Available Online at http://www.recentscientific.com

ISSN: 0976-3031

International Journal of Recent Scientific Research
Vol. 4, Issue, 11, pp.1691-1696, November, 2013

International Journal of Recent Scientific Research

RESEARCH ARTICLE

APPLICATION OF INDIGENOUS MICROORGANISMS (IMOS) ON POULTRY FLOOR (SOIL) AND ANALYSIS OF MINERALS IN THE POULTRY IMOS TREATED SOIL

SomaSekhar,M., Sai Gopal,D.V.R., and Rohini Reddy,K.

Department of Virology, S.V.U.College of Sciences, S.V.University, Tirupati - A.P – 517502, India

ARTICLE INFO

Article History:

Received 16th, October, 2013
Received in revised form 26th, October, 2013
Accepted 12th, November, 2013
Published online 28th November, 2013

Key words:
Pollution free poultry, indigenous microorganisms, IMOs, fermentative feed for poultry, Natural farming poultry, Preparation of Indigenous microorganisms(IMOs).

ABSTRACT

Different concentration of IMOs,Orinted Herbal Nutrient(OHN),Fermented Plant Juice(FPJ) Fish Amino Acids(FAA) and Lactic Acid Bacteria (LAB) were applied to test poultry soil and not applied to control poultry soil.Test poultry soil smoother than control soil, chicks were tereated as well as in both test and control soil floor. Estimation of minerals of Natural farming IMOs treated poultry test soil sample and control soil floor samples were assessd. Resulting increasing Organic Carbon, pH, Electric Conductivity (EC), Phosphorus Contant and Zink, dicreasing of Potassium(K) contant (estimated with spectrophotometer) in test poultry soil sample. The resulting values are furnished in table1,2,3 and 4. In conclusion, indigenous microorganisms are increasing soil minerals increased in test poultry soil samples than control soil sample, decreasing the pollution or chick's fecal matter respectively.

INTRODUCTION

Microorganisms are effective only when they are presented with suitable and optimum conditions for metabolizing their substrates including available water, oxygen, pH and temperature of their environment.[1] The various types of microbial cultures and inoculants are added to the soil and increase the fertility Natural Farming with Indigenous Microorganisms is a method of organic farming utilizing cheap and readily available ingredients and the microbes from farm.[2][4] The philosophy behind Natural Farming is to return to the farmers their natural relationship with nature. Farmers should be able to make a living from their work. [3] Farmers are making six figure incomes, raising chickens for egg production. Natural Farming is a comprehensive system, in that almost every animal's need is met by inputs produced on the farm.[1][2]Natural poultry practice maximizes the use of on farm resources, recycles farm wastes and minimizes external inputs like vaccination, artificial feed does not using chemical vaccination,growth promoters and avoid enzymatic feed. The most important thing in this technology soil is the primitive diversity and power of Indigenous Microorganisms. [5] Making of poultry farm and the requirements are made from natural resources. [2] Chickens are raised very differently from conventional poultry farming. This farming approach maximizes the use of on-farm resources, recycles farm waste, and minimizes external inputs while fostering soil health and is gaining popularity among farmers that are interested in sustainable poultry.[6] They have been practiced for decades in Asia and were introduced and have been adopted by several farmers in Asia. However, scientific evidence of the benefits of natural farming has been limited. [7]

MATERIALS AND METHODS

Collecting Indigenous Microorganisms from the Environment

The IMOs can be collected by various methods. It can be collected from hills and mountains using steamed rice with low moisture (hard- boiled), decomposed leaves and bamboo stumps. [1] It is possible to collect, to a certain extent, particular types of microorganisms. The collection process takes approximately 4-5 days in cooler temperature (about 20°C) and 3–4 days under warmer conditions (above 30°C).[2] Indigenous Microorganisms are highly concentrated under undisturbed conditions or places or areas. Combining Indigenous Microorganisms collect from multiple sites. [3] The Indigenous Microorganisms (IMO) cultured at any time of the year. Avoid wet, rainy seasons. Excessive moisture in the environment promotes growth of bacteria, fungi that are less desirable for the intended uses. [1]

