

Seed Germination inhibition test for pregnancy detection in Malnad Gidda Cows

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Abstract

In the present study, the seed germination inhibition technique was applied to diagnose pregnancy in Malnad Gidda cattle breed, a dwarf breed found in coastal and neighboring heavy rainfall areas in Karnataka. The urine samples collected from six inseminated Malnad Gidda cows at two months of post insemination served as positive group and the urine from six non inseminated Malnad Gidda cows served as negative group. In both the cases, the urine was diluted at the ratio of 1:4 with distilled water. In each sterile Petri dish fifteen wheat seeds were taken on the blotting paper and 15 ml of diluted urine was added. For each cow the test was conducted with a replica of six tests in six Petri dishes. Control test was also carried out with the addition of water only to the wheat seeds. The Petri dishes were covered with the trays to avoid evaporation. After three days, the seeds were examined for germination inhibition percentage in positive, negative and control groups, wherein the mean germination inhibition percentage was 73.65 ± 2.81 , 27.90 ± 2.56 and 21.48 ± 2.69 , respectively. The mean shoot length of the germinated wheat seeds on fifth day was 0.95 ± 0.47 , 3.62 ± 0.51 and 5.54 ± 0.68 cm in positive, negative and control groups, respectively. Mean germination inhibition percent and reduced shoot length in positive group of Malnad Gidda cattle was indicative of pregnancy state. It was concluded that the seed germination inhibition technique is useful to detect pregnancy in Malnad Gidda cattle as a simple, non-invasive and economical method.

Keywords: Pregnancy Diagnosis, Cow, Seed Germination, Urine.

Introduction

Early detection of pregnancy in cattle is having economic importance. Even though the techniques such as rectal palpation, radiography, ultrasound technique, progesterone assay and rosette inhibition test are some of the pregnancy detection tests (Jainudeen and Hafez, 1993, Wani et al. 2003), due to practical constraints in the application of these methods, there is consistent effort in search of a simple, economical and non-invasive technique. Veena and Narendranath (1993) extended an ancient Egyptian pregnancy test of humans to cattle to diagnose pregnancy by differential seed germination and based on the results they suggested that this test could be used as a simple test to diagnose pregnancy in cattle.

The seed germination inhibition test is recognized as a door step technology to the farmers that can be done at farmers houses by the farmers since it require inexpensive materials and does not require special skills. Rosette inhibition test was

performed to detect early pregnancy in cattle (Narayana Swamy et al., 2000).

The seed germination inhibition test is applied for pregnancy detection in Malnad Gidda cattle. This local breed of dwarf cattle being found only in coastal and adjacent heavy rainfall districts of Karnataka state are very much resistant for diseases and show good tolerance to hot and cold climates compared to other breeds of cattle. They are known as draught animals but still yield a good quantity of milk of 3 to 5 liters per day, even though their body weight ranges from 120 to 180 kg only. As per the 17th cattle census conducted in 2003 the total number of Malnad Gidda cattle are 14.41 lakhs in Karnataka (Narayana Swamy, 2008). They are allowed to graze freely in the fields and normally artificial insemination is not followed. Rarely, they have been inseminated with Jersey semen. In most of the cases they conceive by natural mating in their grazing fields and therefore the occurrence of pregnancy goes unnoticed by the farmers. Therefore, an attempt was made in this study to validate the application of seed

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Table-1. Mean \pm SE values of germination inhibition percentage and shoot length (cm) of wheat seeds in Pregnant and Non – Pregnant Malnad Gidda Cattle compared to Water control. (P <0.05).

Particulars	Water Control	Non Pregnant	Pregnant
Germination inhibition percentage	21.48 \pm 2.69	27.90 \pm 2.56	73.65 \pm 2.81
Shoot length (cm)	5.54 \pm 0.68	3.62 \pm 0.51	0.95 \pm 0.47

$$\text{Germination inhibition percentage} = \frac{\text{No. of seeds not germinated in Petri dishes}}{\text{Total No. of seeds taken in Petri dishes}} \times 100$$

germination inhibition test for detection of pregnancy in Malnad Gidda cows.

Materials and Methods

The urine samples collected at farmers' houses of Shimoga Town of Karnataka state from six inseminated Malnad Gidda cows at two months of post insemination served as positive group and the urine from six non inseminated Malnad Gidda cows served as negative group. The urine samples were collected between 7.00 to 8.00 AM and subjected to testing on the same day. In the laboratory, the urine was diluted at the ratio of 1:4 with distilled water. In each sterile Petri dish fifteen wheat seeds were taken on the blotting paper and 15 ml of diluted urine was added. For each cow, the test was conducted with a replica of six tests in six Petri dishes. Control test was also carried out with the addition of water only to the wheat seeds. The Petri dishes were covered with the trays to avoid evaporation, wherein there was little air movement at the bottom of the inverted trays and they were undisturbed for three days. After three days, the seeds were examined for germination inhibition percentage and shoot length in positive, negative and control groups as suggested by Veena and Narendranath (1993). The data was analyzed by GraphPad prism (2004).

Results and Discussion

The mean germination inhibition percentage was 73.65 \pm 2.81, 27.90 \pm 2.56 and 21.48 \pm 2.69, respectively, in positive, negative and control groups (Table-1). The mean shoot length of the germinated wheat seeds on fifth day was 0.95 \pm 0.47, 3.62 \pm 0.51 and 5.54 \pm 0.68 cm in positive, negative and control groups, respectively (Table-1). The mean values of both germination inhibition percentage and shoot length between positive and negative groups were significantly different (P>0.05). The water control test was performed as a comparative test to differentiate and visualize clear results between the three test groups. Mean germination inhibition percent and reduced shoot length in positive

group of Malnad Gidda cattle was indicative of pregnancy state and it was confirmed by rectal palpation. The results observed in this study were in conformity with Veena and Narendranath (1993). Nirmala et al. (2008) concluded that estrogen and progesterone hormones did not influence seed germination and shoot length. Booth (1987) opined that the veterinary surgeons will need to be aware of the strategic uses of new and simpler test kits for pregnancy diagnosis in combination with traditional veterinary techniques. It was concluded that the seed germination inhibition technique is useful to detect pregnancy in Malnad Gidda cattle as a simple, non-invasive and economical method.

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