

1. **Full name of the faculty member:** Dr. Guru Prasad Mandal
2. **Designation:** Professor
3. **Specialisation:** Animal Nutrition, Feed additives
4. **Contact information:** Phone: +91 9051538887 e-mail ID: gpmandal1@gmail.com
5. **Academic qualifications:**

College/ university from which the degree was obtained	Abbreviation of the degree
WBUAFS, Kolkata	B.V.Sc& A.H
NDRI, Karnal	M.Sc. (Animal Nutrition)
IVRI, Bareilly	PhD (Animal Nutrition)

6. Positions held/ holding or Work Experience:

Sl.	Post Held	Organization	From	To
1	Assistant professor	Sher-e- Kashmir University of Agricultural Sciences & Technology, R.S.Pura, Jammu	09.10.2003	06.11.2006
2	Assistant professor	Central Agricultural University, Aizawl, Mizoram	07.11.2006	06.10.2007
3	Assistant Professor	West Bengal University of Animal & Fishery Sciences, Kolkata	07.10.2007	09.10.2015
4	Associate Professor	West Bengal University of Animal & Fishery Sciences, Kolkata	10.10.2015	09.10.2018
5	Professor	West Bengal University of Animal & Fishery Sciences, Kolkata	10.10.2018	Till date

7. Awards:

S.No.	Name of Award	Awarding Agency	Year
1	JRF	Indian Council of Agricultural Research	1998
2	SRF	Indian Council of Agricultural Research	2002
3	Best Paper	2 nd National Indian Academy of Veterinary Nutrition and Animal Welfare Conference, Jammu	2013
4	Best Paper	IX Biennial Conference of Animal Nutrition Association, Guwahati	2015
5	Best Paper	XI Biennial Conference of Animal Nutrition Association, Patna	2018
6	Best Paper	XXVI Annual Conference of Indian Association for the Advancement of Veterinary Research, Kolkata	2019
7	Best Paper	National Conference of Pashu Poshan Kalyan Samitee (PPKS), Meerut	2019
8	Best paper	ANA 2 nd World Conference, Nagpur	2025
9	Fellow	Animal Nutrition Society of India	2026
10	Best research paper in Indian Journal of Animal Nutrition	Animal Nutrition Society of India	2026

8. Other notable activities:

- Dr. Mandal has completed 10 externally funded research works.
- Dr. Mandal has tested plant additives rich in saponins and essential oils on livestock, demonstrating that these supplements can improve rumen fermentation and increase Conjugated Linoleic Acid (CLA) levels in animal products
- He investigated the effects of varying n-6 to n-3 fatty acid ratios in broiler chicken diets. He established optimal dietary requirements that enhance broiler health and modify muscle fatty acid profiles to better meet human nutritional needs.
- Dr. Mandal has conducted extensive research aimed at replacing synthetic antibiotic growth promoters with natural and safe alternatives. His studies indicate that dietary supplementation with phytobiotics, such as plant extracts and essential oils, as well as prebiotics and probiotics, significantly improves gut morphology, feed conversion ratio (FCR), and overall immunity in broiler chickens. These interventions also reduce harmful pathogen loads, including *E. coli* and Salmonella, and lower cholesterol levels in poultry.

9. Publication:

a. Journals (National & International):

S.No	Authors	Title	Name of Journal	Volume	Page	Year	NAAS rating
1.	Mandal, GP; Kurar, CK; Neelam, K;	Effect of methionine and lysine supplementation on dry matter intake, nutrient utilization and growth in buffalo calves	Animal Nutrition and Feed Technology	2	39-47	2002	5.0
2.	Paul, SS; Mandal, AB; Mandal, GP; Kannan, A; Pathak, NN;	Deriving nutrient requirements of growing Indian sheep under tropical condition using performance and intake data emanated from feeding trials conducted in different research institutes	Small Ruminant Research	50	97-107	2003	7.40
3.	Paul, Shyam S; Mandal, Asit B; Kannan, Alagarsamy; Mandal, Guru P; Pathak, Nitya N;	Comparative dry matter intake and nutrient utilisation efficiency in lactating cattle and buffaloes	Journal of the Science of Food and Agriculture	83	258-267	2003	10.10
4.	Paul, SS; Mandal, AB; Mandal, GP; Kannan, A; Pathak, NN;	Deriving nutrient requirements of lactating Indian cattle under tropical condition using performance and intake data emanated from feeding trials conducted in different research institutes	Asian-Australasian Journal of Animal Sciences	17	769-776	2004	8.50

