

## A Brief Overview on Ventilation and Its role in Poultry Production

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### RESEARCH ARTICLE

#### ABSTRACT

*All bird release heat which is produce by several reactions take place in body like metabolisms as we know that during metabolism when particle of feed breaks down in pieces the heat releases and there are several other reactions which take place in body and heat produced in body. Bird needs to excrete this heat from their body and other thing Bird feces contain large amount ammonia as we know ammonia is one of toxic gas which may harm to the bird and also reduce the production of bird. This review shows the importance of ventilation and also gave the appropriate ways to manage the ventilation in a poultry house. This review also gives the tips to manage the temperature which is main component of poultry farming. This review will help out farmer and students of science to understand the importance of ventilation and temperature management in rearing of poultry birds. This review also gave a logic how heat moves in the shed or how gasses gathered in a poultry house can and also show how these gases will affect the bird's health. In this review it clearly mentions that for good production it is necessary to maintain ventilation without proper ventilation its impossible to achieve proper production. Poor ventilation also causes death of bird and in result loss of farmer. Normally rural farmer are not concentrating on ventilation system and this thing becoming a reason for their loss in their business so this review is about their guidance by this farmer will know the importance of ventilation and also learn proper ventilation*

**Keywords:** Ventilation, Amonia Effect, Production Due to proper ventilation, ventilation of poultry house.

#### INTRODUCTION

As we know that birds have not any sweating system so birds release heat three different methods

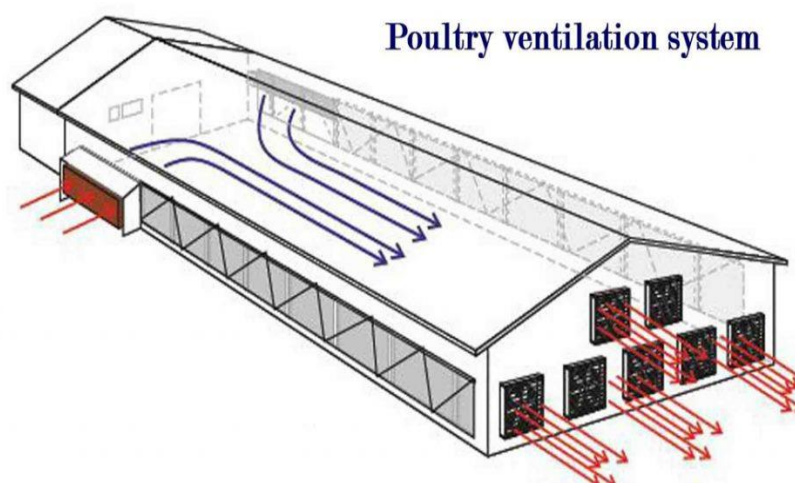
[1,2,3] [4] sensible heat loss (SHL) via radiation and evaporative cutaneous mechanisms, [5,6,7,8], conductance and convection [8]. Evaporative heat loss by the method of panting is linked water content of body; thus, heat loss is reduced. Besides that, panting of bird persuades alkalosis of respiration, which reduce the body temperature of bird and also may work as barrier in maintenance of body and effect the broiler performance [9] Panting rate is decrease down due to this reason, in indulgence of cutaneous evaporative dehydration, in birds who lives in desert like pigeon of desert [10]. Alkalosis of respiration is due to panting have worst effect on laying hen as it effects egg quality: Alkalosis of respiration can also effect  $P_H$  of blood in arterioles and also decrease the pressure of  $CO_2$  This pointers to a failure in the bicarbonate level of plasma [11] and to increases linkage between calcium ion contents and organic acid [12] Thus, it causes decrease down of Calcium ion and bicarbonate level of chicken's body which directly effects egg Quality. It is assumed that SHL does not affect the temperature maintenance in domestic fowl when ambient temperature reaches at upper level [13]. Temperature effects the production of bird and also effect the bird maintenance [14]. Bird will give higher production on adequate maintenance of ventilation [15]. By following appropriate ways of ventilation management, we can manage ventilation in a poultry house [16]. Ventilation is key of good production and management of ventilation means good FCR [17]

## MATERIAL AND METHODS

### The role of ventilation

As we know that bird needs large amount of energy to maintain their selves and production. For this energy, they required good quality of feed which have higher Cp value besides this some other factors are also required for best yield among them ventilation is very important factor which directly effect on birds. Good ventilation helps out bird to give higher production while poor ventilation effects bird and in result bird lose its production and also cause death or mortality of bird. The process of metabolism increases humidity rate as when feed breakdown and metabolic water is releases [18]. Birds required to excrete out this humidity so bird excrete that humidity through respiration and feces and this humidity increase body temperature sensation of the birds [19]. The other thing is that bird produce heat during their process of metabolism as we know when large particle converted in small it release energy in the form of temperature so the temperature of the poultry house increase as we know birds don't have any ability to sweat, so they decrease down their temperature trough breathing, panting and vigorous flapping [20]. So we need to excrete out extra temperature and humidity from the shed through proper ventilation system by which we can give proper comfort to our birds in result bird give us proper weigh or meat production and egg production[21]. Birds release extra body heat by four methods [22]

- Convection
- Conduction
- Radiation
- Evaporation



**Figure 1.** Ventilation in Farm

### **Convection**

Birds release their extra heat through movement of air

### **Conduction**

Heat exchange through direct contact

### **Radiation**

Heat is emitted in form of heat radiation

### **Evaporation**

As we evaporation give cooling effect so by breathing heat is released from bird's body

### **Advantages of Ventilation**

- Removal of extra heat from shed.
- Removal of toxic gasses from shed
- It protects birds through heat stress according to a survey 30% mortality occur in bird due to heat stress
- Reduce in humidity reduces ammonia level in the shed
- Reduce in humidity save litter cost as we need to change litter if humidity increase in litter.

