

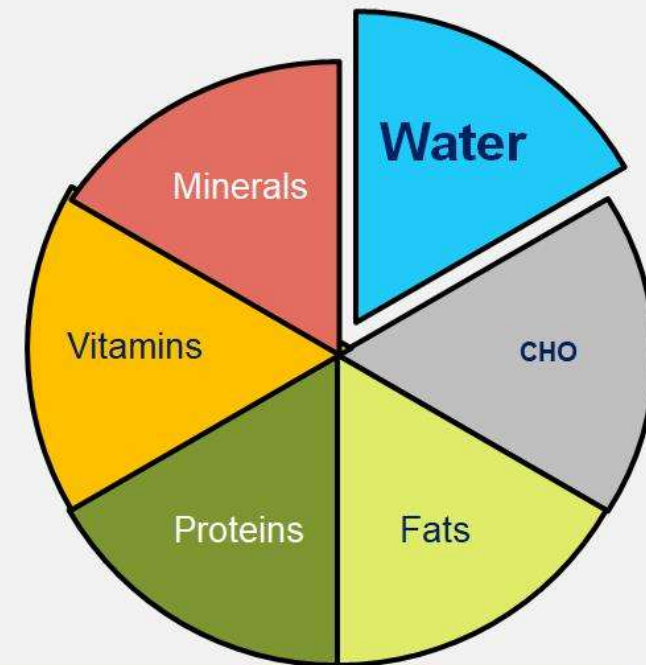
WATER SANITATION

Challenges & Solution !

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Water...

- A chicken body has around 60-70 % water.
- Water is the **most critical nutrient** to guarantee the best poultry performance.
- Water quality frequently changes from **season to season** and **Location to location**.



A safe and adequate water supply is essential for efficient poultry production

Water in poultry metabolism...

Involved in every aspect of the poultry metabolism..



- o Thermoregulation
- o Digestion & nutrient absorption
- o Nutrient transportation
- o Excretion
- o Joint lubrication
- o Enzymatic & intra/extra cellular biochemical reactions
- o Etc..



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Sources of water...

Different water sources such as ..

- Springs
- Shallow wells, artesian wells
- Bore & Deep wells
- Lakes

From a microbiological point of view...

The sources of superficial water are more subjected to contamination than the underground waters.

Surface water : Provide highest risk for potential contamination with avian pathogens

Challenges

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Challenges....

Poor water quality affect bird's physiology:-

- o Health
- o Egg production
- o Body weight
- o Body temperature regulation



- The fastest way a pathogen can spread disease in a farm and affect the majority of your flock is **through the drinking water**.
- To remain healthy, poultry flocks require water of adequate quality & quantity.

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POULTRY DISEASES POTENTIALLY TRANSMITTED BY WATER...

- o **Chronic Respiratory Disease (CRD)**
- o **Colibacillosis / E.Coli**
- o **Fowl Cholera**
- o **Salmonellosis**
- o Newcastle Disease
- o Infectious bronchitis
- o Marek's disease
- o Avian encephalomyelitis
- o Gumboro disease
- o Coccidiosis



The pathogens may contaminate water by faecal contamination or by discharges from the respiratory tract

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Solutions :