5.	Sharma, RK; Samanta, AK; Ramachandran, M; Mandal, GP;	Nitrogen solubility and protein fractions of grasses	Indian Journal of Animal Nutrition	21	173-176	2004	5.19
6.	Biswas, AK; Kondaiah, N; Mendiratta, SK; Mandal, GP;	Organic meat production: A critical review	Indian food industry	23	65-67	2004	
7.	Paul, SS; Mandal, AB; Mandal, GP; Kannan, A; Pathak, NN;	Deriving nutrient requirements of lactating Indian cows under tropical condition using performance and intake data emanated from feeding trials conducted in different research institutes.	Asian-Australasian Journal of Animal Sciences,	17	769-776	2004	8.50
8.	Mandal, AB; Paul, SS; Mandal, GP; Kannan, A; Pathak, NN;	Deriving nutrient requirements of growing Indian goats under tropical condition	Small Ruminant Research	58	201-217	2005	7.40
9.	Sharma, RK; Mandal, GP; Samanta, AK; Rastogi, A;	Nutritional status of top foliages in Kathua district	Journal of Research, SKUAST-J	5	35-41	2006	4.88
10.	Mandal, GP; Dass, RS; Isore, DP; Garg, AK; Ram, GC;	Effect of zinc supplementation from two sources on growth, nutrient utilization and immune response in male crossbred cattle (Bos indicus× Bos taurus) bulls	Animal Feed Science and Technology	138	01-Dec	2007	9.20
11.	Yadav, Anish; Khajuria, JK; Sharma, RK; Samanta, AK; Mandal, GP;	Accute coccidiosis in kids and its treatment	Journal of Veterinary Parasitology	21	71-72	2007	5.0
12.	Mandal, GP; Dass, RS; Garg, AK; Varshney, VP; Mondal, AB;	Effect of zinc supplementation from inorganic and organic sources on growth and blood biochemical profile in crossbred calves	Journal of Animal and Feed Sciences	17	147-156	2008	7.0
13.	Mandal, GP; Dass, RS; Garg,	Effect of supplemental zinc on growth	Indian Journal of Animal	25	211-	2008	5.19

	AK;	performance, nutrient utilization and trace mineral metabolism in crossbred calves	Nutrition		214		
14.	Mandal, GP; Dass, RS;	Serum mineral profile of crossbred calves supplemented with zinc sulphate and zinc propionate.	The Indian Veterinary Journal	86	700-702	2009	4.99
15.	Mandal, GP; Dass, RS;	Haemato-biochemical profile of crossbred calves supplemented with inorganic and organic source of zinc.	Indian Journal of Animal Research	44	197-200	2010	6.50
16.	Mandal, GP; Roy, Amitava; Samanta, I; Biswas, P;	Influence of dietary zinc and its sources on growth, body zinc deposition and immunity in broiler chicks	Indian Journal of Animal Nutrition	28	432-436	2011	5.19
17.	Chatterjee, Saurav; Samanta, I; Joardar, SN; Bandyopadhyay, S; Mahanti, Achintya; Dutta, TK; Isore, DP; Mukhopadhyay, SK; Mandal, GP; Taraphder, S;	Occurrence of shiga toxin producing Escherichia coli (STEC) in healthy cattle of organized farms in West Bengal	Indian Journal of Comparative Microbiology, Immunology and Infectious Diseases	33	29-33	2012	4.49
18.	Roy, A; Mandal, GP; Patra, AK;	Evaluating the performance, carcass traits and conjugated linoleic acid content in muscle and adipose tissues of Black Bengal goats fed soybean oil and sunflower oil	Animal Feed Science and Technology	185	43-52	2013	9.20
19.	Amitava Roy; Mandal, GP;	Effect of phytase supplementation on performance and nutrient availability in boilers.	Indian Journal of Animal Health	42	9-12	2013	5.01
20.	Naskar, S; Mandal, GP; Borah, S; Vashi, Y; Thomas, R;	Evaluation of fatty acid profile in subcutaneous adipose tissue of indigenous and crossbred	Indian Journal of Animal Sciences	84	88-90	2014	6.30

