



Some Important Aspects of Broiler management

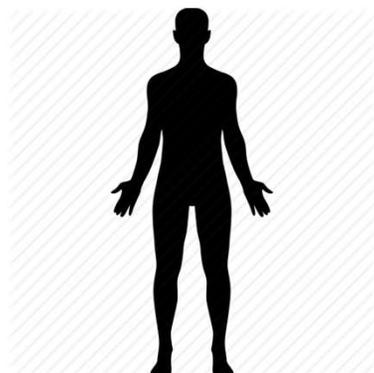
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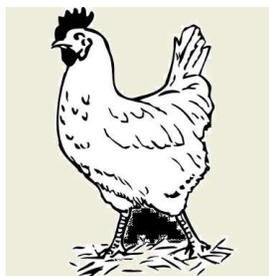
We will discuss

- ❖ Litter ammonia
eating up your profit silently
- ❖ Lighting in poultry house
essential for profitability and birds welfare

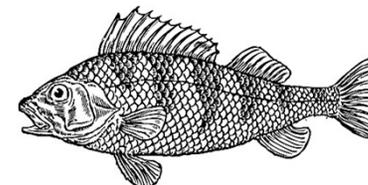
Nitrogenous Waste for Different Species



UREA
 $\text{CO}(\text{NH}_2)_2$

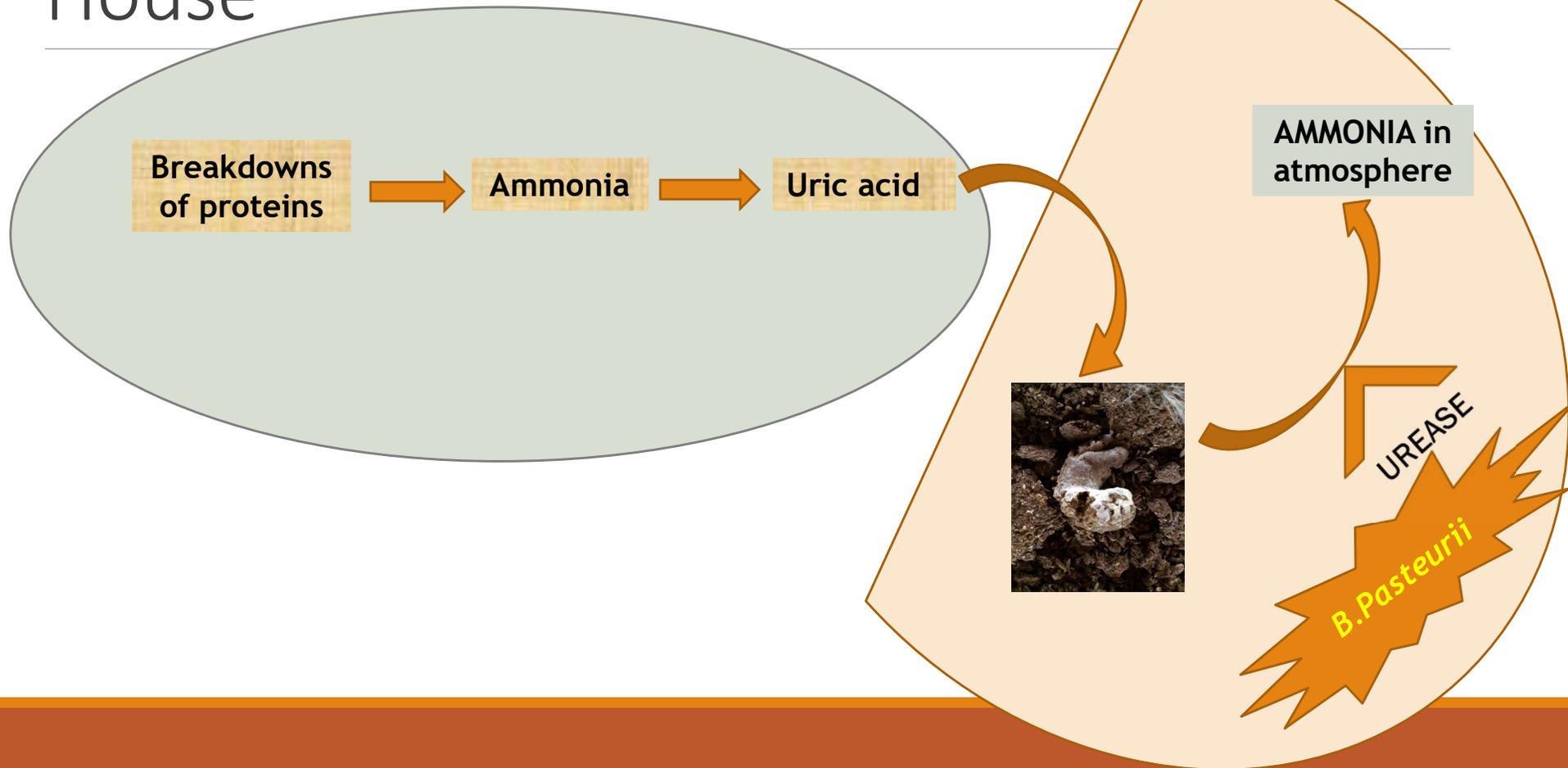


URIC ACID
 $\text{C}_5\text{H}_4\text{N}_4\text{O}_3$



AMMONIA
 NH_3

From Where We Get Ammonia in Poultry House



How detrimental for poultry

- ❑ Paralysis of cilia to deciliation (loss of cilia) of epithelial cells and sometimes necrosis of the epithelial cells of the respiratory tract
- ❑ Clearance of particles from the respiratory tract of birds is approx. 30 times faster than that of mammals. So, any alteration of such a sensitive system may pave the way for pathogenic organisms (*E. coli*, *Mycoplasma*, Newcastle disease, AI, etc.) into the body
- ❑ Among these *E. coli* is most important as poultry house dust has been shown to be a reservoir of *E. coli* in particular
- ❑ Atmospheric ammonia at high concentration may lead to conjunctivitis

How detrimental for poultry

- ❑ Processing plant condemnation
 - Neutralization of acid surface of skin

- ❑ Poor body weight
 - Neutralization of gastric acid. Research quantifying the detriment of ammonia exposure showed approx. 226 gr. Reduction in broiler body weight at 7 weeks of age when ammonia exposure increased from 25 to 50 ppm (Miles et al., 2004)

- ❑ Poor Feed conversion ratio

- ❑ Livability