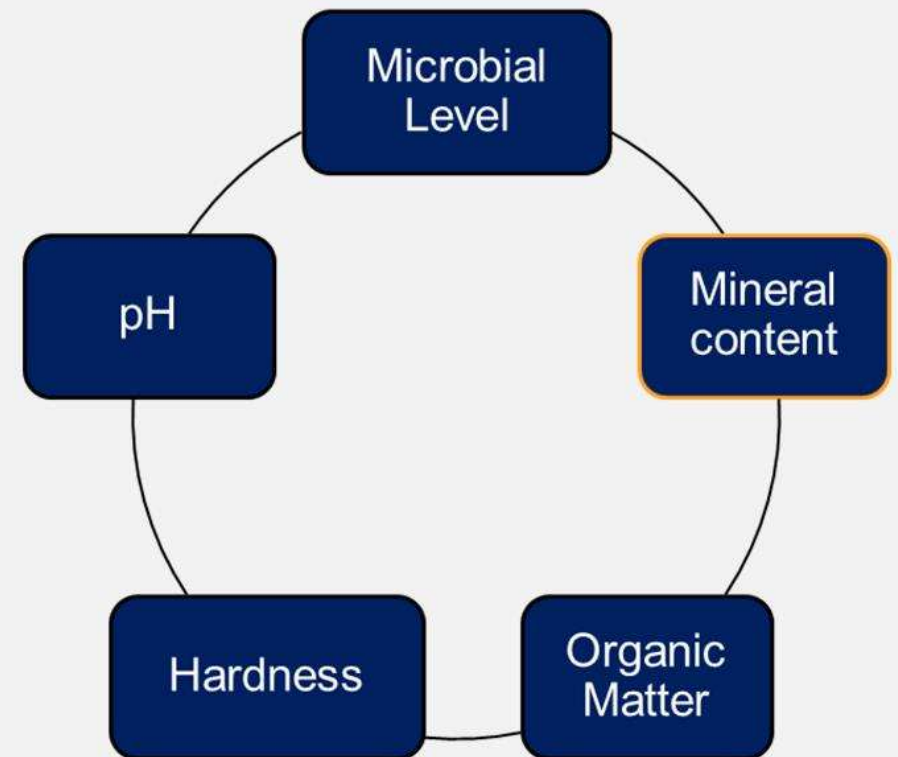
Water analysis

It's a need of hours to perform periodic sampling of the supply water at our facility mainly bird level & tank level.

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Water Quality Parameters

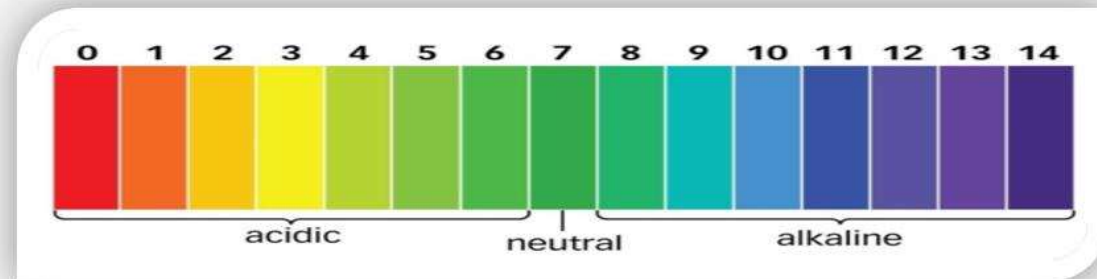
- o Color
- o Taste & Odor
- o pH
- o Organic matter/Turbidity
- o Hardness/TDS
- o Microbial contamination



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pH

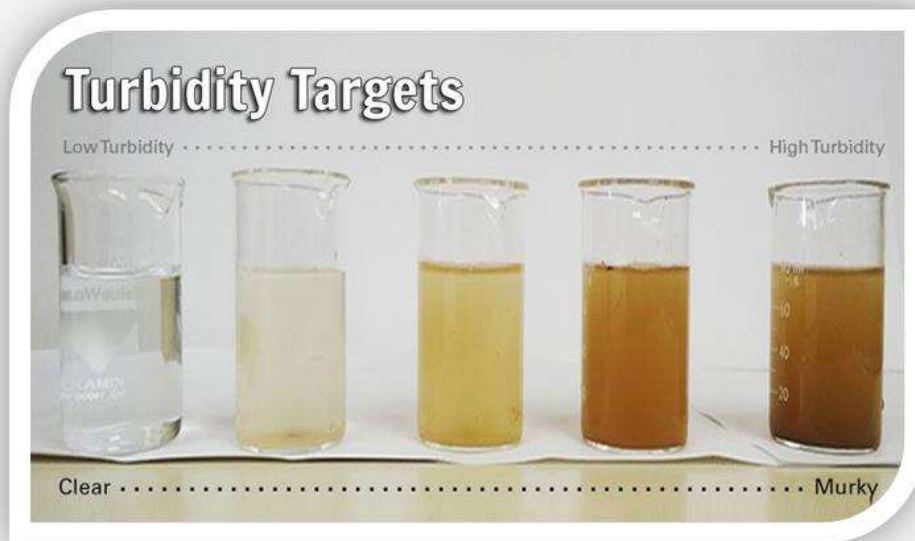
- Below 7 pH – Acidic
- 7 pH- Neutral
- Above 7 pH – Alkaline
- Normal range : 6.8 – 7.5
- Deep Bore well water – highly alkaline



In India we noticed the pH range from 6.3 to 8.9 in different region & season

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Organic matter/Turbidity



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TDS level (Total dissolved solids)

TDS Level	Unit	Remark
Less than 300	mg/l	Excellent
Between 300 to 600	mg/l	Good
Between 600 to 900	mg/l	Fair
900 & above	mg/l	Poor