	Dhara, SK;	pigs					
21.	Pal, K; Patra, AK; Sahoo, A; Mandal, GP;	Effect of nitrate and fumarate in Prosopis cineraria and Ailanthus excelsa leaves-based diets on methane production and rumen fermentation	Small Ruminant Research	121	168-174	2014	7.40
22.	Mandal, GP; Roy, A; Patra, AK;	Effects of feeding plant additives rich in saponins and essential oils on the performance, carcass traits and conjugated linoleic acid concentrations in muscle and adipose tissues of Black Bengal goats	Animal Feed Science and Technology	197	76-84	2014	9.20
23.	Roy, Amitava; Mandal, GP; Pal, Kaushik; Samanta, I; Biswas, P; Roy, B;	Effect of zinc supplementation with or without phytase on performance, mineral accumulation in tissues and immune response of broiler	Animal Nutrition&Feed Technology	14	311-319	2014	5.00
24.	Mandal, GP; Ghosh, TK; Patra, AK;	Effect of different dietary n-6 to n-3 fatty acid ratios on the performance and fatty acid composition in muscles of broiler chickens	Asian-Australasian journal of animal sciences	27	1608	2014	8.50
25.	Ghosh, A; Mandal, GP; Roy, A; Patra, AK;	Effects of supplementation of manganese with or without phytase on growth performance, carcass traits, muscle and tibia composition, and immunity in broiler chickens	Livestock Science	191	80-85	2016	6.50
26.	Mandal, GP; Roy, A; Patra, AK;	Effects of plant extracts rich in tannins, saponins and essential oils on rumen fermentation and conjugated linoleic acid concentrations in vitro	Indian J. Anim. Health	55	49-60	2016	5.01
27.	Pathak, M; Mandal, GP;	Effects of dietary supplementation of	Animal Production	57	821-827	2017	7.40

	Patra, AK; Samanta, I; Pradhan, S; Haldar, S;	cinnamaldehyde and formic acid on growth performance, intestinal microbiota and immune response in broiler chickens	Science				
28.	Roy, Amitava; Mandal, Guru Prasad ; Patra, Amlan Kumar;	Effects of different vegetable oils on rumen fermentation and conjugated linoleic acid concentration in vitro	Veterinary World	10	11	2017	7.70
29.	Kumar, Pawan; Patra, Amlan Kumar; Mandal, Guru Prasad ; Samanta, Indranil; Pradhan, Saktipada;	Effect of black cumin seeds on growth performance, nutrient utilization, immunity, gut health and nitrogen excretion in broiler chickens	Journal of the Science of Food and Agriculture	97	3742-3751	2017	10.10
30.	Abhishek Kumar; Kaushalendra Kumar, Kaushalendra Kumar; Sanjay Kumar, Sanjay Kumar; Chandramoni, Chandramoni; Sinha, RRK; Paswan, JK; Mandal, GP ;	Effect of feeding different level of Moringa oleifera leaf meal on growth performance, lipid profile and meat fatty acid composition of Vanaraja chicken in tropics.	The Indian Journal of Animal Sciences	87	644-648	2017	6.30
31.	Sarkar, M; Mandal, GP ; Prabha, S; Baidya, P; Baidya, S;	Nutritional status of Anganwadi children of Matigara block of Darjeeling district of West Bengal.	Exploratory Animal and Medical Research	7	170-174	2017	5.0
32.	Ghosh, P; Samanta, I; Joardar, S; Mandal, G ; Isore, D; Dey, S; Batabyal, K;	Sero-Surveillance of Newcastle disease virus in Kuroilers and indigenous birds in Darjeeling district	Indian Journal of Animal Health	56	95-98	2017	5.01
33.	Sarkar, M; Mandal, GP; Prabha, S;	Nutritional status of Anganwadi children of Phansidewa Block of	Exploratory Animal and Medical	7	170-17	2017	5.0