Factor affecting ammonia production

- ❑ Amount of substrate (Uric acid in faeces)

- ❑ In winter season feed consumption is more. So, uric acid in your farm is more and ammonia production is more. Besides, extra curtaining aggravates the situation

- ❑ Amount of enzyme (Urease from *B. pasteurii*)
 - Situation favourable for bacterial growth may accounts for more Urease enzyme
 - Litter temperature and moisture

Factor affecting ammonia production

Litter pH

- Litter pH has a vital role in ammonia production.
- Free ammonia has two forms 1) ammonia-NH₃ and 2) ammonia ion-NH₄⁺
- As litter pH increases ammonia (NH₃) increases
- *Bacillus pasteurii*, cannot grow at neutral pH, but thrives in litter above pH 8.5.
- Typically litter pH in a broiler house ranges between 9-10
- Urease, the enzyme that catalyzes the uric acid breakdown has maximum activity at pH of 9

Some important notes

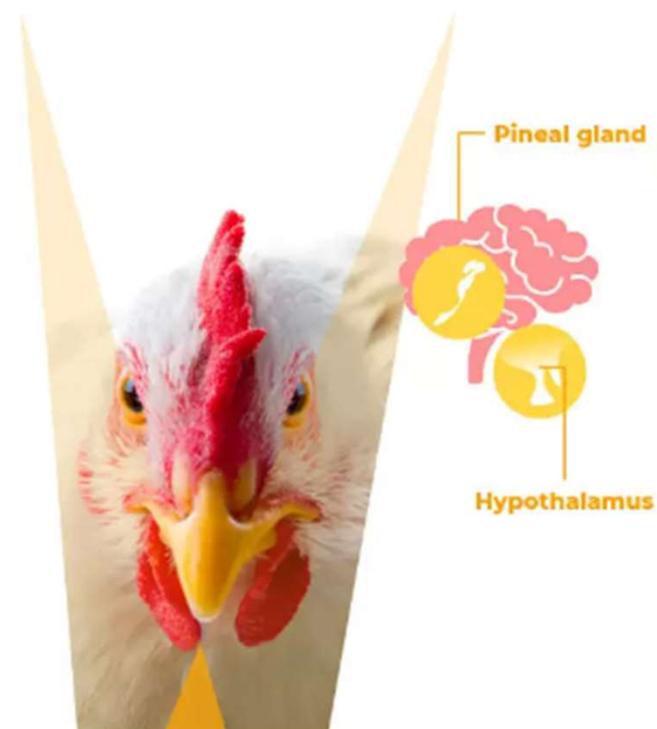
- ❑ Ammonia should be checked at birds level
- ❑ Ammonia concentration of 10 ppm affects birds health
- ❑ Ammonia >25 ppm affects birds respiratory health
- ❑ Human can smell ammonia at concentration between 20-30 ppm
- ❑ But persons continuously exposed to ammonia in poultry sheds lose their ability to detect ammonia until it reaches 50-60 ppm or higher
- ❑ There is a misconception among farmers that ammonia production is more in rainy season
- ❑ Mixing lime with litter may aggravate the condition by releasing more ammonia and producing cake if litter moisture is more
- ❑ Most farmers feel that ammonia in farm is harmful after 3 week of age. But reality is that it is important in 8-21 days of age and crucial for 1st week