Procedure to Cultivate the Indigenous Microorganisms

A square shape (L1.5xW1xH1) wooden box was taken and filled with 75% cooked Rice and tied with string. Buried the box into the soil and covered with leaf deeply and also covered it with plastic sheet to prevent from rain and rats. [8]Depending on the temperature base after 3 to 5 days opened the box and obtained white layer, includes fungus, bacteria forms. It's called as Indigenous microorganisms. (IMO-I). [1][9] Mix jaggery into the IMO-I equal ratio (1:1) and took in cool place within the jar,(IMO-II) Cultured IMO-II placed in cool and dried place within the jar. IMO-II has applied in 2:1000 ratios apply on the rice bran and mix equally, along with FPJ&FFJ was the same ratio.[2][8] It is called as IMO-III. IMO-III mixed in the soil called as IMO-IV, than later the IMO-IV were starts working and ready to use. [10]

* Corresponding author: **Sai Gopal ,D.V.R.**
Department of Virology, S.V.U.College of Sciences, S.V.University, Tirupati - A.P – 517502, India

Making of Poultry Shed Floor (Bed)

The floor of poultry covered with 3 inches deep in litter and straw. This straw was sprayed with lactic acid bacteria (LAB) and IMO 3 to quick start the microbial activity. During dry season the floor should be lightly sprayed with water weekly intervals. The microorganisms on the floor will break down the chicken faecal matter and there will be virtually no smell. The same bedding in place for 10 years or remove as needed for fertilizer, leaving half of it in to continue the cycle. [2] Fermentation occurs in the bedding, providing warm, even in the winter. The chicken has a window in the roof to let natural sunlight fall on one-third of the floor area. This will disinfect the floor naturally and help the microorganisms to grow. The poultry will provide food for people and manure to condition the soil for the plants. In return, agricultural by products can be used as chicken feed. In this manner human, animals and crops will become inter-dependent. [1] [7]

Important Accepts

The floor of the chicken housing should be contained with soil, not concrete. Farming of the chicks without soil it can cause diseases to chicks. Temperature should not be artificially controlled. Heat from fermenting compost will surface, even for small chicks, eliminating the need for heating machines. Feed for hatchings should consist of whole bran rice grains and bamboo leaves to strengthen their intestines.[1] [2] [14]

Making Of Poultry Roof and Walls

The roof is consists of cement sheets, which becomes gives hot environment to the chicks. This hot air escapes through the window and the air is refreshed from the open walls. The walls are made with net, with a curtain to control air flow and make it rainproof. It needs to stay dry. Feed trays for new born chicks are small. By the Feed trays is partitioned into two boxes. Feed in the one side of poultry and water in the other side of form. This provides exercise for the chicks also. The last aspect of raising chicks is the nesting box, which the chicks should be put into from a young age so they are used to it. At first it can be brightly lit, so the hens are not afraid, and then gradually darken it with a curtain. In this technology no need current for lighting and maintain the temperature. This technology use natural lighting and temperature.

One important aspect of raising healthy chicks is feeding the freshly hatched chicks whole bran rice grains in an unlimited supply. After three days the bamboo leaves are added to the feed that strengthen the chick's intestine. Chicks feed this way develop a strong digestive system and long intestines. A homemade mix of bran, wild food waste and soil can be fed at this point also. This homemade feed should be adjusted to be sure there is a nutritional balance for meat. Fermentative feed has concrete approach as to how to practice farming while observing and respecting the law of nature utilizing only what nature provides. Feed produces a good yield health and resistance power in chicks. Feed is given to the chicks only once a day, two hours before sunset. If rice husks aren't available, look for wheat bran or other meal. This should be sufficient to maintain a steady laying rate for a long, productive period: twice as long as conventional methods. There should be no pollution, no smell, no flies, no wastewater, disease or cleaning needed. The egg quality will be superior with super sturdy yokes. [1][2][7]

Floor Requirement- Lactic Acid Bacteria (Lab)