	Baidya, P; Baidya, S;	Darjeeling district of West Bengal, India.	Research				
34.	Amitava Roy; Mandal, Guru Prasad ; Patra, Amlan Kumar;	Effects of different vegetable oils on rumen fermentation and conjugated linoleic acid concentration in vitro.	Vet World	10	11-16.	2017	7.70
35.	Chowdhury, Subrata; Mandal, Guru Prasad ; Patra, Amlan Kumar;	Different essential oils in diets of chickens: 1. Growth performance, nutrient utilisation, nitrogen excretion, carcass traits and chemical composition of meat	Animal Feed Science and Technology	236	86-97	2018	9.20
36.	Chowdhury, Subrata; Mandal, Guru Prasad ; Patra, Amlan Kumar; Kumar, Pawan; Samanta, Indranil; Pradhan, Saktipada; Samanta, Arup Kumar;	Different essential oils in diets of broiler chickens: 2. Gut microbes and morphology, immune response, and some blood profile and antioxidant enzymes	Animal Feed Science and Technology	236	39-47	2018	9.20
37.	Kumar, P; Patra, AK; Mandal, GP ; Debnath, BC;	Carcass characteristics, chemical and fatty acid composition and oxidative stability of meat from broiler chickens fed black cumin (Nigella sativa) seeds	Journal of animal physiology and animal nutrition	102	769-779	2018	8.40
38.	Samanta, Arindam; Mahanti, Achintya; Chatterjee, Souvik; Joardar, Siddhartha Narayan; Bandyopadhyay, Samiran; Sar, Tapas Kumar; Mandal, Guru	Pig farm environment as a source of beta-lactamase or AmpC-producing Klebsiella pneumoniae and Escherichia coli	Annals of Microbiology	68	781-791	2018	9.40

	Prasad ; Dutta, Tapan Kumar; Samanta, Indranil;						
39.	Singh, AD; Debnath, C; Chaudhari, S; Biswas, R; Barua, R; Samanta. I; Mandal, G.P	Studies on some phytoextracts for their antifungal activities against <i>Microsporum canis</i>	Indian Journal of Animal Health	59	45-49	2020	5.01
40.	Parveen, S; Mandal, G. P ; Samanta, I; Patra, A; Soren, S; Roy, B;	Effect of essential oil blend on intestinal morphology, gut microbiota and immune response of broiler chickens	Indian Journal of Animal Health	59	228-36	2020	5.01
41.	Samanta, Arup Kumar; Gali, Jagan Mohanrao; Dutta, Tapan Kumar; Rajkhowa, Tridib Kumar; Mandal, Guru Prasad ; Patra, Amlan Kumar;	Effect of dietary phytobiotic mixture on growth performance, nutrient utilization, and immunity in weaned piglets	Tropical Animal Health and Production	53	459	2021	7.70
42.	Acharjee, S; Mandal, GP ; Patra, AK; Debnath, BC; Roy, B;	Effects of feeding rice-based dried distillers grains with solubles and condensed distillers solubles on feed intake, milk production and fatty acid composition in lactating crossbred cows.	Animal Nutrition & Feed Technology	21	233-247	2021	5.00
43.	Chowdhury, M; Bardhan, R; Pal, S; Banerjee, Aparna; Batabyal, K; Joardar, SN; Mandal, GP ; Bandyopadhyay, S; Dutta, TK; Sar, TK;	Comparative occurrence of ESBL/AmpC beta-lactamase-producing <i>Escherichia coli</i> and <i>Salmonella</i> in contract farm and backyard broilers	Letters in Applied Microbiology	74	53-62	2022	8.00

44.	Kumar, P; Mandal, GP ; Paul, A; Munsi, S; Samanta, I;	Substitution of antibiotic growth promoter with locally available plant derivatives: in-vitro study	Indian Journal of Animal Health	10	855- 867	2022	5.01
45.	Pawankar, KN; Samanta, R; Ghosh, N; Bera, S; Biswas, S; Mandal, GP; Ramteke, SS;	Comparative production performance traits of Kadaknath, Giriraja and black australorp breeds of poultry under intensive system of management in Maharashtra State of India	International Journal of Veterinary Sciences and Animal Husbandry	7	59-63	2022	4.61
46.	Rai, Saroj; Kumar, M; Jas, R; Mandal, GP ; Samanta, I; Rajendar, M; Tripura, S; Das, SK; Mondal, M; Mandal, DK;	Antibacterial effect of kitchen herbs against pathogenic multidrug- resistant E. coli isolates from calf diarrhoea	Tropical Animal Health and Production	55	211	2023	7.70
47.	Nath, Sudhanya; Mandal, Guru Prasad ; Panda, Niranjan; Dash, Susanta Kumar;	Effect of Neem (Azadirachta indica) Leaves Powder and Cinnamon (Cinnamomum zeylanicum) Oil on Growth Performance of Broiler Chickens.	Indian journal of animal research	57		2023	6.50
48.	Dey, Subhagata; Padhan, Saktipada; Samanta, Indranil; Das, Partha; Mandal, Guru Prasad ;	Effect of feeding an essential oil blend on growth performance, nutrient utilization, intestinal health and humoral immunity in broiler chicken	Animal Nutrition and Feed Technology	23	539- 552	2023	5.00
49.	Nath, Sudhanya; Mandal, Guru Prasad ; Panda, Niranjan; Behera, Sidhartha Sankar;	Effect of neem (Azadirachta indica) leaf powder and cinnamon (Cinnamomum zeylanicum) oil on growth performance and blood haematological indices of broiler chickens	Indian Journal of Poultry Science	58	29-36	2023	5.30
50.	Soren, Stephen; Mandal, Guru P; Mondal, Samiran;	Efficacy of Saccharomyces cerevisiae fermentation product and probiotic supplementation on	Animals	14	866	2024	8.70

