

Effects of pesticides on maize crop using experimental animals

Abdul Munim Farooq (✉ munimfarooq@gmail.com)

Centre of Excellence in Molecular Biology <https://orcid.org/0000-0002-9205-1002>

Mariam Zameer

Institute of Molecular Biology and Biotechnology, University of Lahore

Ussal Tahir

The University of Lahore

Nureen Zahra

The University of Lahore

Shazia Yaqub

Punjab Food Authority

Zahida Qammar

Centre of Excellence in Molecular Biology

Nida Rahat

University of the Punjab Quaid-i-Azam Campus: University of the Punjab

Hafiz Sabah-ud-din Mazhar

University of Agriculture Faisalabad Faculty of Agriculture

Idrees Ahmad Nasir

Centre of Excellence in Molecular Biology

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Editor in chief
Molecular Biology Reports

Subject: Effects of pesticides on maize crop using experimental animals

Dear Editor,

I am attaching herewith a manuscript original research article entitled “*Effects of pesticides on maize crop using experimental animals*” for possible evaluation and publication.

With the submission of this manuscript, I would like to undertake that the above-mentioned manuscript has not been submitted elsewhere and this is original work.

The following Authors have not provided their official email address/they don't have one. The list is here as under.

1. Zahida Qammar, Assistant Professor (<http://pu.edu.pk/faculty/description/485/Ms-Zahida-Qamar.html>)
2. Idrees Ahmad Nasir, Professor (<http://pu.edu.pk/faculty/description/504/Dr-Idrees-Ahmad-Nasir.html>)
3. Shazia Yaqub, Government Public Analyst, Punjab Food Authority. <https://orcid.org/0000-0003-2342-3367>.
4. Nida Rahat, Student from University of the Punjab.
5. Hafiz Sabah-ud-din Mazhar, University of Agriculture Faisalabad.

Information for Author 1 and 2 is provided in link. For Author 3 ORCID is provided. Information for authors like student letters for 4 and 5 can be provided on request.

Please don't hesitate to contact me for further information. Thanks in advance for your time and consideration.

Sincerely

Abdul Munim Farooq

Assistant Professor

Centre of Excellence in
Molecular Biology, University
of Punjab.

Effects of pesticides on maize crop using experimental animals

Abdul Munim Farooq¹, Mariam Zameer², Ussal Tahir², Nureen Zahra², Shazia Yaqub³, Zahida Qammar¹, Nida Rahat,⁴ Hafiz Sabah-ud-din Mazhar⁵ and Idrees Ahmad Nasir¹.

¹Center of Excellence in Molecular Biology University of the Punjab Lahore, ²Institute of Molecular Biology and Biotechnology, University of Lahore, ³Government Public Analyst, District Food Lab, Punjab Food Authority, Lahore, ⁴CEES University of the Punjab, ⁵Department of Plant Breeding and Genetics, University of Agriculture Faisalabad.

¹Abdul Munim Farooq, Assistant Professor

munimfarooq@gmail.com

¹Zahida Qammar, Assistant Professor

florilab5@gmail.com

¹Idrees Ahmad Nasir, Professor

Dr.idrees@gmail.com

²Mariam Zameer, Lecturer

mariam.zameer@imbb.uol.edu.pk

²Usaal Tahir, Lecturer

usaal.tahir@imbb.uol.edu.pk

²Nureen Zahra, Assistant Professor

naureen.zahra@imbb.uol.edu.pk

³ Shazia Yaqub; G. Public Analyst

Shaziaft743@gmail.com

⁴Nida Rahat, Student

nida.rahata@hotmail.com

⁵ Hafiz Sabah-ud-din Mazhar, Student

t.sibu7246@gmail.com

Effects of pesticides on maize crop using experimental animals

Abstract

In the present era production and use of pesticides has been increased enormously and it has become the need to evaluate the pesticides effects on animals and mankind. For that, experiment has been performed to check the biosafety issue of pesticides by experimenting them on animals and their toxicity has been analyzed on soil and plants. For this, maize crop was selected in the confined area. Pesticide used was Talstar that belongs to a pyrethroid group, and its active ingredient is bifenthrin. Plants were sprayed with this chemical and their toxicity was then checked on the animals. For such purpose four groups of chicken and two groups of rats were selected. Groups of chicken were divided as control, normal maize, high dose pesticide, and low dose pesticide whereas rats were divided as control and experimental group. They were subjected to the feeding trial of pesticide exposed feed for 45 days. Their weights were examined, and high dose group showed significant effects. Biochemical analysis showed variations in the group belonged to high dose pesticide group. Immense increase in the number of platelets was observed in Wister rats. Morphological and histological study showed no prominent effects. Variations were only seen in the groups that were subjected to the high dose of pesticide. No microbial activity was disrupted. Plant growth was satisfactory. So, it is concluded that the effects of pesticides are dependent on time and duration. Hence, pesticides have both negative and positive effects in the welfare of human well-being.

Keywords: Pesticides, Rats, Chicken, Biochemical analysis.

Introduction

Pesticides are the entities that are used to inhibit or kill the plant pests. Generally, a pesticide is any biological or chemical agent that discourages, weakens, kills, or depresses pests. Pesticides are designed specifically to affect target or non-target organisms. Target pests can include nematodes, plant pathogens, weeds, insects, fish, mammals, microbes and birds that not only cause turbulence in the atmosphere but can also destroy property, can be cause of spreading disease or vector borne diseases massively. Non target organisms may also be affected by the pesticides as they kill those organisms that can be beneficial for the crop. Advantages and disadvantages of the pesticides go hand in hand, such as holding potential of higher toxicity to humans, animals and even environment [1]. According to the Stockholm Convention the most dangerous, toxic and persistent organic pollutant reported are organo-chlorine pesticides.

According to World Health Organization, “Pesticides are chemical compounds that are used to kill pests, including rodents, fungi, insects and some other unwanted plants that are also called weeds.” Pesticides have been enormously used in the welfare of public health to kill vector borne diseases like malaria, dengue, in agricultural sector to kill those pests that can be deadly to the crops. Pesticides need to be used and handled with great care and proper safety as they can cause toxicity to the humans especially when they are not properly disposed of.” (WHO, 2021). Likewise, The Food and Agriculture Organization (FAO) have defined pesticide as: “any substance or mixture of substances intended for destroying, controlling, or preventing, any pest, including vectors of human or animal disease, unwanted species of plants or animals, causing harm during or otherwise interfering with the production, processing, storage, transport, or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances that may be administered to animals for the control of insects, arachnids, or other pests in or on their bodies. The term includes substances intended for use as a plant growth regulator, defoliant, desiccant, or agent for thinning fruit or preventing the premature fall of fruit. Also used as substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport” (FAO, 2002).