Lactic acid bacteria are microorganisms that have a low pH of 2. They can survive with or without oxygen and withstand high temperatures. They are very effective in improving soil aeration and dissolve chelates or minerals in the soil. Making of lactic acid bacteria (LAB), first wash the rice and save the water and this water and filled in a jar 20 cm with it. Cover it with paper to keep bugs out and let it sit in a dark spot for a week, preferably in an opaque container. It wills start to give off a sour smell when it's done. Next, pour off the rice water and add the rice water to milk, ideally raw milk, at a 10:1 ratio the lactic acid bacteria will grow vigorously in the milk. [1][2] In 5-7 days the milk will have separated into the milk solids. Starch, protein and fat will float on the top of the liquid which remains at the bottom. Remove the floating substance and save the liquid. This is the lactic acid bacteria (LAB). It can be stored in a refrigerator or mixed with equal parts brown sugar and stored at room temperature. This lactic acid bacteria (LAB), is diluted 1,000 times. It can be combined with IMO's, which are mostly aerobic, and sprayed on fields. It is an important component for poultry of natural farming and easy to make and have on hand. [10][11][14].

Preparation of Feed: Food Wastes as Wet and Dry Feed For Chicks

Chicks feed produced by using fermentation technology. Different types of grains like maize, horse gram, paddy straw green grass and waste vegetables will be used to produce fermentation feed. For the preparation of fermentation feed indigenous micro-organisms are used, and these are involves in ferments and enriches the feed. Generally micro-organisms decompose complex organic compounds into simple form, these simple inorganic compounds have high nutrients value are easily digestible. Micro-organisms in the fermentation feed produce enzymes, antibiotic substances, lactic acids and some nutrients, that suppress various diseases and promote good health and productivity.

This Fermentation Feed Produced In Two Ways or Conditions

- Aerobic condition
- Anaerobic condition

In aerobic condition Dry Feed, in anaerobic condition Wet Feed are produced. In this production to culture the microorganisms at different areas in order to collect different kinds of microorganisms to mix the ingredients to practices and increase the yield. Fermentation feed has concrete approach as to how to practice farming while observing and respecting the law of nature utilizing only what nature provides. Feed produces a good yield health and resistance power in chicks.

Microorganisms Have Two Major Functions in Fermentation Feed

- Microorganisms decompose complex organic compounds such as vegetables, fruits, green grass and wastes in to simple compounds which have high nutrients are easily digestible.
- They create compounds like enzymes, antibiotics and lactic acid that can suppress various diseases and promote healthy productivity.

Fermentation chick feed: wet and dry feed

s.no	Wet feed	Percentage of total weight	Dry feed	Percentage of total weight
1.	Banana Stem Trunk	50	Rice bran	30
2.	Waste vegetables	30	Maize	30
3.	Paddy straw	15	Horse gram	25
4.	Bamboo Leaves	05	Paddy straw & Ant hill soil	15

Preparation method

Materials are cut in to small pieces and mixed properly incubated it three over nights in undisturbed and closed area (Wet Feed). Ingredients are mixed properly and store in dry drum or pot (Dry Feed) indigenous microorganisms are added 500g per 25 kg of feed.

RESULTS AND DISCUSSIONS

The nature farming poultry is monitered 180 days,poultry is divides two parts one is test poultry soil and another is control poultry soil. Various concentration of IMOs, Orinted Herbal Nutrients (OHN), Fermented Plant Juice (FPJ), Fish Amino Acids (FFA) and Lactic Acid Bacteria (LAB) were applied to test poultry soil and not applied to control poultry soil.Test poultry soil smoother than control soil, chicks were tereated as well as in both test and control soil floor. Estimation of minerals of Natural farming IMOs treated poultry test soil sample and control soil floor samples were assessd.

Images of pollution free Poultry

1.Wooden box with Indigenous Microorganisms

Resulting increasing Organic Carbon, pH, Electric Conductivity (EC), Phosphorus Contant and Zink, dicreasing of Potassium(K) contant (estimated with spectrophotometer) in test poultry soil sample. The resulting values are furnished in table 2,3,4 and 5. Using of fermentative poultry chick's feed resulting dicreasing the cost of feed,in this technology Indigenous microorganisms (IMOs) maximize the inborn potential. Farmer friendly and zero waste emission,better quality.fermentative poultry feed alternates artificial or chemical vaccination,the enzymatic poultry feed and growth promoters. Utilization of wastes fermented feed increase chick's resistance power.