	Pradhan, Saktipada; Mukherjee, Joydip; Banerjee, Dipak; Pakhira, Manik C; Amla; Mondal, Anjan; Nsereko, Victor;	growth performance, gut microflora and immunity of broiler chickens					
51.	Kurechiya, Naresh; Roy, Barun; Mandal, Guru Prasad; Debnath, Bikas Ch; Rawat, Kavita;	Chemical and nutritional composition of rice distiller dried grain with solubles for livestock and poultry.	Exploratory Animal & Medical Research	14	325-330	2024	5.00
52.	Ghosh, R; Mandal, GP; Mandal, S; Samanta, I; Bhattacharyya, D; Mondal, T; Soren, S;	Isolation of Lactobacillus sp. from Indigenous poultry (Gallus gallus) and their antagonistic activity against bacterial pathogens	Indian Journal of Animal Health		16923	2024	5.01
53.	Hazra, Puja; Kumar, Pawan; Soren, S; Samanta, I; Mandal, GP;	Performance of Broiler Chicken Supplemented with Zinc oxide Nano Particles	Indian Journal of Animal Nutrition	42	119-127	2025	5.19
54.	Khan, Mahamudul Hasan; Soren, Stephen; Jas, Ruma; Mondal, Samiran; Mukherjee, Joydeep; Pakhira, Manik Chandra; Paul, Aditya; Samanta, Indranil; Mondal, Anjan; Nsereko, Victor;	Effects of Saccharomyces cerevisiae fermentation product (SCFP) and phytogenic feed additive as alternatives to antibiotic growth promoters on pathogen mitigation, immunomodulation and production performance in commercial broiler chickens	Poultry Science		105743	2025	10.20
55.	Seikh, Amanulla; Mandal, Guru Prasad; Mandal, Surojit; Mandal,	Effect of Probiotics Derived from Lactobacillus DH42 as an Alternative to Antibiotics on the Growth	Indian Journal of Veterinary Sciences & Biotechnology	21		2025	5.58

	Samiran; Samanta, Indranil; Soren, Stephen;	Performance, Gut Health, and Immune Response in Broiler Chickens.					
56.	Soren, Stephen; Ghosh, Ranjita; Mukherjee, Joydip; Mandal, Samiran; Mandal, Surojit; Samanta, Indranil; Mandal, Guru Prasad;	Effect of Dietary Synbiotic as a Replacement for Antibiotics on the Growth Performance, Gut Health and Immune Response in Broiler Chickens	Indian Journal of Animal Nutrition	42	251- 260	2025	5.19
57.	Mondal, S; Seikh, A; Mandal, GP; Roy, B; Mukherjee, J; Mondal, S; Samanta, I; Roy, A; Soren, S;	Evaluation of an essential oil blend derived from thymol, cinnamaldehyde, and menthol on the growth performance and gut health of broiler chickens	Indian Journal of Animal Health	64	281- 293	2025	5.01
58.	Seikh, Amanulla; Mondal, Sukanta; Mandal, Guru Prasad; Roy, Barun; Mandal, Surojit; Ghosh, Purnendu; Soren, Stephen;	Comparative study of probiotics and postbiotics on growth performance, carcass traits, and blood biochemical profiles in broiler chickens	International Journal of Veterinary Sciences and Animal Husbandry	10	45-50	2025	4.61
59.	Kurechiya, Naresh; Roy, Barun; Mandal, Guru Prasad; Debnath, Bikas Ch; Rawat, Kavita;	Effect of rice distiller dried grain with solubles on growth performance, nutrients metabolizability and haemato- biochemistry in broiler chicken	Exploratory Animal & Medical Research	15		2025	5.00
60.	Mandal, Guru Prasad; Mandal, Surojit; Mandal, Samiran; Samanta, Indranil; Soren, Stephen;	Effect of probiotics derived from Lactobacillus DH42 as an alternative to antibiotics on the growth performance, gut health, and immune response in broiler chickens.	The Indian Journal of Veterinary Sciences and Biotechnology	21	43-49	2025	5.25

