IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

# Decomposition of Chicken Meat (Forensic Entomology)

**Anjli Chaursiya [1] and Barish E. James[2]**

*Department of Zoology, Isabella Thoburn College, Lucknow*

## ABSTRACT

In this research, a 74-hour decomposition of raw chicken meat was conducted. The purpose of the study was to understand the insect life cycle and its correlation with the time of death. Different insects have distinct life cycles, which they demonstrate on decomposing meat. These insects play a role in the decomposition process by feeding on the meat. Therefore, studying the insects is important for determining the time of death, particularly in the field of forensic science. The research took place in Lucknow, Uttar Pradesh.

**Keywords:** Decomposition, Entomological Study, Forensic Science.

## INTRODUCTION:

All living Organism will die and undergo the decomposition process. The decomposition is the process of breaking down an organic material or substance into smaller part by the action of the composure. The Organism that Usually act as the composure are the fungi and Bacteria in addition some insect also contributes to this composition process. Different Insect are attracted to the difference type of the decomposition Matter Including Carrion order to maintain and balance the eco system. Then they have the potential to the significant evidence n criminal investigation as the Subject of forensic entomology. (Goff, 2016).

Forensic Entomology used the insect and arthropods in forensic analysis and has achieved a lot of importance events since ten until 15 years ago in 1998, the first international seminar on forensic entomology was held in BARI / Italy. In Germany, there are many capabilities of that development have been hardly used up until now. In 1997 independent project of forensic entomology was established in Francfurt (Amendp et al, 2000). The insect are used evidence to estimate the post mortem Interval (PMI). (Ireland Interor, 2006). The PMI is the method that will be carried until several week since that It is very important component in medico – legal investigation. The Ecological Data of Insects That involved in breaking down an organic material process in a certain Are need to be Authorized. (Ahmad 2009).

Entomology is defined as the study of insects and their relationship with respect to human, environment, and other organisms. entomologists give great contribution to various fields like agriculture, chemistry, biology, molecular science, criminology, and forensics. (Ireland and turner ,2006) .

Forensic entomology is the study of insects, arthropods in the criminal justice system criminal inspection from the primary stage, forensic insects are attracted to the decomposing body and may lay eggs in it In addition to their ecological importance in decomposition, such insects may represent important tools in criminal investigation. (Roziana Bujang ,et.al 2020).

Forensic entomology is the science of collecting and analysing insect evidence to aid in forensic investigations. Its main application is in the determination of the minimum time since death in cases of suspicious death,. In addition, toxicological and molecular examinations of these insects may help reveal the cause of death or even they identify of a victim by associating a larva with its last meal, for example in cases where insect evidence is leftat a scene after human remains have been deliberately removed. Some fly species can develop not only on corpses but on living bodies too, causing myiasis. Analysis of larvae in such cases can demonstrate the period ofneglects of animals. (Amendt , et.al 2009).

There are three main mechanisms for meat decomposition

1. Microbial spoilage
2. Lipid oxidation
3. Auto enzymatic spoilage.

## ROLE OF FORENSIC SCIENCE IN ENTOMOLOGY

There are many different kinds of arthropods which are involved in decomposition, but I saw two most important group are flies (Diptera)and beetles (coleoptera ).

After death a animal body undergoes many changes (table) caused by autolysis to tissues, which is promoted by the internal chemical breakdown of cells and released enzymes as well as by the activity of bacteria and fungi (Ashutosh Tripathi and Pinky Nishad 2021).

### Changes of meat

| Time and Death | Changes |
|---|---|
| 0 Min | Circulation and breathing stop. |
| Early Lividity | Muscular relaxation. |
| 2 Hours | Vascular Changes in the Rigor. |
| 4-5 Hours | Coagulation of blood fixation lividity |
| 24 Hours | Skin slippages and bulla formation bacterial over growth |
| 50 Hours | Green Discoloration, bloating |
| 70 Hours | Release of gases, Release of liquified internal organs , Gradual loss of soft tissues . |

## INSECT AND DEATH

Insects are attracted to a body immediately after death. Often within minutes. However, oviposition may not occur. many taxa which appear very early at a death scene are late colonizers or even non- necrophagous species.

Necrophagous species, feeding on the carrion.

Predators and parasites of necrophagous species, feeding on other insects or arthropods.

Omnivorous species such as wasps, ants and some beetles feeding both on the corpse and its colonizers. Otherspecies, such as springtail and spiders , which use the corpse as an extension of their environment.