The term pesticide is a general term and covers a vast variety of compounds that includes herbicides, molluscicides, fungicides, nematicides, rodenticides, plant growth controllers and some others. Out of all these organo-chlorine pesticides have been used enormously in controlling and preventing a large number of diseases, like typhus and malaria but its use has been banned in most of the technological advanced countries after 1960's. There are other synthetic insecticides that were introduced earlier like pyrethroids in 1980's, organophosphates in 1960's, carbamates in 1970's fungicides and herbicides in the 1970's-80's completely changed the environmental conditions in those times. They contributed majorly to control pest and giving the tremendous output in the agricultural sector. Contentedly, pesticides must be deadly to the target species but not to the non-target species, including Homo sapiens. Its use got out of control and so the dispute of its abuse and use has gone out of hands

[2]. In this study major work has been done using pyrethroid insecticides; active ingredient; bifenthrin and product name Talstar.

Pyrethroid insecticides are those synthetic pesticides that are based on the naturally occurred composite pyrethrin that has been extracted from the flower named chrysanthemum. Pyrethroid is infamous for its immediate killing of insects, but the fact remains that natural compound in its composition is not always lethal, but it aids in degrading the environment slowly. Chemically, pyrethroids have been secured to cover the number of factors like increasing perseverance in the agricultural applications and increasing their toxicity to prolong their effectiveness. At the time of application, pyrethroids are often mixed with other insecticides either mixed in a tank or a brand name product at the application site to increase its effectiveness. At site the most noted symptom of pyrethroid poisoning was seen in the honeybees as it caused regurgitation of collected nectar [3].

Pyrethroids have been categorized as Group 1 and Group 2 pyrethroids and their efficiency is dependent of their active ingredients. **Bifenthrin C₂₃H₂₂CLF₃O₂** is a pyrethroid insecticide which is used chiefly against the red imported fire ant by affecting its nervous system. It has a great deal of virulence for marine entities. It is permitted to be traded for daily use with the condition that the sold amount of chemical should contain a low concentration of bifenthrin, though it falls in the category of limited used chemicals in United States. The chemical was discovered and industrialized by FMC Corporation. Products comprising of bifenthrin include FMC 54800, Ortho Home Defense Max, transport, brigade, bifenthrine, Zipak, mega wash, Scotts Lawn Pro Step 3, Maxxthor, Wisdom TC Flowable, bifen L/P, Allectus, Bifen XTS, Ortho Max Pro and OMS3024, Talstar, Bifen IT, Capture and Torant. A long-term study was held on male and female Swiss mice that were 20 to 21 months old. Geiger journalized that there was an increase in urinary bladder tumors in male mice when we compared them in pairs. Whereas in females there were signs of increased lymphoblastic leukemia and lung tumors when we compared them in pairs. In another feeding study in rats 104 days of Sprague Dawley males and Tac (SD) fBR females, McCarty presented that the results of these studies showed no indications of tumors that should be needed to treat eventually .

“For the production of BHC near Calcutta a plant was created with which the manufacturing of insecticides established in India in 1952. Now a day, India is the second largest industrialists of pesticides in Asia after China and on the global rank falls on the twelfth number. There has been a stable progression in the manufacture of mechanical grade insecticides in India, from 5,000 metric tons in 1958 to 102,240 metric tons in 1998. In 1996–97 the mandate for pesticides in the expression of value was calculated to be around Rs. 22 billion (USD 0.5 billion), which is almost 2% of the total world market. Pesticide usage configuration is different in India from that for the world in general. As it is shown in Figure 1, globally 46% of pesticides are used as insecticides as compared to India where 76% of pesticides are used as insecticides. In comparison, there is a less use of fungicides and herbicides respectively. 45% of pesticides are solely used for cotton crops in India, followed by paddy and wheat” [4]. Roughly 2.5 million tons of pesticides are being used worldwide every year and the amount of usage has kept on increasing with the passage of time. The same trend has been perceived in Pakistan. In conclusion to rectilinear jeopardy interpretation of animal data and maximum contact levels of 550 million people, it is testified that in developing countries, there are 37,000 cancer cases yearly linked with pesticide usage. Lately, it has also testified that nearly three million people are insecticides, 39 types of weedicides, 5 types of acaricides, 30 types of fungicides, and 6 different types of rodenticides are being used. Whereas the import of pesticides has been rising progressively with every passing year. The statistics specified that almost 80% of the pesticides is only applied on cotton plants, whereas the rest of the amount is used for diseased and 200,000 died every year world-wide due to pesticide infections and a common amount of these people live in the developing countries. Currently, in Pakistan more than 108 types of other plants, such as tobacco, sugarcane, paddy, fruits, maize etc. According to the Technical Bulletin (2000), in the last 20 years, the pesticide usage has increased by 1169% in Pakistan and the number of sprays used for each crop has extended to more than 10, which is a very distressing condition for the concern of human health. Mostly, brochures of pesticides are printed in English and Urdu languages so more than 70% of farmer groups are unable to read or comprehend the national language i.e., Urdu and henceforth, the awareness provided. Therefore, the likelihoods of ill use of pesticides are comparatively high in Pakistan due to less awareness about how to use pesticides carefully and low literacy rate. Conventionally, cotton picking is done by female field workers and same case is marked by scientific researches held in cotton growing areas of Pakistan, so the SDPI (Sustainable Development Policy Institute) analysis underlined that women are at immense danger of pesticide virulence due to much exposure in cotton fields. The report also exposed that as compared to males, females who work in cotton field, contain multiple indications given as headache (26%), gastroenteritis (10%), skin irritation (27%), and nausea (12%). The health problems got even more intensified when the women picking