***Maximum concentration level set by EPA is 500 mg/l**

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Chemical parameters

Chemical parameter	Unit	Expected	Unfavourable	Remark
Total Hardness	mg/l	60-180	> 300	
Calcium	mg/l	< 60	> 200	Involved in the hardness and taste of water. It can be found in different soluble salts such as fluorides, phosphates, bicarbonates and sulfates.
Chloride	mg/l	< 125	> 350	Excess can cause diarrhea
Sulphates	mg/l	< 50	> 250	Birds have a low tolerance to sulfates, causing diarrhea and stunted growth
Magnesium	mg/l	< 14	> 125	When combined with ion sulfate to form magnesium sulfate, it can cause diarrhea with intestinal irritation.
Arsenic	mg/l	< 0.01	> 0.05	Neurotoxic
Iron	mg/l	< 0.2	> 0.3	Indirectly affect on bird . Leaky nipples, obstructs nipples due to iron oxide particles
Lead	mg/l	0	> 0.02	Higher levels are toxic
Sodium	mg/l	< 32	> 50	Affects consumption and its excess can cause diarrhea
Nitrates	mg/l	< 10	> 25	Excess level may cause diarrhea, stunted growth & incoordination of movements
How to improve chemical parameters			1 .Reverse osmosis 2. Filtration 3. Flocculation	

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Microbial contamination

Microbial	Unit	Expected	Unfavourable
Total Bacteria	CFU/ml	0	> 100
Coliform bacteria	CFU/ml	0	> 50

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Water Sanitation

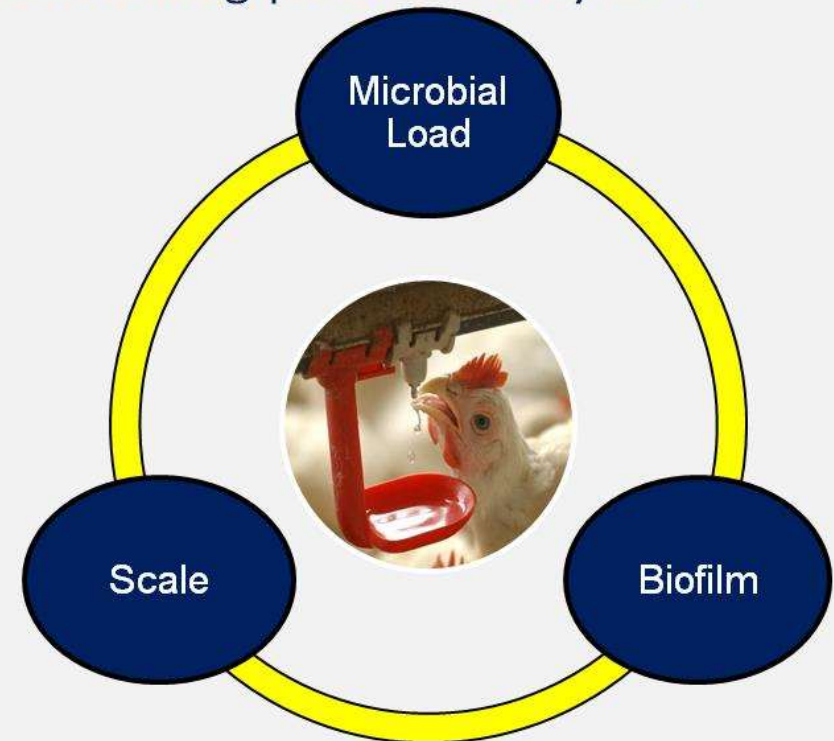
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Continuous water sanitation...

As a means to control water born infectious diseases during production cycle .

Why...?

- Control & Prevent water born infections
- To control scale and biofilm formation in water tank and pipelines .



Use of a proper water sanitization can help to eliminate many disease problems

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Factors affecting the water sanitation...

- Pathogen load
- Organic matter load
- pH
- Turbidity of the water
- Sanitizer quality & Type
- Contact time
- Sanitizer dose
- Pipeline biofilms & scaling

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The benefits of continuous water sanitation include:

- Ideal water intake.
- Reduces pathogenic bacterial count into the gastrointestinal tract.
- Improves feed conversion.
- Reduces incidence of disease.
- Reduces Therapeutic medication cost

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Methods/Chemicals currently used in the market...

- o Quaternary ammonium compounds
- o Iodophors
- o Peracetic acid
- o H₂O₂
- o Chlorination
- o Ozonization
- o UV treatment
- o others

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Best suitable solutions....