## Selection of insects of forensic Importance:

| Order/Family | Important genra |
|---|---|
| Coleoptera /Beetles | |
| Dermiestidae (Larder beetles) | *Attagenus ,Dermestes* |
| Cleridae (Checked beetles) | *Necrobia* |
| Histeridae (Clown beetles) | *Hister, Saparinus* |
| Silphidae (Crrion Beetles) | *Necrodes, Nicrophorus, Silpha* |
| **Diptera/ Files** | |
| Drosophilidae (Fruit Files) | *Drosophila* |
| Ephydride (shore Flies) | *Discomyza* |
| Fannidae (Latrine Flies) | *Fannia* |
| Heleomyzidae (Sun Flower) | *Heleomyza, Neoleria* |
| **Lepidoptera/ Butter Flies** | |
| Tineidae (clothes moths) | *Tineola* |
| **Hymenoptera/ Wasps** | |
| Ichneumonidae (Ichneumon Wasps) | *Alysia* |
| Peteromalidae (Fly Wasps) | *Nasonia, Muscidifurax* |

## DNA analysis in forensic entomology:

In this research that can be found in a meat of chicken and plastic / glass bottle for decomposition of the meat and easily see the reactions in meat. When remain found days, weeks or even longer after death, body temperature, and conditions such rigor mortis for estimating time since death.In forensic entomology , information is essential not only on the development stages of the insects found on the body, but also on their identity. However, these techniques require specialized taxonomic knowledge. Although identification keys are available, only a few experts are able to identify the larvae of forensically relevant insects to species level , furthermore, for some groups of insects (e.g., Sarcophagidae) differntition at the larval stages using morphological criteria is still not possible. time consuming rearing of the larvae to adults for identification may delay the criminal investigation for cause significant. (Lord and Stevenson, 1986).

‘’Professional association’’ of American entomologists, which has since been amalgamated into the entomological society of America as the board certificate entomologist (BCE) program. the majority of entomologists responding to the survey held to Ph.D. Degree or equivalent, with the reminder possessing M.S. or, occasionally, M.D. Degree.

## Forensically Important Insects & their corpse body:

The flies are attracted to moist tissues and thus are early arrivals to remains. The fly larvae are responsible for considerable reduction of soft tissues. In the overall life cycle, beetles generally arrive later, which are more attracted by dried tissues, other arthropods may also arrive to consume feeding insects (2015).

## Some Common Insects are:

Flies = Flies are the first one to get Attracted towards the dead bodies. Beetles= These are often found on old cadavers, or in dry conditions.

Ants = These generally consume smaller cadavers and belong to order – Hymenoptera.

Material Required = Chicken meat pieces, camera, plastic sheets etc. procedure for experiment –