### **Ventilation basics**

In order to understand ventilation, we required to understand some basics

#### **Controlled environment**

It is a house which is completely controlled by a system in which we gave commands according to our requirement it will manage the house accordingly [23,24,25,26]. This system consists of meters, sensor and controllers.

**Controllers:**

Control the temperature, humidity, feed and water requirements

**Sensors**

Sense humidity and temperature

**Meters**

Measure different environmental components e.g gasses, temperature and humidity.

**Fan**

A machine which provides air or machine below air by the movement of its wings This machine is main equipment for ventilation which help out to exchange air in the shed

**Extractor**

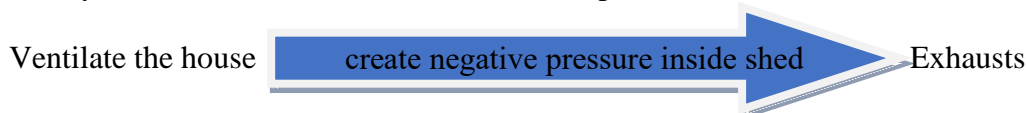
A machine which helps out to expel out extra heat and gasses from shed. It expels bad air from house

**Minimum ventilation**

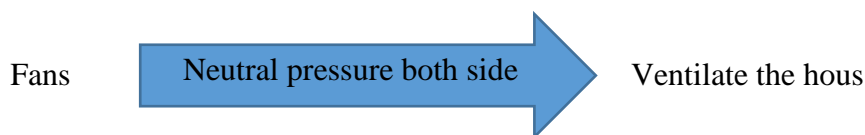
A term which refers to ventilate the house by using low amount of air this system is used in winter system as we need to maintain temperature as well as humidity in winters.

**Types of pressure in ventilation****Negative pressure**

It is most common system in which we use exhaust fan to expel out bad air from house

**Neutral pressure**

This system is also resembled to previous but it requires large number of Fans as temperature in and outside of the shed will be same during this system that's why this type of system is called Neutral ventilation system

**Ventilation systems****Natural ventilation**

It is ventilation system which is normally used in open houses and applicable in only some areas. Normally shed build according to air movement. In south Punjab direction of poultry house will be east to west as air passes through the shed, temperature and humidity maintained. We cannot use this system in some areas as ammonia level is cannot be control in areas of higher humidity through natural ventilation [27].

**Equipment**

No equipment is used

**Tunnel system**

1. System is used in summer
2. Tunnel Fans are used
3. Large amount of air below in shed which minimize temperature and temperature

**General recommendations**

Air inlet: Air inlet should be in a house through which movement of air occur

Size of inlet: size of inlet depends upon the area of house

**Location of the house:**

While selecting the location of house keep in mind some points in respect to ventilation

- House should not near the factory
- Temperature of area
- Weather of area

**Environmental gas meters:**

It is very important to measure the environmental gasses as it is compulsory to know the level of gas higher concentration of gasses can cause mortality.

**Technical and professional assistance:**

Technical assistance is very necessary for installing the equipment and managing proper ventilation.

**Ventilation Requirement per bird**

**Table 1.** Ventilation Requirement of A bird Acceding to Age

Age	Cfm/bird
1	0.10
2	0.25
3	0.35
4	0.50
5	0.65
6	0.70
7	0.80
8	0.90

Gases Ratio (Lethal and desirable)

**Table 2.** Proportion of Gases in farm (lethal; & bearable)

Gasses	Lethal	Desirable
Carbon Dioxide	Above 30%	1%
Methane	Above 5%	1%
Ammonia	Above 500 ppm	40 ppm
Hydrogen Sulfide	Above 500 ppm	40 ppm
Oxygen	Below 6 %	16%

### Tips to manage Temperature

- Use fans and exhaust
- If Temperature is out of control in summer use tunnel ventilation
- In winter use Brooder and heater
- Minimum ventilation is recommended in winter
- In open shed when temperature exceed to its limit throw water directly on birds
- Further an extra equipment of every equipment should be there if someone out order use supplement of those equipment

### CONCLUSION

Poultry is most profitable and important sector as it is contributing about 5% in our total gdp while 11.7% (survey 2018-19) share in Agricultural Gdp. Ventilation is very important for good performance and bad ventilation could cause mortality and also against poultry bird's welfare. Good ventilation can also help out in achieving higher production goals and in result provide profit to the farmer Therefore, knowledge of ventilation is very important for a former this article will provide some basic knowledge of ventilation to an industrialist or farmer or domestic farmer too. It is an effort for peoples who don't know about importance of ventilation further we also gave some tips to manage the ventilation.

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