The Bioscan 15(4): 429-432, 2020
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
www.thebioscan.com

CHEMICAL AND MICROBIOLOGICAL STATUS OF COW DUNG AND COW URINE OF DESI AND HF BREED IN DAIRY FARM OF ZAHRS, BABBUR FARM, HIRIYUR

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KEYWORDS
Desi cow
HF breeds
Cow dung
Cow urine

Received on :
17.06.2020

Accepted on :
19.08.2020

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ABSTRACT
A laboratory experiment was undertaken in the Zonal Agricultural and Horticultural research station, Babbur farm, Hiriyur with view to know the nutrient contents and microbial load in dung and urine of Hallikar and HF breeds cow. The Hallikar cow dung and urine were noticed highest amount of nutrient *viz*., N, P and K (0.81 and 1.10, 018 and 0.22, 0.61 and 1.04 %) and highest number of viable microorganisms *viz*., bacteria (79.33 and 51.33 x 10^5), fungi (4 x 10^4), actinobacteria (18 x 10^3), N_2- fixers (48 and 22 x 10^5), P-solubilizers (7.33 and 2.0 x 10^5), *Pseudomona*s sp. (66 x 105) respectively as compared to dung and urine of HF cow breed. The fungal, actinobacteria, *Pseudomonas* sp. and *Trichoderma* sp. growth were not observed in cow urine sample.

INTRODUCTION

Cow dung is the excreted undigested residue of consumed food material of herbivorous bovine animal species mixed of feces and urine in the ratio of 3:1 and mainly consists of lignin, cellulose and hemicelluloses (Gupta *et al*., 2016). A total of 24 different minerals such as nitrogen, potassium, along with trace amount of sulfur, iron, magnesium, copper, cobalt and manganese are found in cow dung (Garg and Mudgal, 2007). Cow dung and cow urine are traditionally used as organic fertilizer in Indian sub-continental farming for centuries. The addition of cow dung increases the mineral status of soil, enhances resistance of plant against pests and diseases; stimulate plant growth (Naskar and Ray, 2003) and other beneficial activities such as sulphur oxidation and phosphorous solubilization. Normally, composition of cow dung is about 80% water and supports a matrix of undigested plant material that is rich in nutrients, micro-organisms, and their by-products. Cow dung micro flora contains abundant number of bacilli, lactobacilli and cocci and some identified and unidentified fungi and yeasts (Muhammad and Amusa, 2003).

Cow urine is an integral part and most effective substance of animal origin with innumerable therapeutic value in ancient Indian Ayurvedic literature such as Charak Samhita and Sushruta Samhita (Dhama *et al*., 2005). Medicinal properties of CU such as bioenhancer, antibiotic, antifungal, and anticancer have been patented under US patent number 6,896,907 and 6,410,059 (Gosavi *et al*., 2011; Randhawa 2010). There are several evidences to show that fresh cow dung and cow urine are antifungal and antiseptic in antimicrobial metabolites by cow dung micro flora. Therefore, the comparative study was conducted to isolate the microorganisms from cow dung and cow urine of desi and HF cow breed.

MATERIALS AND METHODS

Samples of cow dung and cow urine were collected from desi and HF cow breed in dairy farm at Zonal agricultural and Horticultural Research station, Babbur farm, Hiriyur aseptically in sterile poly bags and transported to laboratory of the Department of Plant Pathology, College of Horticulture, Hiriyur, for the evaluation of microbial analysis and Nutrient analysis in the Department of Soil Science, KVK, Hiriyur.

Nitrogen

The nitrogen was determined by Kjeldahl's digestion-distillation method as described by Jackson (1973). In this method 10 g or ml of dung or urine sample was digested with Conc.H_2SO_4 in presence of digestion mixture (K_2SO_4: $CuSO_4.5H_2O$:Se) in the proportion of (100:20:1) and distilled under alkaline medium. The liberated NH_3 was trapped in boric acid containing mixed indicator and titrated against standard H_2SO_4 (Jackson, 1973).