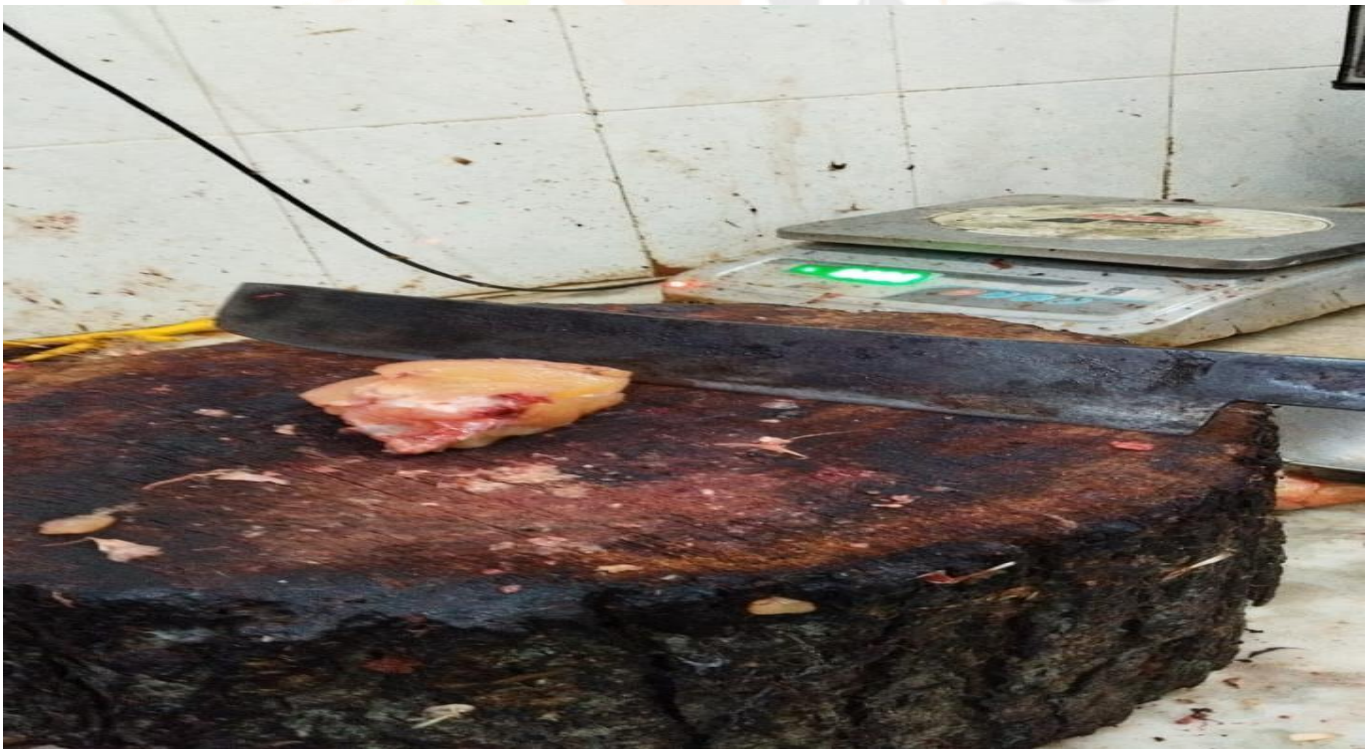
## MATERIAL AND METHOD:

## Study Area:

Lucknow is the capital and largest city of the Indian state Utter Pradesh the district covers an area 2,528 square kilometers. Lucknow sits on the northwestern shore of the Gomti River. The chicken piece are collected from local fish shop of Lucknow like Aliganj , near Kapoorthala masque .

## Field Method:

They were placed separately the protection is very important during study. The protective clothing, mask and glove were used during sampling process to protect from pathogen, pollutant, and contaminants.