cotton in the neighboring fields are severely affected because some specific selections of cotton bloom are sprayed. The notions of transportation of tenacious organic contaminants have been acknowledged since beginning. It is assessed those atmospheric processes are accountable for 80–99% of total reservoirs of the world's oceans but, in Pakistan none of the research up till now has been directed on the issue despite of the fact that a large number of pesticides is being used in a specific area. Therefore, one can't predict the real picture of atmospheric disclosure in the residents of the locality. In Pakistan, many cases of dengue virus were stated in October 2006 that ended up in total 44 deaths. In order to control this vector borne disease, the Government initiated the spray of delta-methrine in the most densely populated cities unknowingly of the population with significant precautionary measures and that resulted in the higher rate of diseased cases. As compared to the past records of hospitals more than 20% of the respiratory complications were reported. Furthermore, the environmental conditions especially in Faisalabad and Lahore were satisfactory as the atmosphere of both the cities were misty enough at that time with the temperature of about 13-20°C and suspended particulate matter was 400-600 µg/m³ so the temperature ranges moderate the persistence of pyrethroid applied [5]. In Pakistan, major crops on which various chemicals are applied are Sugarcane, maize, oil seeds various fruits and vegetable and most of all wheat has been affected. Their spread has also been polluting the provinces of Pakistan [6]. Pesticides have been enormously used as they pose tremendous benefits in forestry, agriculture, domestic circle and public health. Pest controls through pesticides have been reported to continuously amend the livestock and crop yields. Pesticides are reducing the human and animal lives from severe survival. Pesticides have been an essential part of the procedure by decreasing losses from the weeds, diseases as insects and pests that can evidently decrease the quantity of the harvest output. Pesticides often undergo the process of photo chemical transformation which results in the formation of such metabolites that are proved to be beneficial and non-toxic not only to the human beings but also to the environment. Transport sector is also making a massive use of pesticides, especially herbicides and insecticides as they have been used to maintain the pastures of grass in sports pitches, golf courses and playgrounds. Pesticides are also playing vital role in protecting the buildings' structure also other wooden structures to prevent them from termites and other wood loving insects. The most effectively controlled diseases by pesticides are vector-borne diseases as they directly lead to the knock down of vector in the first place. Insecticides are the one and only way to keep the pests and insects from spreading fatal diseases like malaria, dengue and the estimated 5000 deaths each day are reported in India. In 2004, malaria was considered as one of the foremost causes of mortality and morbidity rate in developing countries like India and Pakistan. Public health issue has become quite a chore in India. Strategies for controlling diseases are immensely important for cattle and livestock. In shorts pesticides hold great importance in aiding continuous improvement in the agricultural sector i.e. improving quality of food. Where pesticides benefit the agricultural sector; on the other hand, it has some drastic effects on human health and environment. Pesticides can pollute water, soil, meadow and vegetation. Apart from killing insects' pesticides are very toxic to some of the other animals in the kingdom like birds, some plant-loving insects that are beneficial and also non target plants get affected greatly. Insecticides are considered intensely toxic course of pesticides but amongst pesticides, herbicides are repeatedly reported to be the most dangerous as they show great potential of risk to non-target organisms [6].

Soil treatment with the massive use pesticides can cause population of required soil organisms to decay. According to the Dr. Elaine Ingham (soil scientist) if both fungi and bacteria are lost from the soil then the soil starts to degrade. Excessive use of pesticides and chemical fertilizers pose serious effects on soil microorganisms as humans get affected by the overdose of antibiotics. Undiscerning use of pesticides may work for several years but after sometime its resistance in the soil will not last and soil microorganisms wouldn't be beneficial enough to keep the hold of required nutrients as plants are dependent on the variety of soil bodies that are helpful in transforming atmospheric nitrogen into certain nitrates that can be used by the plants [2].

Human exposure to chemicals can be a cause of acute and tardy health effects. Adverse health effects can be caused by the pesticides exposure that can range from simple to very dangerous for human lives. Some of the simplest effects to be caused by pesticides are skin irritation, eye irritation, skin rash etc. Severe effects of pesticides range from affecting nervous system, endocrinal issues, unbalancing of hormones and ultimately lead to the deadly disease called cancer. In 2007, most studies from the literature showed that leukemia and non-hodgkin lymphoma are strongly associated with the pesticide exposure which leads to conclude that use of pesticides should be immediately decreased. There is considerable indication of links between neurobehavioral alterations and exposure of organophosphate insecticide. Inadequate indication also occurs for other negative results from pesticide exposure that includes fatal death, birth defects, and neurological disorders. In Pakistan different cancers have been reported to be found in men and women like breast, ovarian, prostate and testicular

cancers have been frequently reported. More effective and sound scientific efforts are needed to prevent public health, environmental and soil contamination resulting from the indiscriminate use of pesticides [7].

Material and methods

Research design

The experiment was performed for 45 days on maize crop using broiler chicken and Wister rats as the two groups of animals. Before sowing of the seeds, land was prepared using agronomic practices. Size of the research area was two canals and plants were planted in field tunnel using proper layout design and spacing. Pre-sowing and post-harvest sampling were done for the analysis of the soil and sampling points were selected using GPS. Parameters like pH, Electrical conductivity(mScm^{-1}), Organic matter (%), Available phosphorous (mgkg^{-1}), Available potassium (mgkg^{-1}), Saturation (%), Texture, Sodium, Bulk density were considered for the analysis of soil. Growth of different parts of the germinated plants was noted on weekly basis. After the four weeks when notable germination was observed, Talster was sprayed on the maize plants. Quantity of 10 ml Talster was added in the 20 ml of distilled water. Total chickens were divided in four subgroups Control, Normal maize, High dose pesticide and low dose pesticide while Rats were divided in two subgroups Control and pesticide dose maize.

Feed preparation

Leaves of maize crop were taken from the field and grinded in the fine powder grinder. Control group of both Chicken and rats were fed with commercial feed. For the Normal maize group of chicken 1:1 commercial feed and maize leaves were used while experimental group of rats were fed with known concentration of Talster mixed with the feed. Low dose group of chicken was fed with 3% Talster spray on 1:1 of feed and maize whereas high dose group was fed with 9% of Talster spray on 1:1 of feed and maize.

Sampling & Analysis of Animals

During the trial, animals were weighed after 15 days interval with the help of weighing balance. At the end of trial blood samples were collected in the 5ml syringe. 3ml blood was collected from brachial vein of chicken and heart vein of the rats. Blood samples were stored in the EDTA coated vacutainers with proper labelling and then subjected to centrifugation on 13k RPM for 15 minutes at 4° C. Supernatant was collected and sent to National Laboratory of Genetics for analysis. After the trial the Chickens were slaughtered, and rats were dissected using sterilized blades. Heart, Liver, and Intestines were collected in the appropriate tubes for the histological studies. The samples subjected to washing with 1x PBS and then stored in 10% formalin solution at 4°C.

Microtomy

Microtomy was done for the tissue analysis of the organs. Organ samples were treated to make paraffin blocks for the histological analysis. The samples were treated with different levels of alcohol for dehydration and were moved to falcon tubes containing xylene and were subjected to 15 minutes of shaking at room temperature. Paraffin block was melted at 65° C in water bath. After 15 minutes, the tissue was then moved to one tube of 15ml containing melted paraffin and was kept at 65° C for another 15 minutes on continuous shaking. The tissue was then moved to the new 15ml tube of melted paraffin and was again kept at 65° C for 15 minutes. The tissue was then implanted in paraffin to prepare blocks. For preparation of blocks, the tissue was placed centrally in the mould and boiling paraffin was poured over it. Each cassette of the mould was labeled. For the fixing of cassette, boiling paraffin was poured and kept for the solidification at room temperature. After paraffin solidification, blocks were removed from the moulds, stored at 4°C, wrapped in aluminum foil. The temperature of microtome was set at 50° C. Before sectioning, tissue blocks were kept for 20 minutes at 4° C. Glass slides were then prepared with the proper labeling of samples. Furthermore, sections were prepared by microtomy and were successfully placed on the slides. The slides were kept at room temperature.