Control measures

- ❑ Stock density
- ❑ Minimize the substrate (birds faeces)
- ❑ Use feeder grill to avoid feed spillage as spilled feed may produce ammonia
- ❑ Minimize the urease producing bacteria in litter
- ❑ Replace some percentage of bedding material
- ❑ Try to lower the litter pH
- ❑ Don't compromise with your poultry farm ventilation
 - This happens mostly in winter season. So, E. coli infection is more in winter season
 - From very early age depend on mechanical ventilation for your poultry farm to remove ammonia
- ❑ Maintain proper litter condition
- ❑ Alum (Aluminium sulfate) when mixed with litter it produces H⁺ ions, which attach NH₃ to form NH₄⁺, which further reacts with sulfate ions to form ammonium sulfate- (NH₄)₂SO₄
- ❑ Sprinkle 1 kg of fertilizer grade superphosphate per 100 sq feet area before racking the litter
- ❑ Some commercially available products also can be used to control ammonia

Lighting in Broiler house

Light penetrates not only through the eyes but the top of the skull via the pineal gland and the pituitary gland next to hypothalamus



Some characteristics of chicken vision

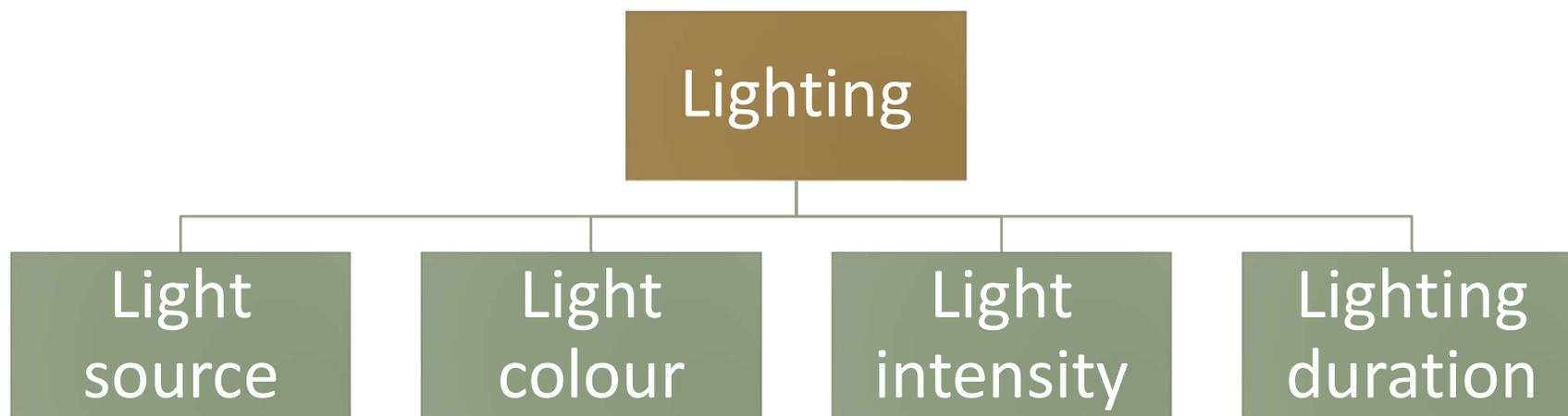
- Avian eyes are able to adapt more quickly to changing lights (light-dark) than mammalian eyes
- Birds can view almost 300 degree without moving their head
- Chicken have wide range of visible light spectrum (approx. 360 – 750 nm)
- Poultry can distinguish visual sequences of 150-200 images per second
- Birds can process two different pictures simultaneously, e.g. to use one eye to search for feed while the other is watching for potential enemies
- The ratio of cones to rod in avian eyes is 85:15 (in human it is 5:95)