- o Iodine based water sanitizer
- o QATS based water sanitizer
- o Chlorine dioxide based water sanitizer

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o Iodine based water sanitizer **Benefits.....**

- o Broad spectrum
- o Non toxic
- o Rapidly kills the pathogens
- o Retains efficacy in hard water
- o Non irritant and non bleaching

It works on wide range of pH but
Its activity is greater at acidic pH

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QATS based water sanitizer **Benefits.....**

- o Fast acting Bactericide, Fungicide, Algaecide & Virucide.
- o Odorless sanitizer and deodorizer.
- o Effective in 400 ppm hard water.

It works on wide range of pH but
Its activity is greater at alkaline pH

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Chlorine dioxide based water sanitizer **Benefits.....**

- **Effective as a broad spectrum, anti-bactericidal, fungicidal & virucidal agent.**
- **Breaks down Biofilms & inhibits new film formation**
- **Its ability to respond even in high organic load.**
- **Its ability to erode and destroy biofilms.**
- **Its ability to work even in wide range of pH.**

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Hydrogen peroxide, Bleaching Powder & Liquid chlorine solution

Disadvantages:

- Exposure of the eyes to concentrations of 5% or more can result in permanent eye damage.
- Carcinogenic and mutagenic to animals.
- Harmful if swallowed.
- Causes severe skin burns.
- High concentration is required for water sanitation & Inactivated by organic matter also pH sensitive.
- May cause fire or explosion; Strong oxidizer



Water tank- Summer...



Wet it every 2 hr in summer

Gunny bags



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Do not keep sanitizer in sunlight...

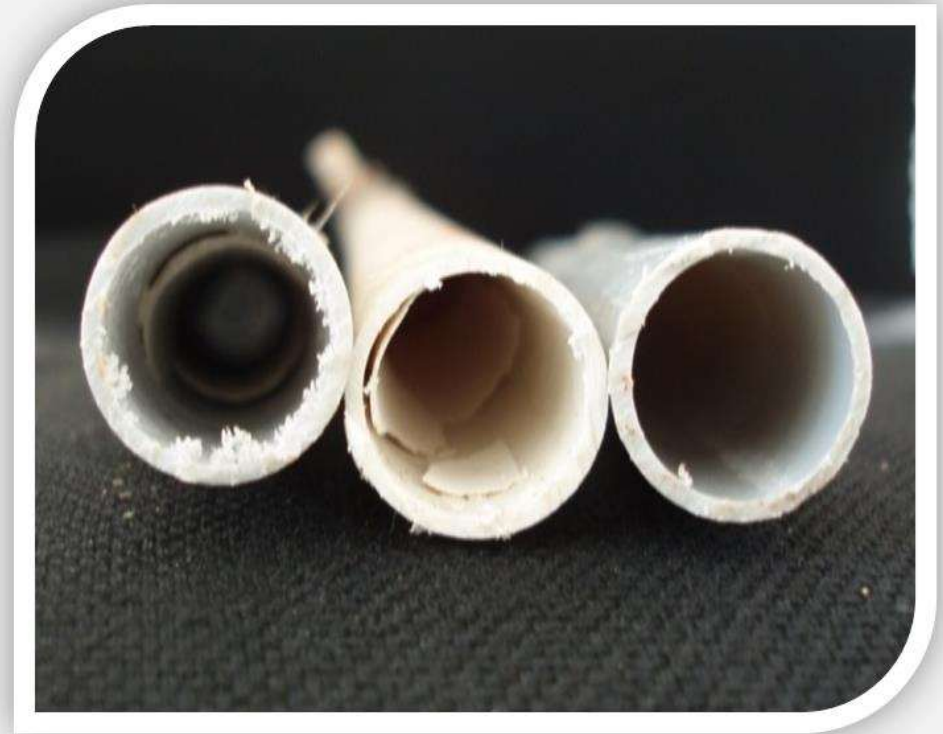


Do not keep tank open...



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Challenges in water sanitization...