Digestion of plant samples with di-acid mixture

A dung or urine sample of 1 g or ml was pre-digested with 5

ml of concentrated HNO_3 and again digested with a di-acid mixture (HNO_3: $HClO_4$ in the proportion of 10:4 ratio). Volume of the digested sample was made up to 100ml with distilled water and preserved for P and K analysis (Jackson, 1973).

Phosphorus

To a known volume of the di-acid digested extract, vanadomolybdate was added to develop yellow colour of vanadomolybdo phosphoric acid in nitric acid medium. The colour intensity was measured at 420 nm wavelength (Jackson 1973).

Potassium

The potassium content was estimated by atomizing the digested diluted sample to a calibrated flame photometer under suitable measuring conditions as described by Jackson (1973).

Procedure for serial dilution plate count technique

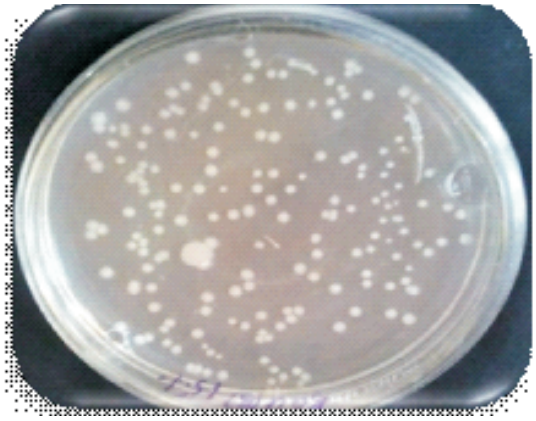
Cow dung and urine suspensions were prepared by serial dilution method (Bunt and Rovira, 1955). The collected and labelled, 10 gm/ ml of cow dung/urine samples were mixed in 90 ml sterilized water and vigorously shaked in vortex for 2 minutes for proper mixing of sample. After dilutions of each sample were prepared by using standard dilution method with the help of sterilized pipette and diluted upto 10^{-5}. From the dilution transferred 0.1 ml aseptically on the respective solidified media and plates were kept for incubation at 30º´C ± 1C for a week time and emerged colonies were counted (Aneja, 2003).

RESULTS AND DISCUSSION

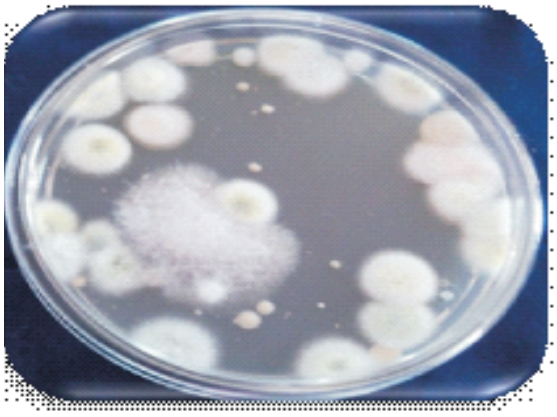
The present study was attempted to assess the microbial load in the fresh cow dung and cow urine samples of desi and HF cow breed by using serial dilution plate count technique. The cow dung and urine samples in present investigation were found to harbor a nutrients and huge array of microorganisms as assumed (Table 1 and Fig 1). The desi cow dung has showed higher nutrient like total N (0.81 % and 1.10 %), total P (018 % and 0.22 %.) and total K (0.61 % and 1.04 %) and highest number of viable microorganisms *viz*., bacteria (79.33 x 10^5 cfu /g of dung), fungi (4 x 10^4 cfu /g of dung), actinobacteria (18 x 10^3 cfu/ g of dung), N_2- fixers (48 x 10^5 cfu /g of dung), P-solubilizers (7.33 x 10^5 cfu /g of dung), *Pseudomonas* sp. (66 x 10^5 cfu /g of dung) respectively as compared to HF cow breed. This is due to desi cow dung contain higher amount of calcium, phosphorus, zinc and copper along with other