61.	Soren, Stephen; Ghosh, Ranjita; Mandal, Guru Prasad ; Mandal, Surojit; Samanta, Indranil;	Impact of Postbiotic Produced from Lactobacillus rhamnosus NCDC 298 as a Replacement for Antibiotics on the Growth Performance, Gut Health and Immune Response in Broiler Chickens	International Journal of Bio-resource and Stress Management	16	01-Nov	2026	5.40
62.	Kurechiya, N; Roy, B; Mandal, GP ; Debnath, BC; Rawat, K;	Determination of ileal endogenous flow and standardized ileal amino acid digestibility of rice DDGS in broilers	Journal of Livestock Science (ISSN online 2277-6214)	17	310-315	2026	6.50

b. Popular Articles:

SI	Authors	Year	Title	Publisher with ISBN number	Total pages
1	Das, Srinibas; Mandal, GP ; Tyagi, AK;	2007	Milk toxicant of natural plant and feed mold origin: a review	Indian Dairyman	Vol: 59: Page: 27
2	Ratogi, Ankur; Sharma, RK; Samanta, AK; Mandal, GP ; Kumar, Ravindra	2011	Organochlorine residues in cow milk: Causes, concerns and possible interventions	Indian Cow (The): The Scientific and Economic Journal	Vol:8
3	Soren, S; Mandal, GP; Samanta, I; Hansda, RN;	2023	Saccharomyces cerevisiae based postbiotics: Assessment of their effects on the health and productive performance of poultry	The Pharma Innovation Journal	Vol: 12 Page: 95-102
4	Soren, Stephen; Mandal, Guruprasad; Ray, Barun; Samanta, Indranil; Hansda, Rabindra Nath;	2023	Fructooligosaccharide as a prebiotic: A substitute for antibiotic growth promoters in poultry production	International Journal of Veterinary Sciences and Animal Husbandry	Vol: 8 Page: 95-102
5	Soren, S; Mandal, GP; Roy, B; Samanta, I; Hansda, RN;	2023	Assessment of Bacillus subtilis based probiotics on health and productive performance of poultry: A review	Indian Journal of Animal Health	Vol: 64 Page: 132-138
6	Das, S; Kar, I; Mukherjee, A; Chatterjee, PN; Mandal, GP;	2025	Role of exogenous bile acids in unlocking the potential of nutritional bio-energetics of freshwater aquaculture	Indian Journal of Animal Health	Vol: 64 Page: Spl.03625
7	Kar, I; Mandal, GP; Das, S; Mukherjee, A; Maity, HK; Mandal, S; Das, AK	2025	Cadmium toxicity in poultry: Mechanisms, food safety concerns, and One Health implications	Indian Journal of Animal Health	Vol: 64 Page: Spl.00825

c. Books/ Books chapter:

Sl.	Authors	Year	Title	Publisher with ISBN number	Total pages
1	G. P. Mandal	2013	Mineral nutrition and its impact on livestock production (In: Animal Science Reviews. S.K. Saha (ed))	Satish Serial Publishing house ISBN: 9789381226711	29
2	G. P. Mandal	2015	Organic trace minerals in Animal Nutrition (In: feed supplements for livestock and poultry. P. K. Singh, R. Kumar, S. Kumar and K. Kumar (eds)	Daya Publishing House ISBN: 9789351243670	10
2	G.P. Mandal and B. C. Debnath	2019	Clove (<i>Syzygium aromaticum</i>) (In: Phytobiotics and animal production. P. K. Singh (ed))	Satish Serial publishing	20