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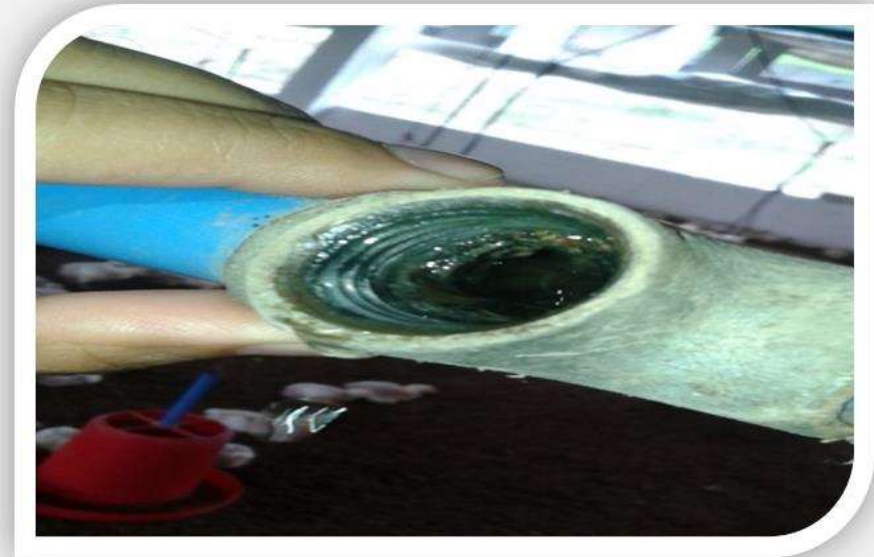
Scales in pipelines



- Contaminates water
- Reduces the efficacy of drugs & water sanitizers
- Also damages the pipelines & drinkers
- Improper supply of water through pipe

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Biofilm in the pipeline



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Importance of Pipeline Cleaning & Flushing....

- o **Water line cleaning is necessary** because biofilm sloughing causing clogging of the drinkers.
- o **Effectively cleaning the water system** (including the drinker lines) helps remove biofilm and scale build-up that can act as a food source and hiding place for harmful pathogens.
- o Biofilms or established growth of bacteria, molds and fungus in water systems can **only be removed with cleaners that contain sanitizers.**

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Reality



Expectations



Reality



Expectations



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Reality



Expectations



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Reality



Expectations

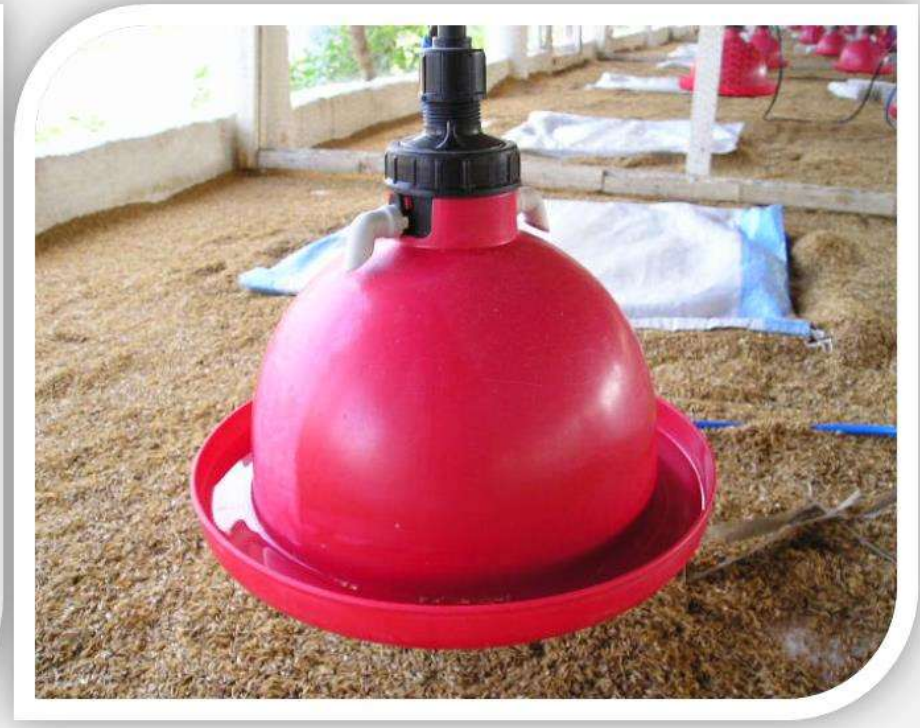


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Reality



Expectations



Regular Monitoring



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Pipeline



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The cost-effectiveness of the system can be affected by poor water quality, as it can cause damage to pipes & equipment.

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Summary...



- Water is the most essential nutrient birds receive, yet the quality of bird drinking water is often overlooked.
- Providing flocks with a sanitized/Clean water will make a difference in performance.
- In case of any flock health issues, check the bacterial load in water.

“Select the right sanitizers & right pipeline cleaning procedure

for efficient cleaning of water lines & water sanitization.”

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THANK YOU...

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