Lighting strategies

Lighting is an essential environmental component in poultry housing systems. It can influence

- ✓ Growth
- ✓ Productive performance
- ✓ Behaviour
- ✓ Digestion
- ✓ Immunity
- ✓ Feed and water intake
- ✓ Reproduction

Lighting strategies



Light sources

- Incandescent lamp (ICD)



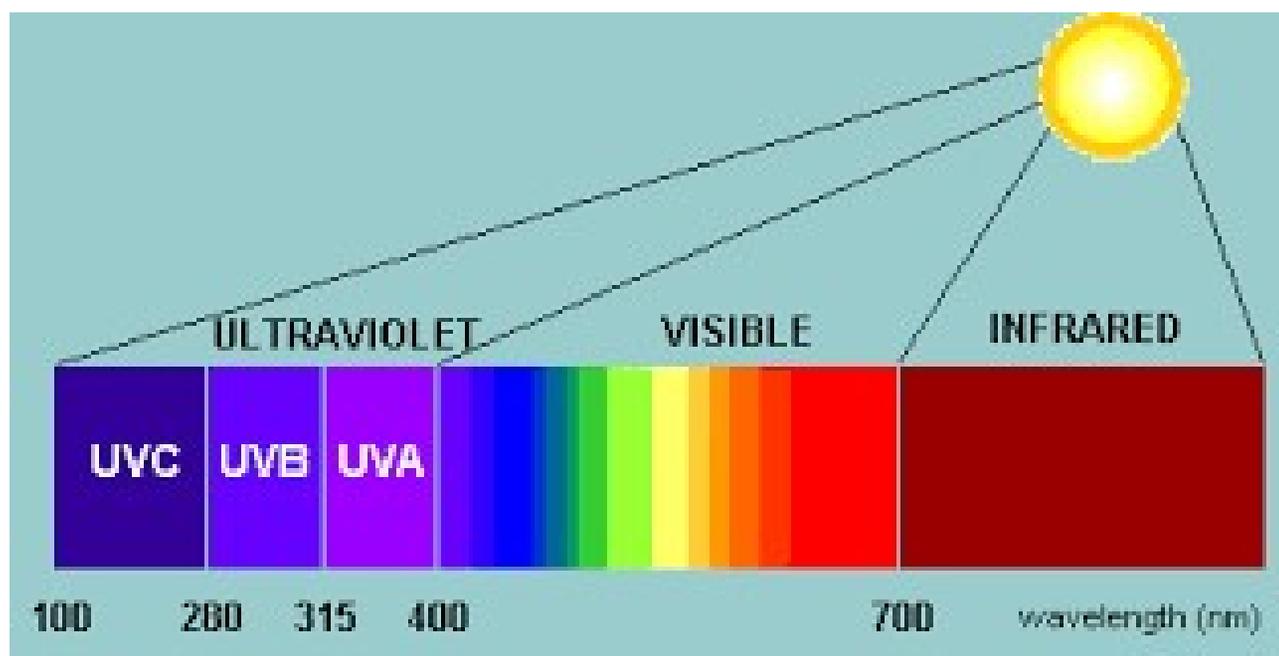
- Compact fluorescent lamp (CFL)



- Light emitting diodes (LED)



