

How can I prevent the Disease

1) BIOSECURITY

“To prevent the entry of chemical and biological agents inside the poultry house that can harm the chicken “

1) DISINFECTABLE AT ENTRY POINT i.e

Individuals, vehicles, equipments/utensils, litter, food items.

2) ALWAYS AVOID THE ENTRY i.e. animals, insects, wild birds .

3) UNAVOIDABLE i.e. depend upon location i.e. Air so choose farm location carefully.

4) KEEP CHECKING THE SOURCE i.e. feed, DOC

And **water**.

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2) IMMUNIZATION

To tone up the birds against specific and non specific pathogens when they encounter them. This is done by ,

1) Specific immunization is done by using vaccines.

2) Non specific immunization is done by using immune Boosters.

3) VENTILATION

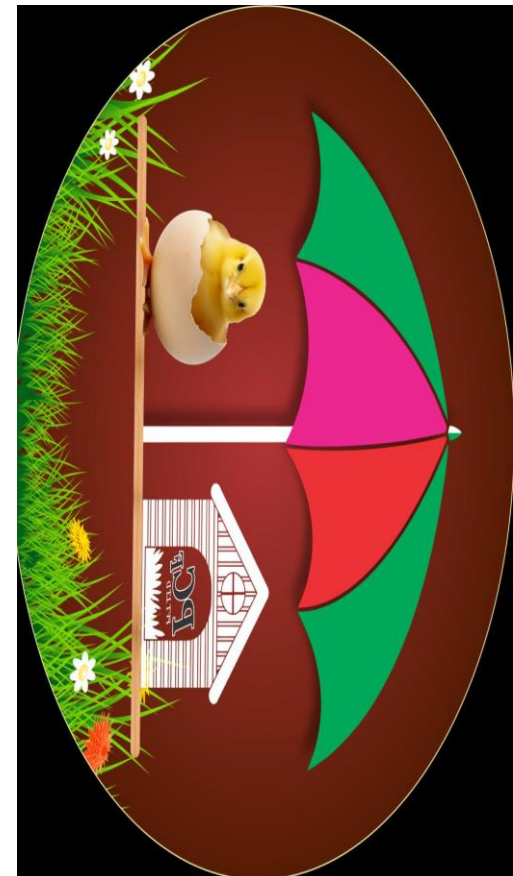
Just to supply oxygen , remove noxious gases and humidity and maintain required temperature inside the house.

DRINKING WATER DISINFACTION

A Minor Gigant

1. A chicken's body is made of by 70 % water .
2. Without water no digestion, No respiration means no life.
3. Water to feed ratio is 1.8 :1.0 (almost double amount of water is required than from feed)
- ▶ 4. water is most abundant compound after air utilized by chicken that concludes its importance in the life of chicken and consequently the success or failure of poultry business for a poultry bird grower.

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WHAT IMPORTANT PATHOGENS THAT WATER CAN CARRY

☆ BACTERIAL PATHOGENS

Salmonella, mycoplasma, E coli, Cholera, Campylobacter.

☆ VIRAL PATHOGENS

Newcastle, infection bronchitis, Gumboro, Marek's, Encephalomyelitis.

☆ PROTOZOAL PATHOGENS

Coccidiosis, Histomoniasis.

FEW MOST IMPORTANT STANDARDS OF POULTRY DRINKING WATER

- ▶ PH _____ 6.7 to 7.3(Best)
- ▶ TDS _____ 300 to 700(Best)
- ▶ TBC _____ 0 cfu/ml

☆ I would like to discuss here the most important of these three
TBC (Total bacterial count) which determines whether your water
Is free of pathogens or contaminated with different disease causing
pathogens.

WHAT ARE THE OVERALL DRAWBACKS OF CONTAMINATED WATER

- ♣ Direct Outbreaks of any of above mentioned Diseases.
- ♣ Indirect outbreaks of different other diseases due to poor immunity and poor response to vaccinations.
- ♣ Poor performance like low Production , hatchability and increased number of nonsettleable eggs in case of Breeders , Grand parents and layers.
- ♣ Poor FCR in case of Broilers.
- ♣ High mortality .

RESULT - decreased profitability or even huge economical losses.

POSSIBLE SOLUTION !

So always keep the water clean to help your birds and your business.

METHOD OF WATER DISINFECTION BEING USED IN PAKISTAN

- ▶ **Chlorination of water** using calcium hypochlorite (بلیچنگ پاؤڈر), Sodium Hypochlorite (لیکوائیڈ بلیچ), Chlorine tablets, chlorine dioxide tablets and troclosene tablets (Sodium diisocyanurate tablets).

HOW CHLORINATION WORKS BY KILLING THE PATHOGENS

CHLORINATION when added to water produces free / residual chlorine that causes oxidation of pathogens so denature and kill them.

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DIFFERENT PRODUCTS OF CHLORINE USED FOR CHLORINATION IN PAKISTAN.

1) Some farmers are using **calcium hypochlorite**.

Benefits

*works well .

*cost effective too.

Drawbacks

*For proper working needs PH less than 7. So PH dependant.

*Causes choking of drinking system.

2) Some are using **chlorine dioxide tablets** .

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Benefits

- *Works well .
- *Works independent of PH.
- *Easy to use .

Draw backs

- *Expensive ones.

3) Some Rare farmers also using **CHLORINE TABLETS** .

Benefits

Works well.