2.Chicks in Natural farming Poultry

Discussion of Natural farming poultry is returning to the farmers their natural relationship with nature and increasing the soil fertility and fixation of various minerals in the poultry test soil.
Making of poultry farm and the requirements are made from natural resources.

3. Indigenous Microorganisms

Natural poultry practice maximizes the use of on farm resources, recycles farm wastes and minimizes external inputs like vaccination, artificial feed. does not using chemical vaccination,growth promoters and avoid enzymatic feed. The most important thing in this technology soil is the primitive diversity and power of Indigenous Microorganisms.

4. Chicks feeding in Natural farming Poultry

The formulation of natural farming poultry not only safe for the environment and also meat taking humans, why means they had no artificial growth promoters and vaccines free. This technology inhibits disease caused agents naturally, and it provides resistance power to the chicks. In this IMO technology use of Indigenous Microorganisms increasing soil fertility and fixation of minarals in the soil. Formulation of this technology is eco friendly, enzymatic free chicks.

5. Poultry soil making

6. Natural farming poultry farm

Tables: Estimation of minerals in the IMOs treated soil sample and control:

Table-I Determination of organic carbon by titration method

s.no	Sample (blank)	Titer value (control)	Titer value (sample1)	Titer value (sample2)	Titer value (sample3)
1.	0.00	6.3	11.3	11.5	23.0
2.	0.00	7.4	12.4	11.3	12.1
3.	0.00	6.8	11.8	11.7	11.9
4.	0.00	7.9	11.5	11.3	11.8
5.	0.00	8.3	11.2	11.6	12.4
6.	0.00	6.3	11.5	11.5	11.3
7.	0.00	7.6	11.8	11.4	11.5
8.	0.00	5.3	11.9	11.6	11.4
9.	0.00	7.2	12.3	11.9	11.7
10.	0.00	8.9	11.5	11.7	11.4
Average	--	7.2	11.7	11.5	11.8

Organic carbon range: Very Low - < 0.25 >; Low - 0.25 – 0.5%; Medium - 0.5-0.75%; High - 0.75%

Titter Value (TV) = $\frac{\text{B.V - Exp. V}}{2}$

Factor: 1g of soil contain = TV x 0.003g C

100g of soil contain = $\frac{\text{TVx0.003x100}}{2}$

Control Soil Sample: = 0.49

Test soil sample: = 2.84

Table - II Determination of pH and Electric Conductivity (EC) of IMOs treated soil sample and control

	Poultry soil pH			Electric conductivity of soil	
s.no	pH (sample)	pH (control)	s.no	Electric conductivity of soil(sample)	Electric Conductivity(control)
1.	8.37	7.5	1.	0.56	0.48
2.	8.21	7.3	2.	0.63	0.45
3.	8.27	7.6	3.	0.64	0.49
4.	8.35	7.8	4.	0.67	0.51
5.	8.45	7.2	5.	0.59	0.47
6.	8.54	7.6	6.	0.51	0.46
7.	8.46	7.2	7.	0.54	0.49
8.	8.37	7.5	8.	0.61	0.48
9.	8.32	7.6	9.	0.57	0.47
10.	8.90	7.7	10.	0.59	0.45

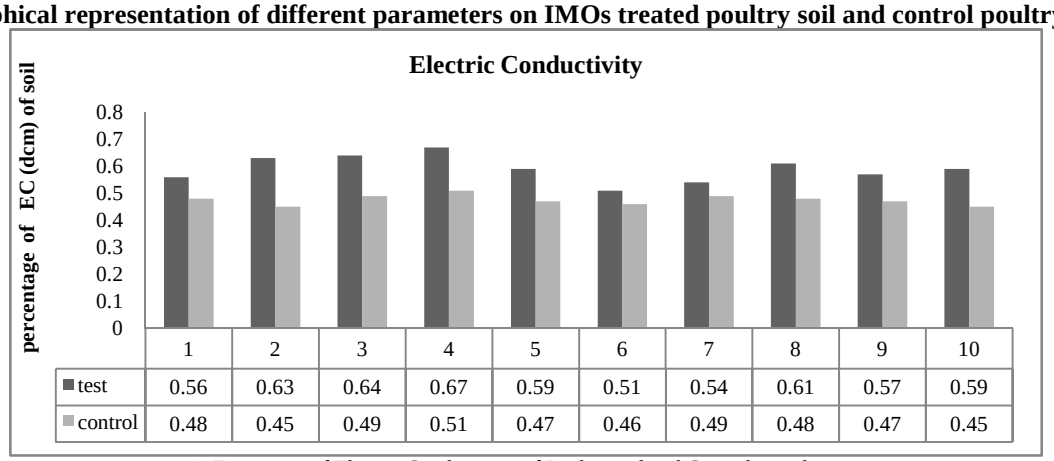
Table –III Estimation of Potassium (P_2O_5) present in the IMOs treated soil sample and control