Light colour





Creating Values

**WHAT
HUMANS SEE**

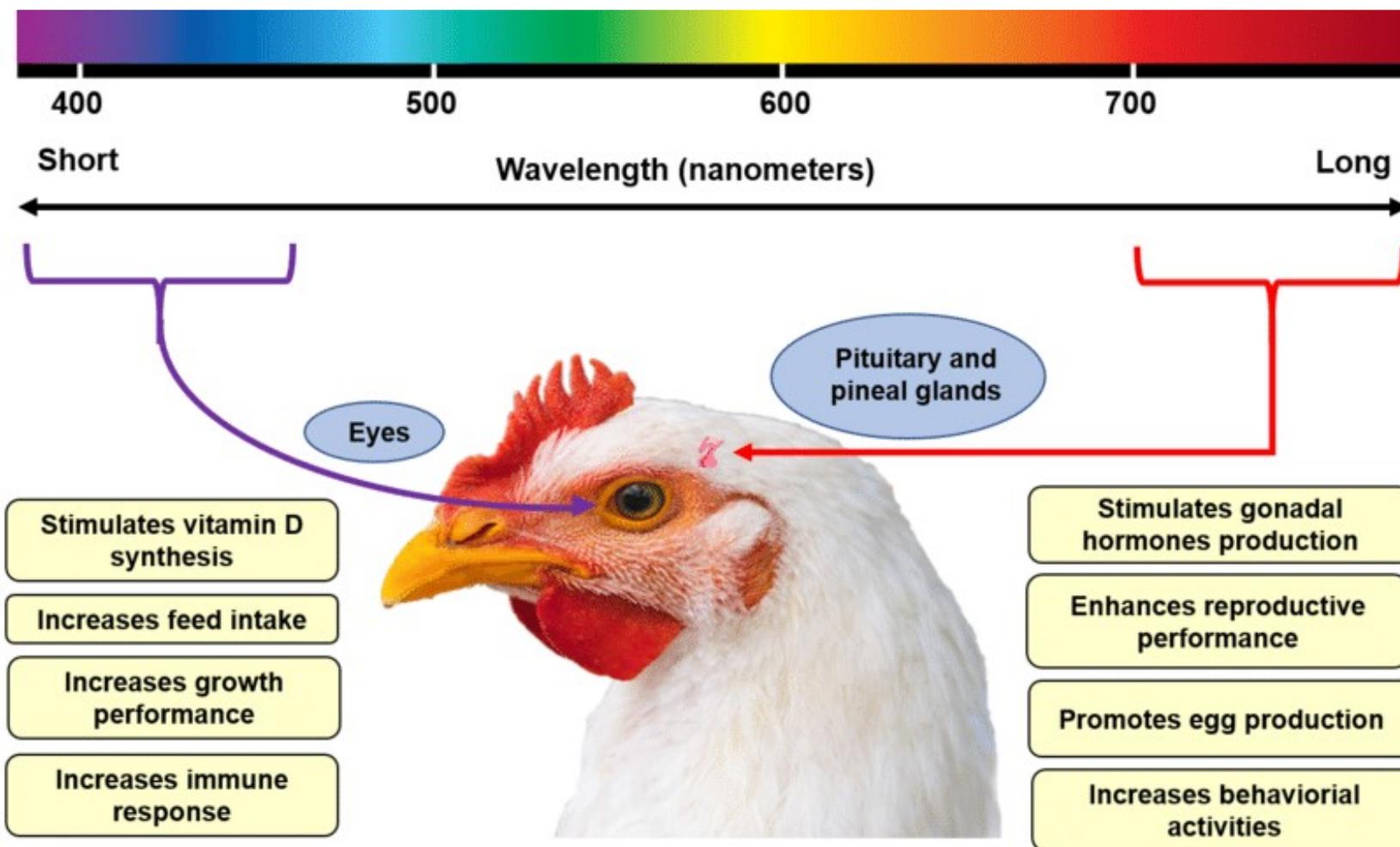


**WHAT
BIRDS SEE**



Light colour (wavelength)

- Light colour is determined by wavelength
- Oke et al (2021a) observed that switching from green to blue light at four weeks of age promoted ideal behaviour and stimulated growth
- Seo et al (2016) reported that rearing broilers under shorter wavelength LEDs such as pure blue and bright blue can improve their growth and immune response at Later stages of production
- Soliman and El-Sabrouh (2020) concluded that more than 50% of the poultry research in this view showed that blue (450nm) and green light (550nm) had a positive impact on body weight (>3%); while red light (700nm) increased activity and aggressive behaviour in birds (>30%) with negatively influencing body weight



Light intensity (brightness)

- For 1st 7 days minimum light intensity must be 20 lux
- After 7 days it should be gradually decreased to 10 lx at 21 days
- After 21 days to marketing 10 lux should be continued
- Light intensity in broiler should not go below 5 lux. It will hamper growth performance and birds welfare
- For broiler light intensity above 30 lux may be detrimental for performance parameters

Light duration (photoperiod)

- The duration of light exposure substantially affects broiler growth, FCR and immunity
- It is mainly determined by the age of the birds and types of housing
- Generally it is recommended to provide broiler chicks start with 24 hrs light per day, gradually decreasing after the first days of chicks' life
- A minimum continuous dark period of 4-6 hrs should be provided for birds based on their developing stages
- Dark period must be started with same time everyday

Darkness is as much important as light for birds growth and health



Thank you for listening