Staining of Slides

For Eosin treatment, slides were treated with xylene for three minutes than subjected to grading treatment of alcohol i.e., 100%, 95%, 80%, and 70% of ethanol. For Haematoxylin treatment, slides were treated with Eosin for one minute than washed under water. Slides were dipped in the alcohol grading 70%, 80%, 95%, and 100% respectively and were dipped in the xylene solution afterwards. Cytosine mount was kept on the slides and slides were covered with cover slips to be seen under microscope.

Results

Soil Analysis

Samples were taken from the various parts of field before sowing of the seeds and after the harvest of the crop to check the effects of pesticides on the soil. Various parameters were tested to check the soil i.e., Electrical Conductivity (EC), pH, available contents of Phosphorus, Potassium and Sodium in the soil, Soil saturation and Bulk Density.

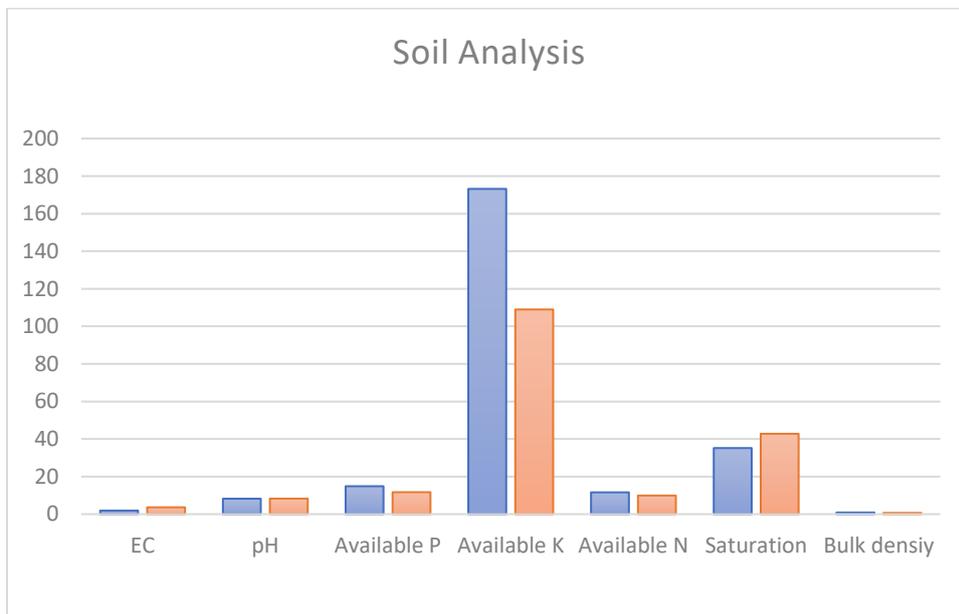


Figure 1: Soil analysis

Weight of Chicken

Weight of chicken were calculated regularly and at the end of trial one best chicken from each group is chosen and their weights were calculated, there was no significant differences between the control, Normal and low dose group but significant differences were observed in the weight of high dose group chicken. Following graph shows the interpretation of the data.

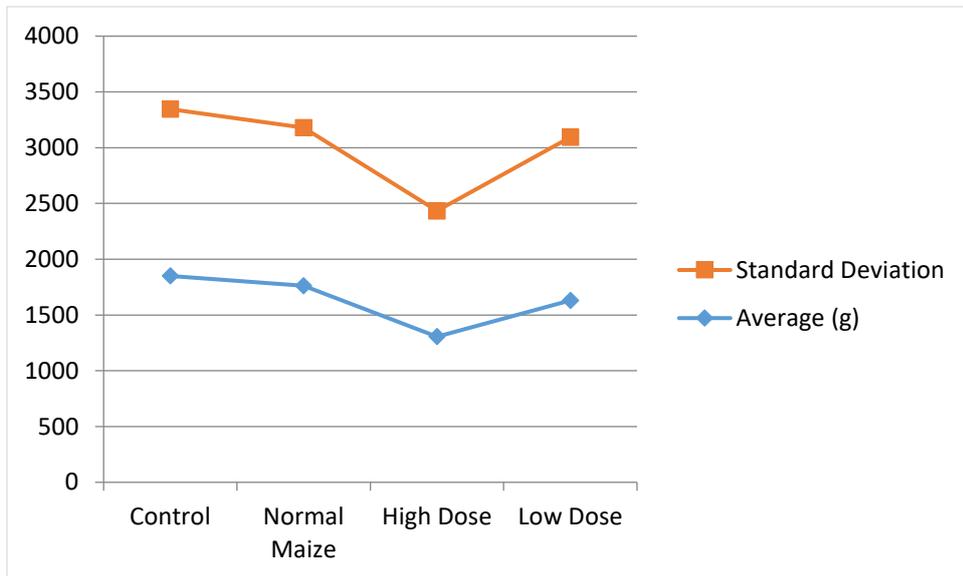


Figure 2: Weight of chicken

Table 1: Weight of Chicken

Groups	Average (g)	Standard deviation
Control group	1850	1495.25
Normal Maize	1762	1418.57
High dose	1305.75	1128.04
Low dose	1629.5	1465.66

Weight of Rats

During the trial rats were weighed after the fifteen days interval regularly. After the interpretation of the data there was no significant difference in the weight of different groups of rats.

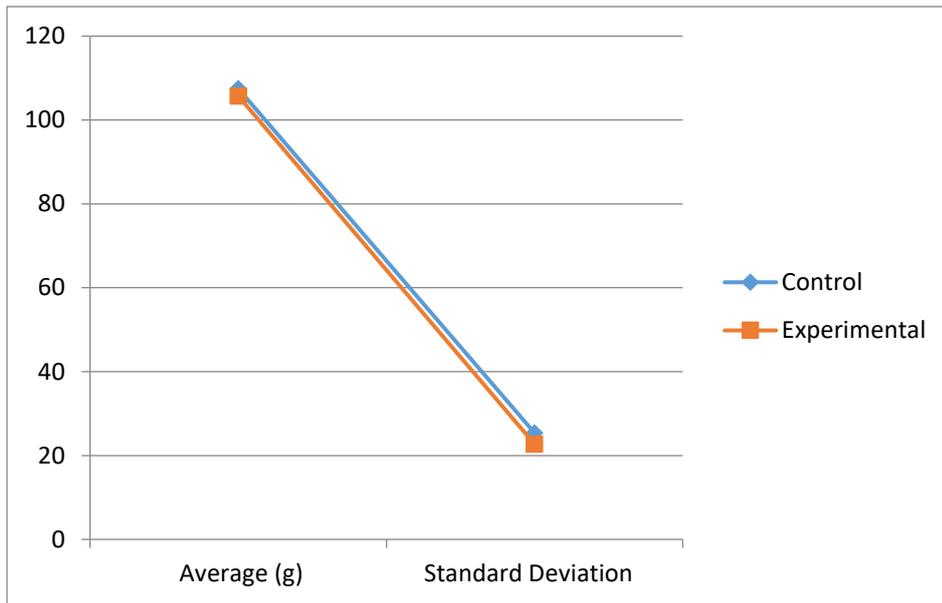


Figure 3: Weight of Rats

Table 2: Weight of Rats

Groups	Average (g)	Standard deviation
Control	107.5	25.383722
Experimental	105.75	22.7307611

Organs of chicken

After the dissection of chicken different organs i.e., Heart, Liver and Intestines were weighed. Graphical analysis showed that high dose group has prominent effects as compared to the other groups.