s.no	Control(kg/he)	Sample 1(kg/he)	Sample -2(kg/he)	Sample 3(kg/he)
1.	228.2	204.6	204.2	203.5
2.	214.2	209.4	201.3	201.2
3.	212.7	206.3	205.2	206.3
4.	218.4	207.4	210.0	207.2
5.	220.7	201.2	203.4	205.8
6.	221.3	203.5	202.6	208.2
7.	227.4	205.2	208.2	202.9
8.	221.4	201.6	204.2	206.3
9.	223.8	205.2	203.8	203.2
10.	224.3	201.3	205.9	206.2

Table -IV Analysis of minerals in IMOs treated soil sample and control sample

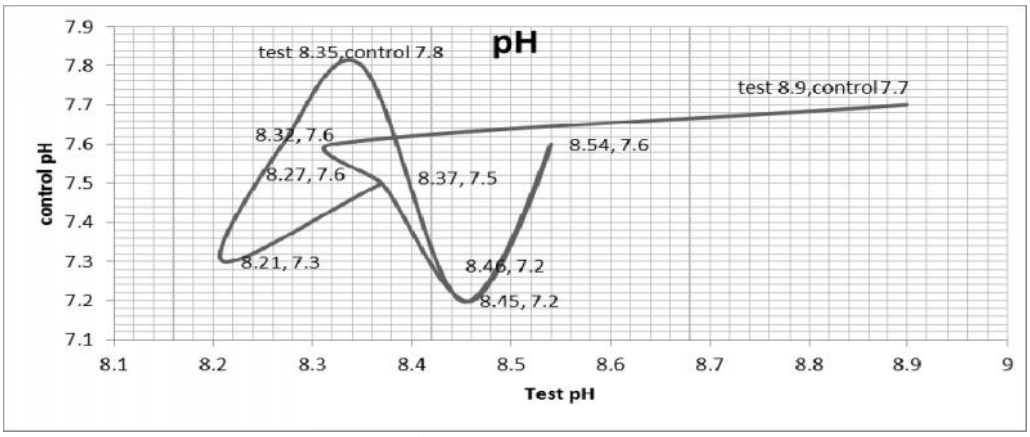
s.no	Test	Control	Sample -1	Sample -2	Sample – 3
1.	pH	7.8	8.2	8.5	8.4
2.	EC	0.51	0.67	0.63	0.61
3.	OC %	0.49	2.84	2.15	2.67
4.	P_2O_5 (kg/he)	20.8	23.4	22.3	22.5
5.	K_2O (kg/he)	228.2	204.6	209.4	207.2
6.	Zn (ppm)	0.45	1.12	1.32	1.25

Graphical representation of different parameters on IMOs treated poultry soil and control poultry soil