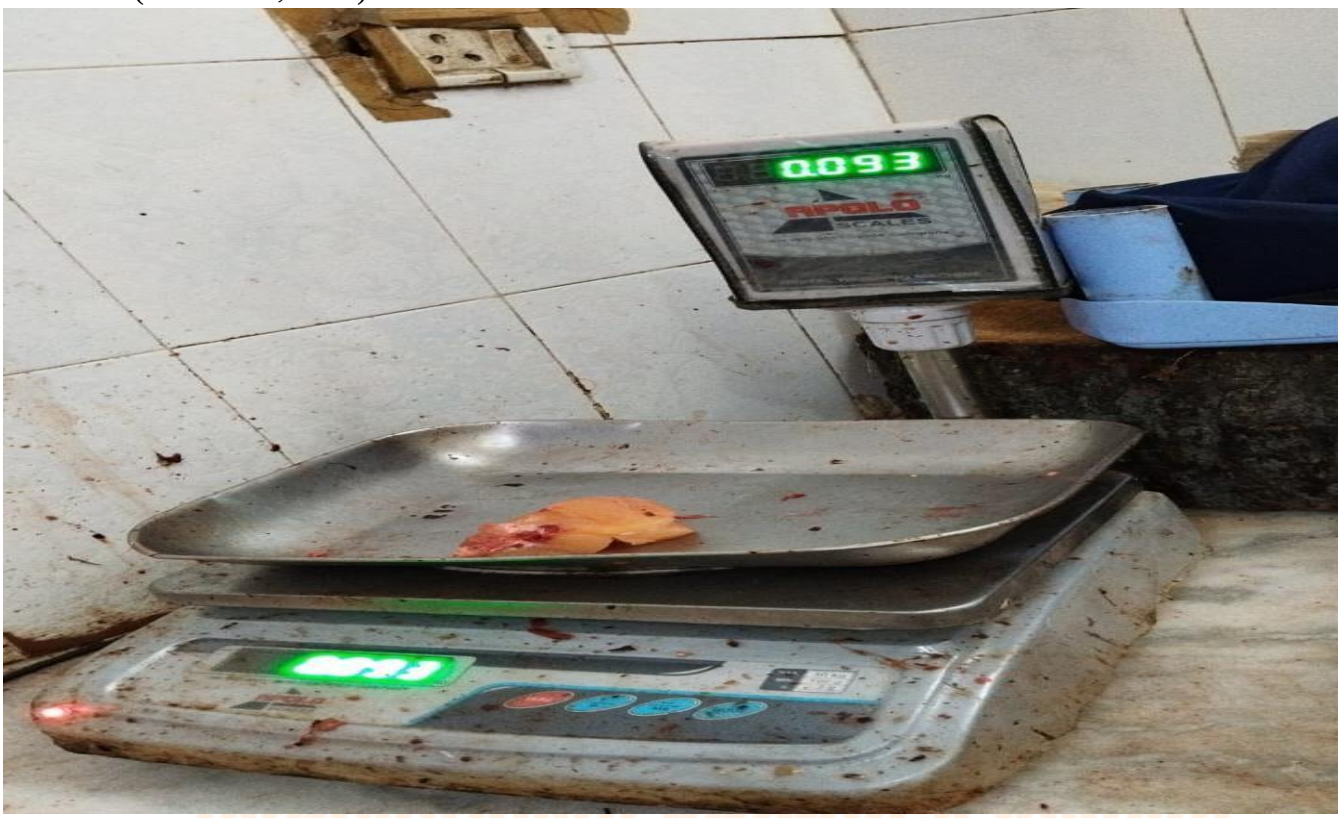
COLLECTION OF MEAT

## Length -weight Relationship

The relationship between length and weight of chicken meat by measuring length and weight of meat by using the parabolic equation.

$W= aL^b$

Where W is total weight of (expressed in g), L is total length (expressed in cm ) a is intercept I.e coefficientrelated to the body, and b is slope. The growth pattern is isometric when the value of b=3 and allometric when significantly different from 3 (Alam et al, 2014).




TOTAL WEIGHT AND LENGTH OF CHICKEN MEAT

## Sample collection and Identification process:

Drumstick part of chicken were put in a plastic sheet observation every day. This method is effective to remain the good shape and softness of the specimens for further identification. Forceps were used to pick the maggot'sand other immature specimens. Identification of species were referred to key of insects by chapman, Simpson and Douglas (2013).

## RESULTS

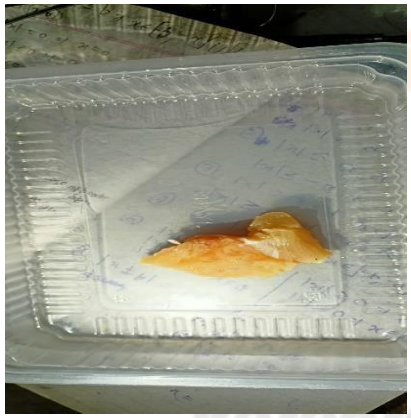
For conducting the experiment first, we need chicken meat pieces and we observe decomposition in air the changes occurring until 72 hours.

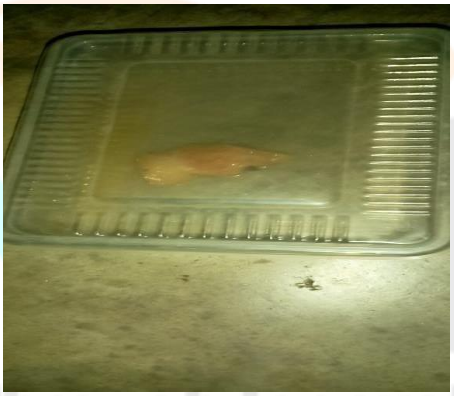
Now we took the meat piece with bone, it was placed in a plastic sheet in the manner like 1st part touched theplastic area and the other part is in direct contact with air.

The samples are placed in a shady area of an open terrace where it does not get connected with sun but with the wind.
For 3 days, we have to observe the changes occurring in the sample and write down the observation and the decomposition changes happened in the sample.
Also, we have to photograph the sample from day 1 to day 3.

| Traits | Cycle | Sample (in air) |
|---|---|---|
| 6:30pm to June 4 to June 5 6:30pm | DAY 1 | 1- Soft, fleshy meat with little blood sticks with Meat skin including bone. |
| | | 2- Meat becomes white from no smell is Absorbent. |
| | | The Botfly Starts Appearing. |
| June 04 (07:15 pm) to June 05 (07:15 pm) | DAY 2 | 1-Botfly increases with white dry Layer appearing at almost every Area of the meat. same day After some intervals of time white Later changes to maroon colour. |
| June 05 (07:15 pm) to June 06 (07:15pm) | DAY 3 | 1- Meat colour becomes dark Maroon colour with little black on it. Rotten smell observed with Less number of botflies at top Surface of meat and baby and Maggots at bottom side. On the Plastic sticky liquid also observed. |
| | | |

**DAY 1:**





**DAY 2:**

**DAY 3:**

After performing the practical, observing the changes, and comparing the differences, we concluded that decomposition rate in air the meat placed in plastic box.