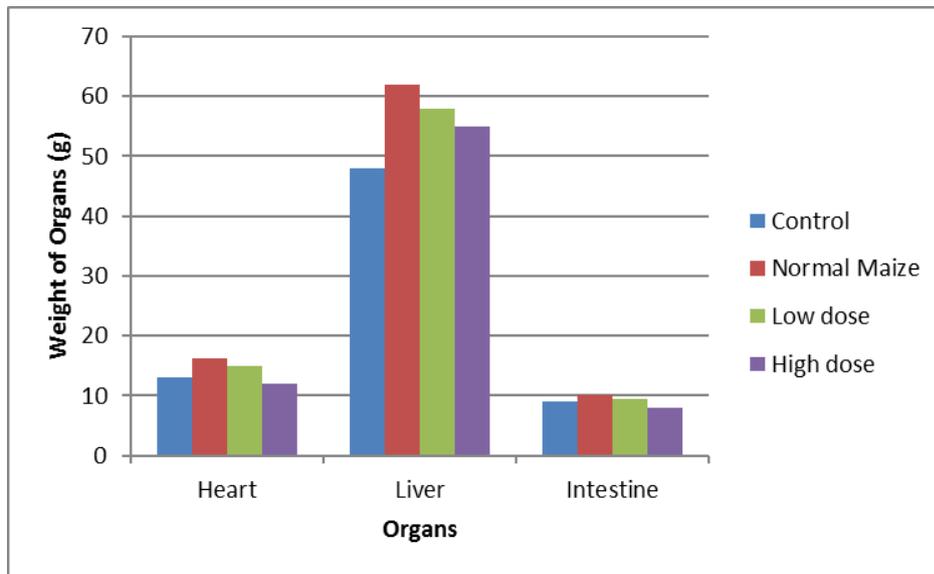


Figure 4: Chicken Organs Weight

Table 3: Chicken Organs Weight

Organ	Control	Normal	Low dose	High dose
Heart	13	16.3	15	12
Liver	48	62	58	55
Intestine	9	10	9.5	8

Organs of Rats

After the dissection the rats vital organs like Heart, Liver and Intestine were weighed and no prominent difference between different groups seen.

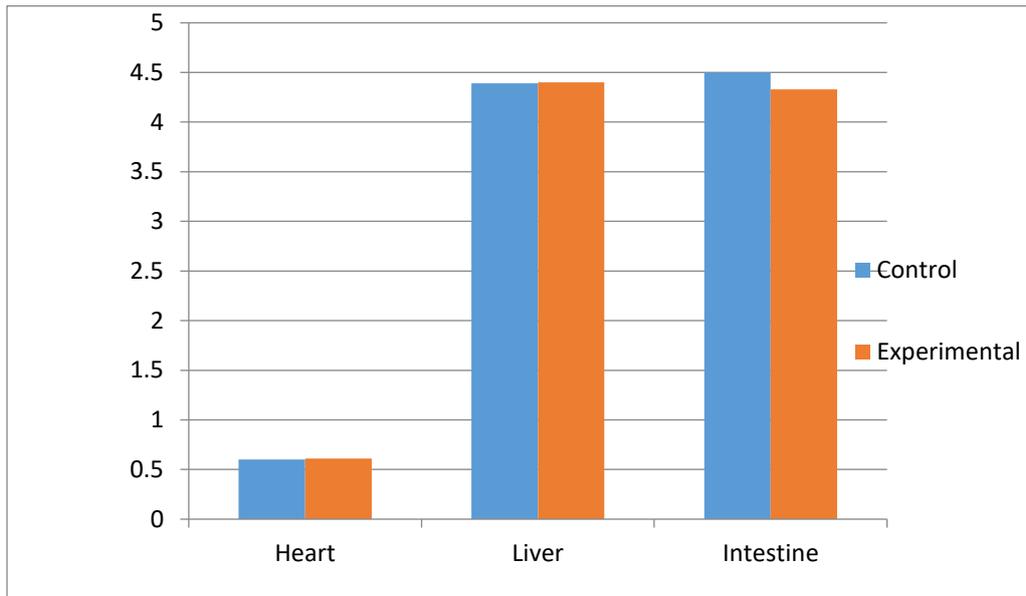


Figure 5: Wiegth of organs of Rats

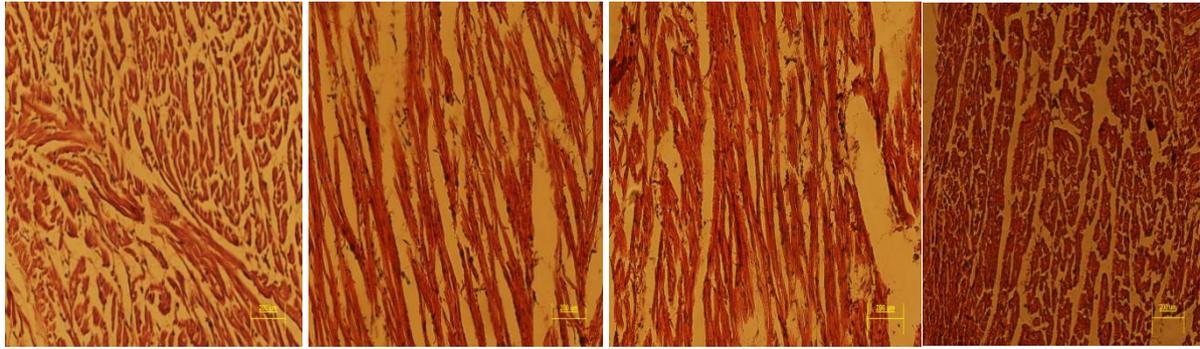
Table 4: Weight of organs of Rats

Organ	Control	Experimental
Heart	0.6	0.61
Liver	4.39	4.4
Intestine	4.5	4.2

Histological Analysis

Heart Tissues of Chicken

Heart tissues of chicken were observed under fluorescent microscope at 20x lens. The cellular representation has been shown in the fig 6.