Table 1: Nutrient status of cow dung and cow urine of desi and HF cow breed

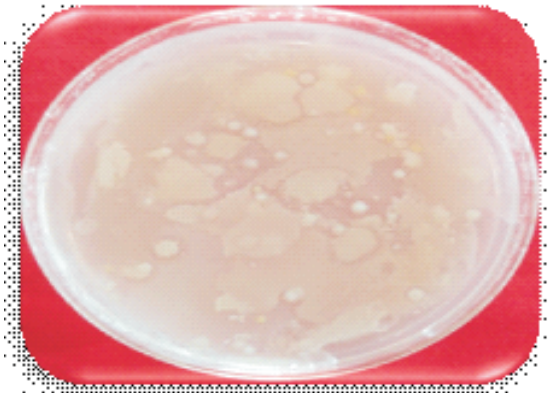
Particulars	Halikar breed		HF Breed	
	Cow dung	Cow urine	Cow dung	Cow urine
Total N (%)	0.81	1.1	0.65	0.98
Total P (%)	0.28	0.22	0.21	0.21
Total K (%)	0.61	1.04	0.53	0.94



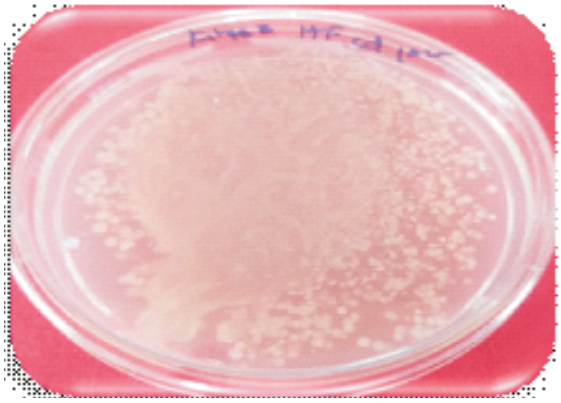
Bacteria



Fungi



N_2 - Fixers



Pseudomonas sp

Plate1: Microorganisms isolated form Desi Cow dung

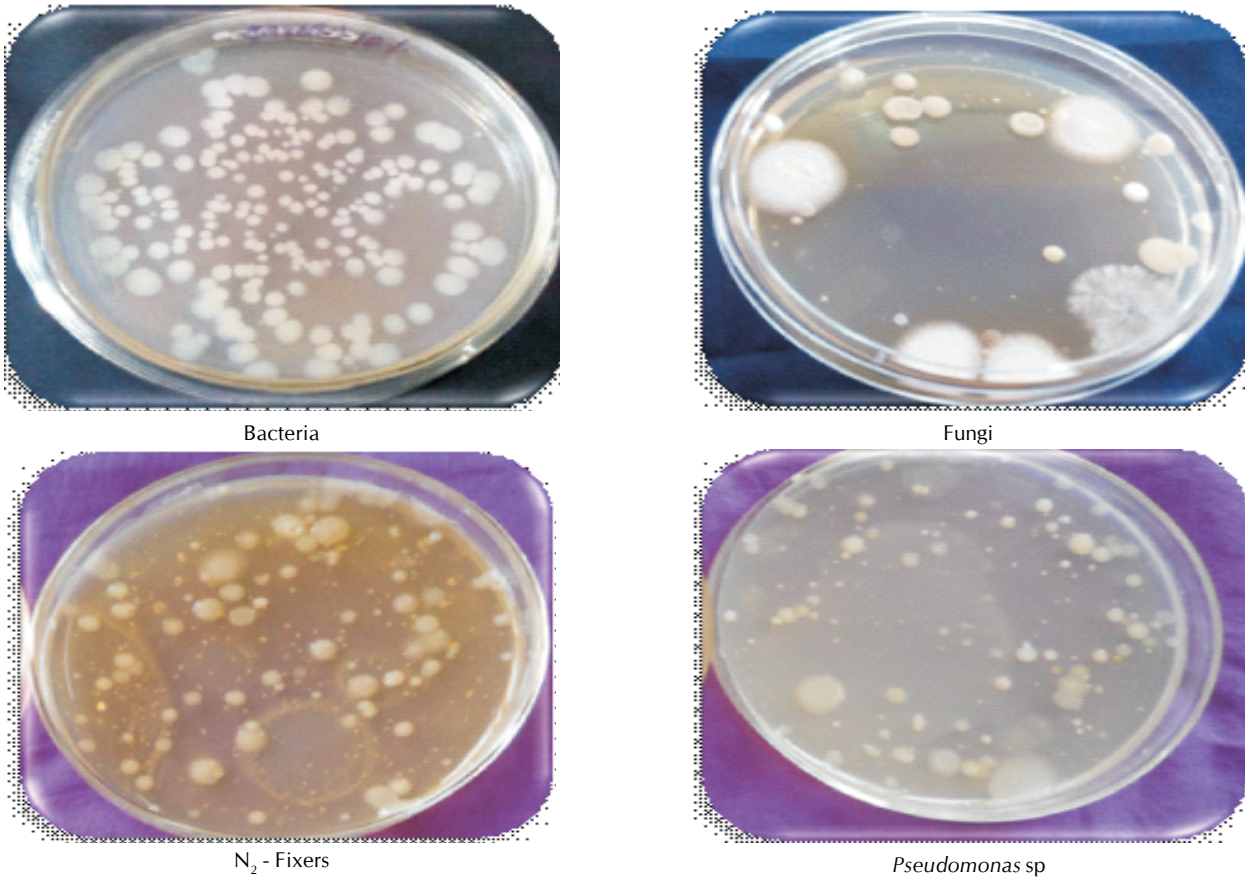


Plate 2: Microorganisms isolated form HF breed Cow dung

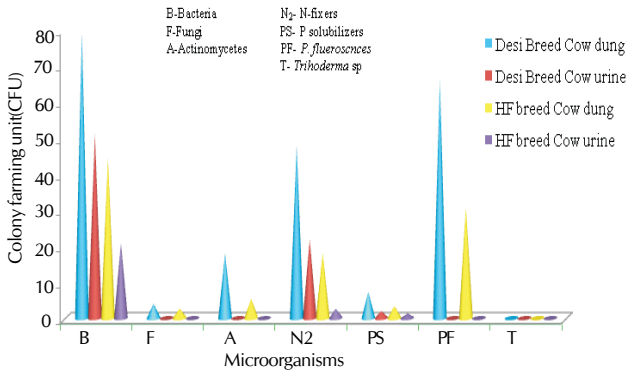


Figure 1: Microbial Load in cow dung and cow urine of desi and HF cow breed

nutrients than the cross-breed cow (Garg and Mudgal 2007, Randhawa and Kullar 2011). Cow dung harbours a rich microbial diversity, containing different species of bacteria (Bacillus spp., Corynebacterium spp. and Lactobacillus spp.) and yeast (Saccharomyces and Candida) (Randhawa and Kullar 2011).

Whereas in cow urine, the desi breed has contained higher number of microorganisms like bacteria (51.33 x 10^5 cfu /ml of urine), N_2- fixers (22 x 10^5 cfu /ml of urine), P-solubilizers (2 x 10^5 cfu /ml of urine) as compared to HF cow breed. The fungi, actinobacteria, *Pseudomonas* sp. and *Trichoderma* sp. colonies were did not appear/growth in cow urine sample due to medicinal properties of cow urine such as bioenhancer, antibiotic, antifungal anticancer, antioxidant properties and this will inhibit the fungal growth (Gosavi *et al*., 2011, Randhawa 2010, Sachdev *et al*., 2012).The indigenous Indian cow also contain higher amount of calcium, phosphorus, zinc and copper than the cross-breed cow (Garg and Mudgal 2007, Randhawa and Kullar 2011).

ACKNOWLEDGMENT

Special thanks to Zero Budget Natural Farming (ZBNF) project funded by GOK grants, Department of Agriculture, KSDA, Karnataka and University of Agricultural and Horticultural Sciences, Shivamogga for providing the necessary facilities to carry out this study.

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