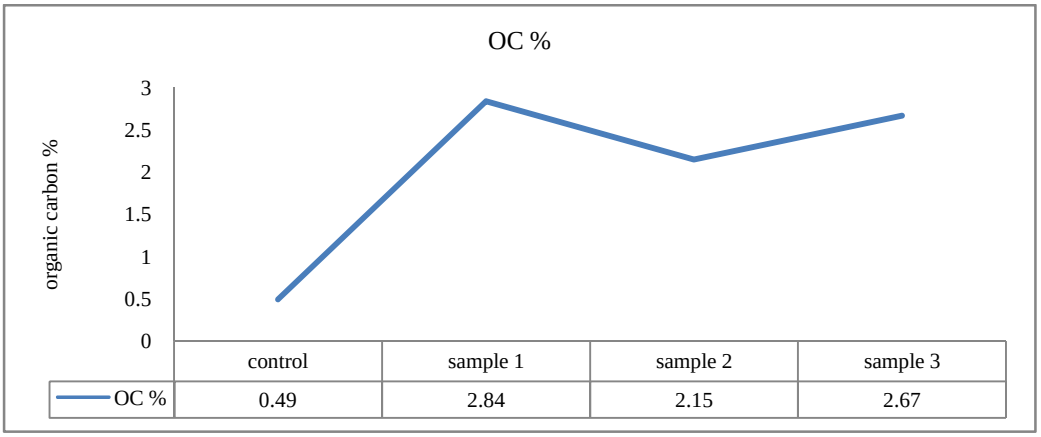


	1	2	3	4	5	6	7	8	9	10
test	0.56	0.63	0.64	0.67	0.59	0.51	0.54	0.61	0.57	0.59
control	0.48	0.45	0.49	0.51	0.47	0.46	0.49	0.48	0.47	0.45