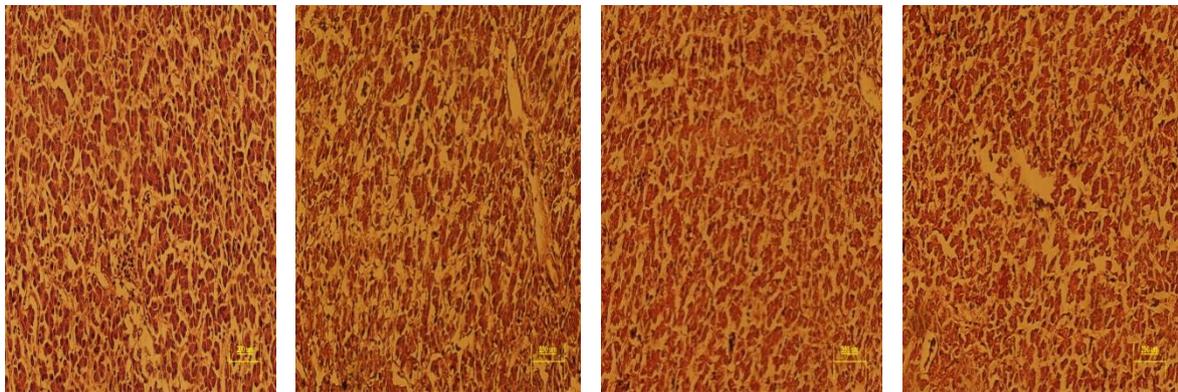


(A) (B) (C) (D)

Figure 6: Histological analysis of different groups of Chicken heart tissues i.e., (A) Control , (B) Normal dose, (C) Low dose, (D) High dose

Liver tissues of Chicken

Liver tissues of chicken were observed under fluorescent microscope at 20x lens. The microscope revealed polygonal cells along with a rounded nucleus. The cellular representation has been shown in the fig 7.

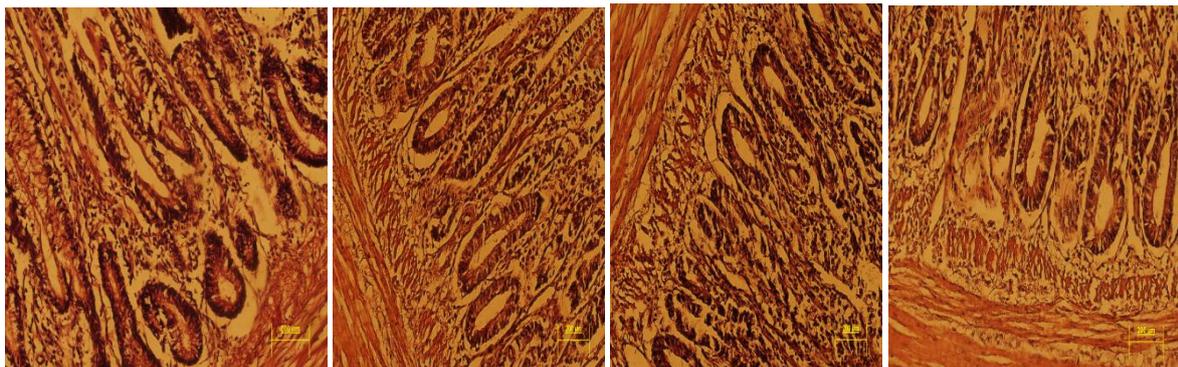


(A) (B) (C) (D)

Figure 7: Histological analysis of different groups of Chicken Liver tissues i.e., (A) Control , (B) Normal dose, (C) Low dose, (D) High dose

Intestinal tissues of chicken

Intestinal tissues of chicken were observed under fluorescent microscope at 20x lens. The ring-shaped villi of the intestine were clearly visible. The cellular representation has been shown in the fig 8.



(A) (B) (C) (D)

Figure 8: Histological analysis of different groups of Chicken Intestinal tissues i.e., (A) Control , (B) Normal dose, (C) Low dose, (D) High dose

Heart tissues of rats

Heart tissues of rats were observed under fluorescent microscope at 20x lens. The cellular representation has been shown in the fig 9.

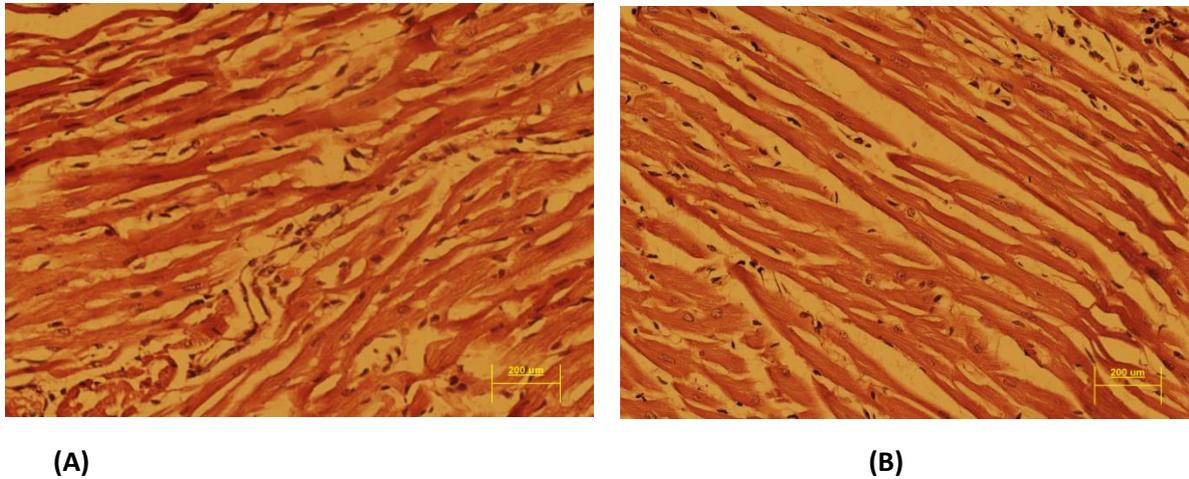


Figure 9: Histological analysis of Heart tissues of Rats i.e., (A) Control Group, (B) Experimental Group

Liver tissues of rats

Liver tissues of rats were observed under fluorescent microscope at 20x lens. The cellular representation has been shown in the fig 10.