## DISCUSSION

There are several different findings in stages of decomposition process. Goff (2010), Ahmad and Ahmad (2009) and Chin et al., (2007) stated that the decomposition process were classified into five stages. According to Bharti Singh (2003), three different stages were classified. from this study, there are five stages of decomposition process in drumstick part of chicken carrion which are flesh stage, bloated stage, active stage, advance and dryremain stage. The classification of three stages was also used by Martinez er al., (2006) and Apichat et al., (2007) there are several factors cause difficulty in observation process which are the age of the corpse, humidity, ventilation, cause of death and constitution. Another factor is different location involved temperature variation.

## CONCLUSION

In this research we conducted that the environment plays a very important role of the dead body of a decased person. we understood this by examining the flesh at different conditions like the sample contact with air in plastic sheet. the decomposition rate was slow in direct contact with plastic. in this research we also observe the entomological importance in forensic science. with this we concluded that forensic entomology gives us very crucial evidence

when we don't have any other trace evidence to examine.
In conclusion, 16 species with a total of 7 families and four orders have been collected manually from six carrions. There orders were presented on three carrions of chicken, namely Diptera, Coleoptera and Hymenopteran. Flies Diptera especially Chrysomya megacephala, plays important role in this study as a decomposition insect in order to decompose all carions during the decomposition.

**ACKNOWLEDGEMENTS**

The authors are grateful to Dr. E Charles president and Dr. V. Prakash, Principal of Isabella Thoburn College, Lucknow, Uttar Pradesh, India for her providing facilities for conducting experiment in college premises. The authors are also grateful to Dr. Chitra Singh, Head of the department, Zoology for her great support and encouragement.

## REFERENCE:

1- Ahmad, A, & Ahmad, AH 2009 'A preliminary study on the Decomposition and dipterans associated with exposed Carcasses in an oil palm plantation in Bandar Baharu, Kedah, Malaysia', Tropical Biomedicine, vol. 26, no. 1, pp. 1-10.

2- Amendt, J, Krettek, R, Niess, C, Zehner, R, & Bratzke, H2000, 'Forensic entomology in Germany', in Forensic Science International, vol. 113, pp. 309–314.

3- Anderson GS & Van Laerhoven, SL 1996, 'Initial study on Insect succession carrion in South Western British Columbia', Journal Forensic Science,vol. 41, pp. 617-625.

4- Anderson, GS, 2007, 'Forensic entomology: the use of insect in death investigation', viewed 28th November2018,

5- Apachito, V, Wilawan, P, Udomsak, T. Chanasorn, P, &, N 2007, 'A preliminary study on insects associated with pig (Sus scrofa) carcasses in Phitsanulok,Northern Thailand', Tropical Biomedicine, vol. 24, no.2, Pp. 1–5.

6- Azwandi, A, Nina Keterina, H, Owen, LC, Nurizzati, MD, & Omar, B 2013, 'Adult carrion arthropod community in a Tropical rainforest of Malaysia: Analysis on three common

7- Benecke, M, 2001, 'A brief history of forensic entomology',Forensic Science International, vol. 120, no.(12), pp. 2-14.

8- Bharti, M, & Singh, D 2003, 'Insect Faunal Succession on Decaying Rabbit Carcasses in Punjab, India', Journal of
Forensic Sciences, vol. 48, no. 5, pp. 1–11.

9- Campobasso, CP, Vella, GD & Introna, F, 2001, 'Factors Affecting decomposition and Diptera colonization', Forensic Science International, vol. 120, pp. 18-27.

10- Cats EP & Haskell NH 1990, 'Entomology and death: a Procedural guide', Joyce's Print Shop Inc., Clemson, pp. 1 – 182.

11- Forensic entomology animal models', Tropical Biomedicine, vol. 30, no. 3, pp. 481–494.

12-Sanjay kumar meena, Suman, Arti prasad A review of forensic entomology.