnant courses ^[3, 4]. The presence of ABA could be one of the factors causing decreased seed germination ^[1] argued that hormone metabolites exerted through urine of pregnant animal might affect seed germination. Test performed with different concentration of hormone – estradiol and progesterone.

Seed germination inhibition techniques has be in use from Ancient period. It way back around 4000 yrs and has been mentioned in Egyptian papyrus. In recent years much study has been done in this field. This study is the extention of its implication in field condition for easy and quick pregnancy diagnosis in cattle.

Material and Methods

Experimental design

A total of 16 cows were included for trial. These cows were divide into four groups named A, B, C and D shown in Table 1. The experimental trial groups are as follows.

| Group | Animal | Number | Details |
|-------|---------|--------|---|
| A | ND cows | 04 | Natural service by Haryana bull |
| B | ND cows | 04 | Artificial insemination by Haryana bull semen |
| C | | 04 | Natural service by Haryana bull |
| D | | 04 | Artificial insemination by Haryana bull semen |
| E | | 04 | |

After the insemination all animals were maintained in same managemental conditions for next 15 days. The urine from all the cow were collected twice a day let to stand for half an hour then diluted ratio of 1:14 (1ml urine+14 ml of water). This diluted urine was irrigated on wheat seeds for next 15 days. Along with the control prepared by placing wheat seeds in separate petridishes being irrigated by simple water (15 ml) for next 15 days.

Results

Group A: The animal from group A was reported 03 animals positive for pregnancy 01 animal showed negative /Non-pregnant

Group B: 02 animals showed true for positive or pregnant 02 were negative/Non pregnant.

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Group C: 02 animals showed true for positive for pregnancy 02 were negative / Non-pregnant.

Group D: 03 animals showed true for positive for pregnancy 01 were negative/Non-pregnant.

Controls also showed germination of seeds. Results showed that germination pattern of pregnant animals, controls & NP animals were different showing differential growth & shooting pattern as shown in Table 2. Pregnancy status was cross checked with expert opinions & nonoccurrence of heat in subsequent cycles which revealed following results.

| Group | Pregnant | Non Pregnant |
|-------------|----------|--------------|
| A | 03 | 01 |
| B | 02 | 02 |
| C | 02 | 02 |
| D | 03 | 01 |
| E (Control) | 00 | 04 |
| Total | 10 | 20 |

So it reveals differential seed germination. The growth of shoot was least in pregnant cow and maximum in controls shown in Figure 1. Result shows no false positive but has false negatives. So it's quite confirmatory if supported by expert opinion and non-occurrence of heat. The results drawn are 63%.

| Days | Group A | Group B | Group C | Group D | Group E (Control) |
|------|---------|---------|---------|---------|-------------------|
| 05 | 0.78 | 0.79 | 0.79 | 0.81 | 1.01 |
| 10 | 2.25 | 2.27 | 2.26 | 2.23 | 2.9 |
| 15 | 3.37 | 3.39 | 3.36 | 3.38 | 3.53 |

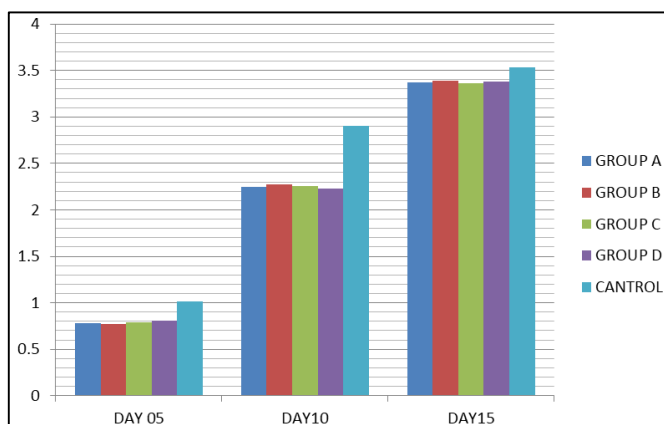


Fig 1: Mean shoot length after seed germination in wheat on different days.

Conclusion

Above study shows a clear cut maximum shoot growth in group E (control) and comparatively lesser growth in pregnant animals which shows validity of the test. Since results found to be near 60% which reveals the applicability of test in field for pregnancy diagnosis. But for 100% results with zero error requires other supportive measures for confirmation of pregnancy like expert opinion by animal examination and nonoccurrence of heat. A high concentration of Absciscic Acid has been identified in urine of Cattle [2] has its main effect on seeds to maintain dormancy. ABA is found in high concentration in pregnant cows compared with that in the urine of non-pregnant cows. The presence of ABA could be one of the factors causing the observed decreased germination & shoot growth of wheat seed when [3] treated with the urine of pregnant cow. This finds its future in simple bioassay kit for pregnancy diagnosis in animals which can be readily used in rural areas to diagnosis pregnancy in cattle & buffalo

population. Thus the modified seed germination bioassay is simple, noninvasive is suitable from animal welfare point of view, does not require chemical reagents or advanced instruments. This is quite favorable in field situations for agricultural nation like India where farmers can utilize this at local field conditions for pregnancy diagnosis.

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