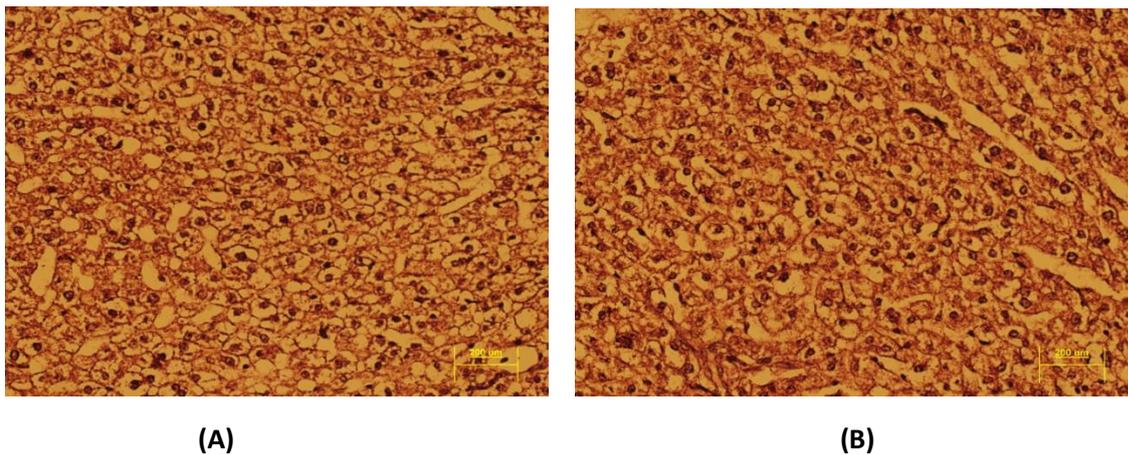
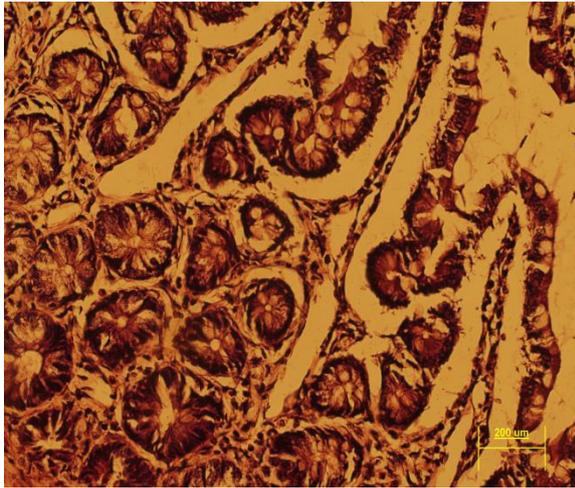


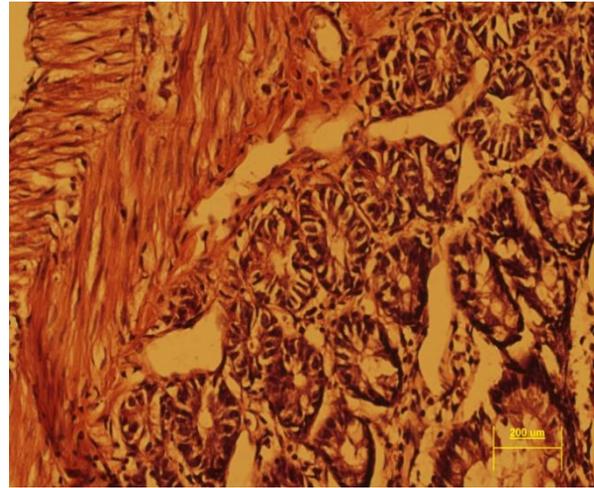
Figure 10: Histological analysis of Liver tissues of Rats i.e., (A) Control Group, (B) Experimental Group

Intestinal tissues of rats

Liver tissues of rats were observed under fluorescent microscope at 20x lens. The cellular representation has been shown in the fig 11.



(A)



(B)

Figure 11: Histological analysis of Intestinal tissues of Rats i.e., (A) Control Group, (B) Experimental Group

Biochemical testing of specimen

For biochemical analysis, complete blood count test was done of both the specimen. WBC, RBC, HCT, HGB, MCV, MCH, MCHC, PLT and LYM were the parameters that were considered for the biochemical testing of blood samples from the assorted groups. Results have been tabulated below:

Table 5: CBC of Chicken

	Samples	WBC	RBC	HGB	HCT	MCV	MCH	MCHC	PLT	LYM%
Control	22-June	195.7	1.31	6.1	19.5	130.3	41.2	30.6	10	95.4
	15-july	198.8	1.61	6.9	21.6	134.2	42.9	31.9	11	97.5
Normal	22-June	244.2	2.60	11.3	35.5	136.5	43.5	31.8	0	-
	15-july	246.4	2.93	12.2	36.5	124.6	41.6	33.4	5	-
Low dose	22-June	235.8	2.54	10.3	32.9	129.5	40.6	31.3	0	-
	15-july	180.1	2.09	6.6	28.4	131.8	23.5	21.3	0	-
High dose	22-June	235.4	2.41	9.8	30.9	128.2	40.7	31.7	1	-
	15-july	150.2	2.19	3.8	28.5	130.1	17.4	13.3	0	95.1

Table 6: CBC of Rats

Name	Sampl es	WB C	RB C	HG B	HC T	MC V	MC H	MCH C	PL T	LYM %
Control	15 July	6.1	6.8 7	12. 3	45. 3	65.9	17.9	27.2	566	88.7
Experimen tal	15 July	7.9	7.0 3	12. 7	47. 2	67.1	18.1	26.9	897	92.3

Interpretation of different parts of plants by ANOVA

Two-way ANOVA was applied on the measurements of plants to compare the mean differences between the independent variables. The main purpose of using two way ANOVA is to understand the relationship between two independent factors on the dependent factor. The selected significant value was 0.05. Following data shows the plant growth. No significant effect was computed.