Cost effective

Easy to use

Drawbacks

Works well at a PH less than 7 so needs proper prior adjustment of PH.

4) TROCLOSENE tablets

Benefits

Work well

Easy to use

Work independent of PH

Drawbacks

Costly

5) **SODIUM HYPOCHLORITE** (liquid/house hold bleach) is most commonly used and preferred method in pakistan .

Benefits

Works well

Cost effective

Drawbacks

*Works dependent of PH i.e. works well at a PH lower than 7.

* Highly alkaline with PH near 13.0 and alters the PH of water.

WHY ITS IMPORTANT TO MAINTAIN PH OF WATER towards Acidic

When liquid chlorine is added to water is dissociate to form Hypochlorous acid and Hypochlorite ions. Hypochlorous acid is having disinfection power about 300 times more than hypochlorite ions. So our main required product is Hypochlorous acid then that from hypochlorite ions.

☆ BUT here is a twist , **in basic water** media liquid bleach mainly dissociate to form hypochlorite ions which are extremely less effective ON THE OTHER HAND **in acidic water** liquid bleach dissociate to form more Hypochlorous acid which is our desired product for effective water disinfection. Let's Have a look at the chart showing dissociation of liquid bleach into Hypochlorous acid and Hypochlorite ions depending upon PH of water.

PH	HYPOCHLOROUS ACID %	HYPOCHLORITE IONS %
8.5	10	90
8.0	20	80
7.5	48	52
7.0	72	28
6.5	90	10
6.0	96	4.0
5.0	100	0.0



☆THIS CHART SUGGESTS THAT TO HAVE EFFICIENT FORM OF FREE CHLORINE WATER PH MUST BE ACIDIC.

*Liquid bleach is not easy to use as it requires chlorine dosing pump for proper dosing amount of chlorine and also a second dosing pump to pour proper amount of acid to adjust the PH of water towards acidic . These pumps not only costly but easily turns to out of order specially pump being used for acid .

To use liquid chlorine and acid manually is absolutely not recommended due to human error as we are filling water tanks again and again.

» WHAT CONCENTRATION OF FREE CHLORINE IS REQUIRED IN POULTRY

Answer is 2-3 part per million (ppm).

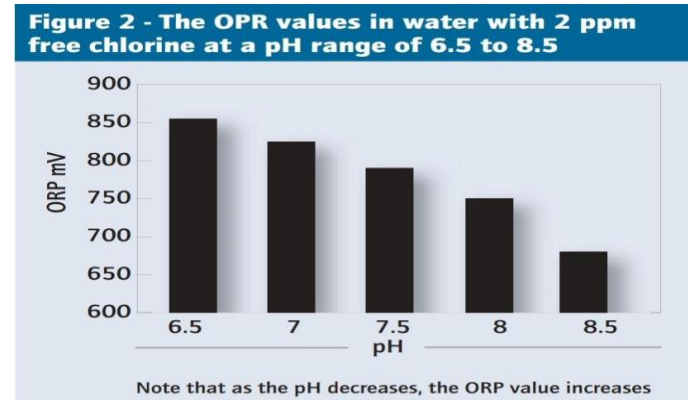
» PROPER AND MOST EFFECTIVE METHOD TO MEASURE FREE CHLORINE LEVEL IN WATER TO BE USED FOR POULTRY BIRDS.


conventionally in pakistan farmers are using color matching chlorine test kits or strips. These kits measure both Hypochlorous acid and Hypochlorite ions as free chlorine and readings of chlorination level don't change with different PH levels. So with these conventional kits/strips we actually measuring active and far more less active free chlorine which is not desirable. Accurate method of measuring reactive chlorine i.e. Hypochlorous acid is to measure oxidation reduction potential of your water using **ORP** meter .

ORP METER

It is an electric meter(Battery operated hand held) that measures the power of water for oxidation/ reduction of pathogens in milli volts . Desired ORP value with ORP meter is 700 -750 . ORP Meter measures active free form of chlorine which is Hypochlorous acid resultantly ORP values of same water changes as we change the PH of that water as we decrease the PH ORP value goes up and ORP value falls down as we increase the PH of water as shown in the graph.

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» When liquid chlorine reacts with water it forms Hypochlorous acid and Hypochlorite ions as discussed earlier . Hypochlorous acid(HOCl) is a weak acid and easily converted into Hypochlorite ions(OCl-) though this conversion is reversible depending upon PH of water .Chlorine being oxidizing agent not only oxidizes pathogens but also reacts with minerals like iron ,manganese, organic matter and form chloramines/ combined available chlorine which is not effective against pathogens this underlines the importance of **clean water** .

» Also if there present **biofilms** (thin layers containing colonies of pathogens) in water supply lines most of the Active chlorine will be used in oxidizing them and there will be no active chlorine available particularly in the Last drinkers of the house so this underlines the importance of removing biofilms from your drinking system regularly.

CONCLUSION

- Always disinfect the water .
- If u are using liquid chlorine then use automatic dosing pump for chlorination and also adjust the PH of water by using second automatic dosing pump for acidification.
- You can you clo2 or Troclosene tablets that are easy to use and do not require adjustment of PH however these are slightly costly.
- Use ORP meter to access purely Hypochlorous acid instead of chlorine kits or strips.

THIS IS ALL ABOUT WATER DISINFECTION , ITS BENEFITS AND DIFFERENT METHODS.

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THANK YOU VERY MUCH FOR THE ATTENTION.

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