1. Estimation of Electric Conductivity of Poultry soil and Control sample.

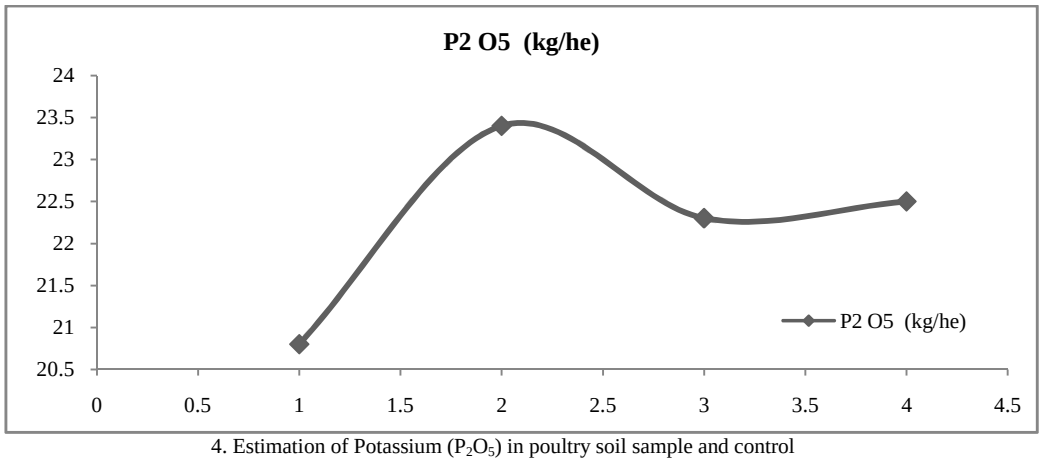


2. Estimation of pH in poultry soil and control sample

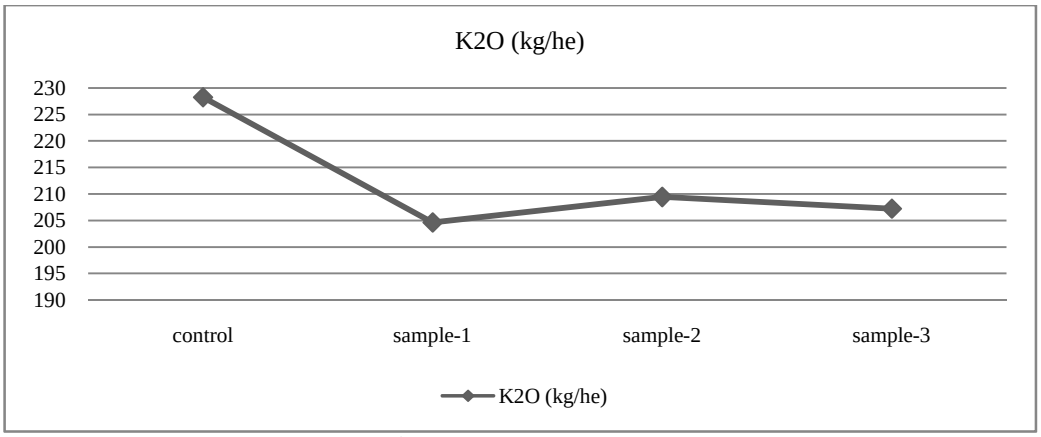


	control	sample 1	sample 2	sample 3
OC %	0.49	2.84	2.15	2.67

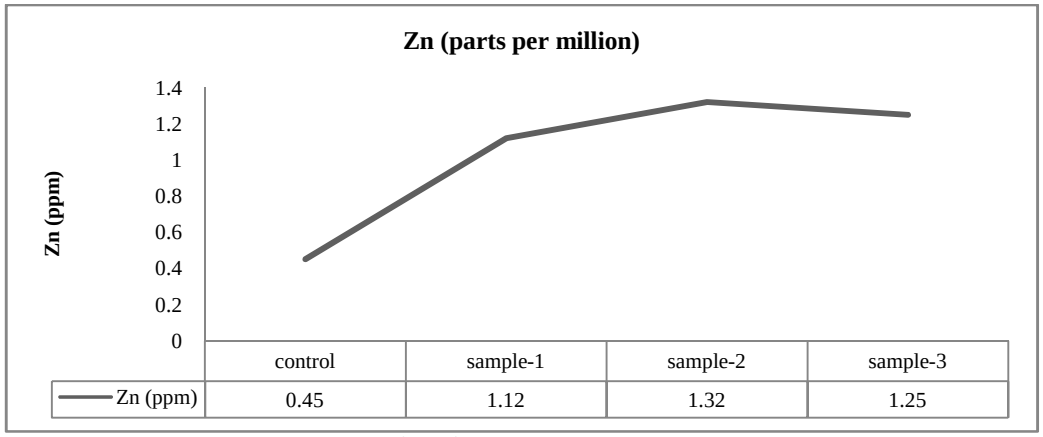
3. Estimation of Organic Carbon % in poultry sample and control



4. Estimation of Potassium (P_2O_5) in poultry soil sample and control



5. Estimation of K_2O in poultry soil sample and control



6. Estimation of Zn of Poultry soil and Control sample.

References

1. Cho Han-Kyu Natural Farming. Cho Han Kyu. CGNF technology, 2010, Seoul, Korea.
2. Ju-Young, Cho Han Kyu 2010. Natural Farming; Agricultural Materials. Cho Global Natural Farming, Seoul, South Korea.104p.
3. Cho Han-Kyu, Natural Farming with Indigenous Microorganisms, 2003. Janong Natural Farming Institute, Chungbuk, Republic of Korea.
4. Park, H.and M.Duponte, 2008. How to cultivate indigenous microorganisms. CTAHR Cooperative Extension Service Publication. BIO-9.
5. Higa, T. and G.N Wididana. 1991. The concept and theories of Effective Microorganisms P.118-1
6. Hornick, S.B. 1992. Factors affecting the nutritional quality of crops. Amer.J.Alternative agriculture.7:63-68.
7. Higa.T.1991. Effective microorganisms; A biotechnology for mankind. 8-14.in J.F.Parr, S.B. Hornick, and C.E. Whitman.
8. H.Y.Cheng, X.L.Wang, Experiments on EOR Employing Indigenous Microorganisms(In Chine's) 33 (1):91-94.
9. J.E.Parr and S.B.Hornick.1992. Utilization of municipal Wastes. P.545-559.
10. Darke, 2012, Fermented plant juice. http:// natural farminghawaii.net/2012/04.
11. Prell, Jackie.2010.Natural Farming with Indigenous Microorganisms: Inputs & Uses.Acres U.S.A. July.p.20-21, 24-26, 36-39
12. H.Parcon, S.Arita, M.Loke and P.Leung 2011. A comparision of Agricultural inputs Prices: Hawai's CTAHR Coopertive Extension Service Publication E1-20-23 pp.
13. Harris, D.C.2007 Quantitative Chemical Analysis. W. H. Freeman and Company. p. 12
14. Szmanski, N., and R.A. Patterson. 2003. Effective microorganisms (EM) and waste management systems in future directions for on-site systems: ISBN 0-9579438-1-4 p. 347–354.

****