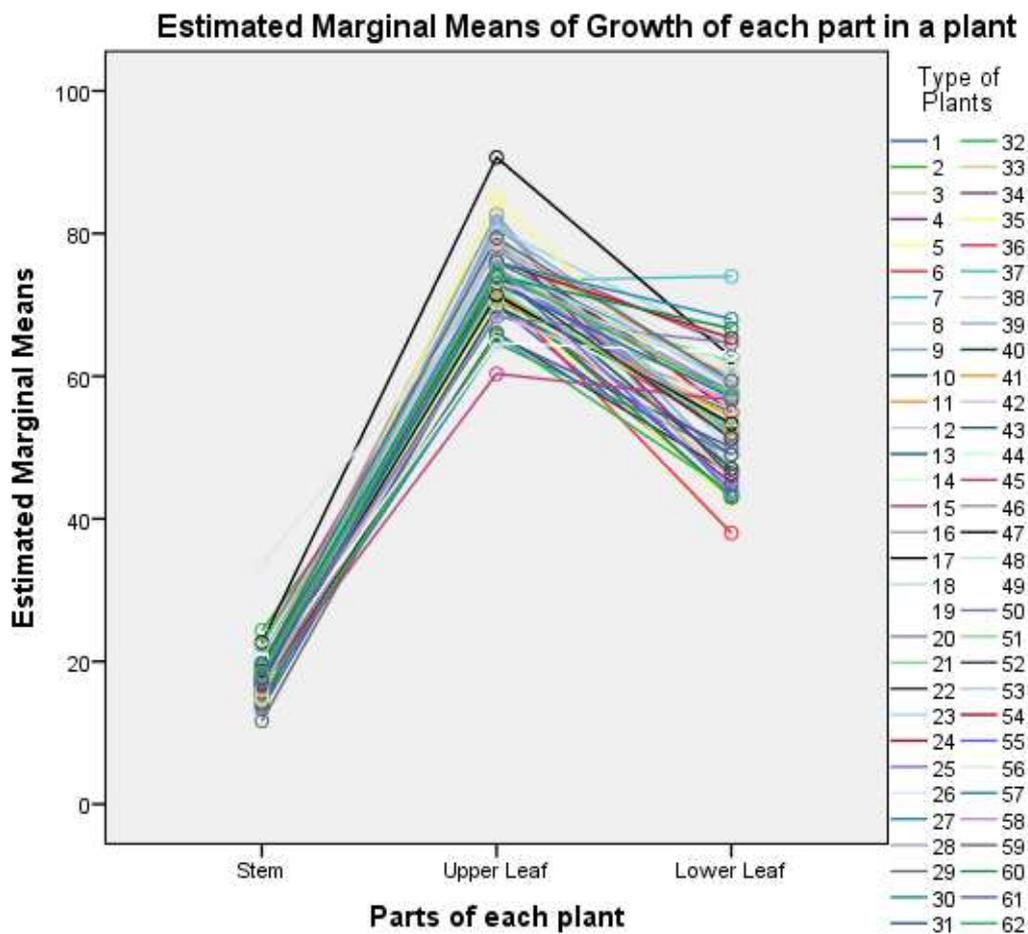


Figure 12: Marginal Means of growth of each part in a plant

Table 7: Significance of dependent Variables

Dependent Variable: Growth of each part in a plant

Independent Variable: Pesticide

Source	Type III Sum of Squares	df	Mean Square	F	Sig. P-value
Corrected Model	325053.149 ^a	185	1757.044	34.033	.000
Intercept	1329292.518	1	1329292.518	25747.890	.000
Plants	7655.815	61	125.505	2.431	.000
Parts	308063.326	2	154031.663	2983.535	.000
Plants * Parts	9334.007	122	76.508	1.482	.003
Error	19205.333	372	51.627		
Total	1673551.000	558			
Corrected Total	344258.482	557			

Discussion

With the advancement in agricultural industry, the productions of pesticides have also been massively increased. Some of them even become the basic need of the famers. After the introduction of Pesticides and Agrochemicals in the field they didn't just protected the crops but also gave farmers the desirable yield which ultimately increased the production of these chemicals and attracted many more companies to make their unique ones. Due to its continuous adaptation in the daily life, large amount of several new chemicals has been used in the protection of crops every year but in the end, they are causing unwanted effects also floating the food costs. In addition to this, new technologies like genetically modified organisms (GMO) are recently proved to be resistant and can be the major reason to stop the excessive spread of pesticides in agricultural industry. Efforts are needed to increase the food production and protection of crop but with an expression that along with food, quality, safety and production residues of pesticides should be well controlled in order to prevent the biotic life from severe effects [8].

Though there are some useful means to make the use of pesticides but still at present, it is mandatory to find out the issues relating to the use of pesticides on crops in terms of checking toxicity and the intensity of severity they

can cause to biotic life and environment as the use of pesticides has been proved to be dangerous to mankind. For that an attempt was made to check biosafety study of pesticides, Maize crop on Chicken broilers and rats. The crop was implanted in the confined area, tunnel. Broiler chicken were selected for such drive. They were divided in to four groups i.e., Control, Normal, high dose pesticide, and low dose pesticide. On the other hand, Wister rats were divided into two groups Control and Experimental group. Soil analysis was also done before and after the harvesting of crop. Soil analysis was done before and after sowing of the crop. Almost nine parameters were performed to check the effects of pesticides i.e., sodium, potassium, phosphorous, electrical conductivity, pH, texture. No major change was seen.

The chickens were weighed at four different levels i.e., every fifteen day, and the trial was due for 45 days. The data was inferred in Excel 2013. It was observed from the graphical representation that the initially, weight of chicken belonging to control, normal and low dose pesticide was notably increased whereas high dose pesticide group in the end showed sudden weight loss. Similarly, weight of Wister rats from control group was increased but the experimental rat showed weight loss.

After dissection, the organs were also weighed. The collected data showed that the weight of segmented organs was normal. No prominent and significant difference was noted when it came into comparison with the control group. Morphology of vital organs were also noted, visually it was noted that no substantial variation was apparent [9] also studied the effects of pesticides on domestic animals (cats & Dogs) that were exposed to the chemicals incidentally and the results pointed out the toxicity of pesticides from different areas, showed significant effects on animals.

Blood biochemical analysis was also done determined by CBC. Blood was drawn from the broilers twice. Blood of chicken was drawn from the brachial vein that is located under the wing and from rats' blood was collected from the heart under authentication. Normal and control groups showed normal ranges whereas significant effects have been observed in high and low dose groups i.e., WBC, RBC, HGB etc. were decreased. In rats no significant effect was observed but platelets count was highly increased.

To analyze the growth of plants, two-way ANOVA was applied on the measurements of parts of plants i.e., stem, upper leaf and lower leaf. Significant value was 0.05 and the results did not exceed the value which means the plant growth was not affected.

Conclusion

The amount of detrimental and radical effects that come from the repeated use of agro chemicals in developing countries are vast. These numbers have caught the eye of environmentalists, doctors and governments because at present, long-term exposure to chemicals on living forms of life including plants are of great concern [10]. Use of pesticides without proper knowledge and guidance from the professional has showed the clear potential of adverse health effects as human life is the eventual target. It reaches them through different pathways either directly from water, air, fodder or indirectly from animals upon consuming meat, milk, egg and eventually accumulates in human beings and harms them [11].

Even Though the use of pesticide is important and beneficial in terms of improving food quality, crop protection and livestock yielding but on the other hand it has some drastic effects that can be dangerous in the long-term consumption. The use of pesticides should be adopted under the conditions that avoid potential risks. One of the foremost precautions regarding this is the safe handling of pesticides as the farmers in the respective area are mostly illiterate and they are not capable of understanding the instructions labeled on the product and end up in unknowingly using the higher concentrations of pesticides. Increased efforts and time should be appointed to the on-farms trials before they face any interventions in such regard. In developing countries like Pakistan, it should be mandatory for researchers and policy makers to consider each and every parameter in the surroundings when it comes to the use of pesticides.

Overall, pesticides are beneficial in making higher yield or pest control, but their excessive use has proved to be imposing deleterious effects on human health as well as on animals. Pesticides are not environment friendly. They hold the potential to cause toxicity and if the residues remain, can lead to the deadly diseases. Although this study didn't pose major threat as it was organized under the guidance of the researchers and done in the confined area

using proper protocol, but it is evident from the literature that cultivation of crops by using pesticides should be minimized as this approach can't be done in Pakistan without uncertainties.

Ethical Approval:

All applicable international, national, and institutional guidelines for the care and use of animals were followed.

Compliance with Ethical Standards:

Funding Source:

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Conflict of Interest:

All the authors Abdul Munim Farooq, Mariam Zameer, Ussal Tahir, Nureen Zahra, Shazia Yaqub, Zahida Qammar¹, Nida Rahat, Hafiz Sabah-ud-din Mazhar and Idrees Ahmad Nasir, have no conflict of interest.

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