

# Making Water soluble Calcium using Eggshells



Prepared by Tanzania Organic  
Agriculture Movement (TOAM)

## **About the Author**

Tanzania Organic Agriculture Movement (TOAM) is a National Organic Agriculture Movement of Tanzania which promotes and coordinates the organic sector in the country.

TOAM envisioning to see the vibrant organic sector in Tanzania in the area of production, marketing and policies.

Under KHEA project TOAM is the lead agent that coordinates the implementation of the project in Tanzania by working closely with the associate partners and master trainers to develop and collect the knowledge products for dissemination.

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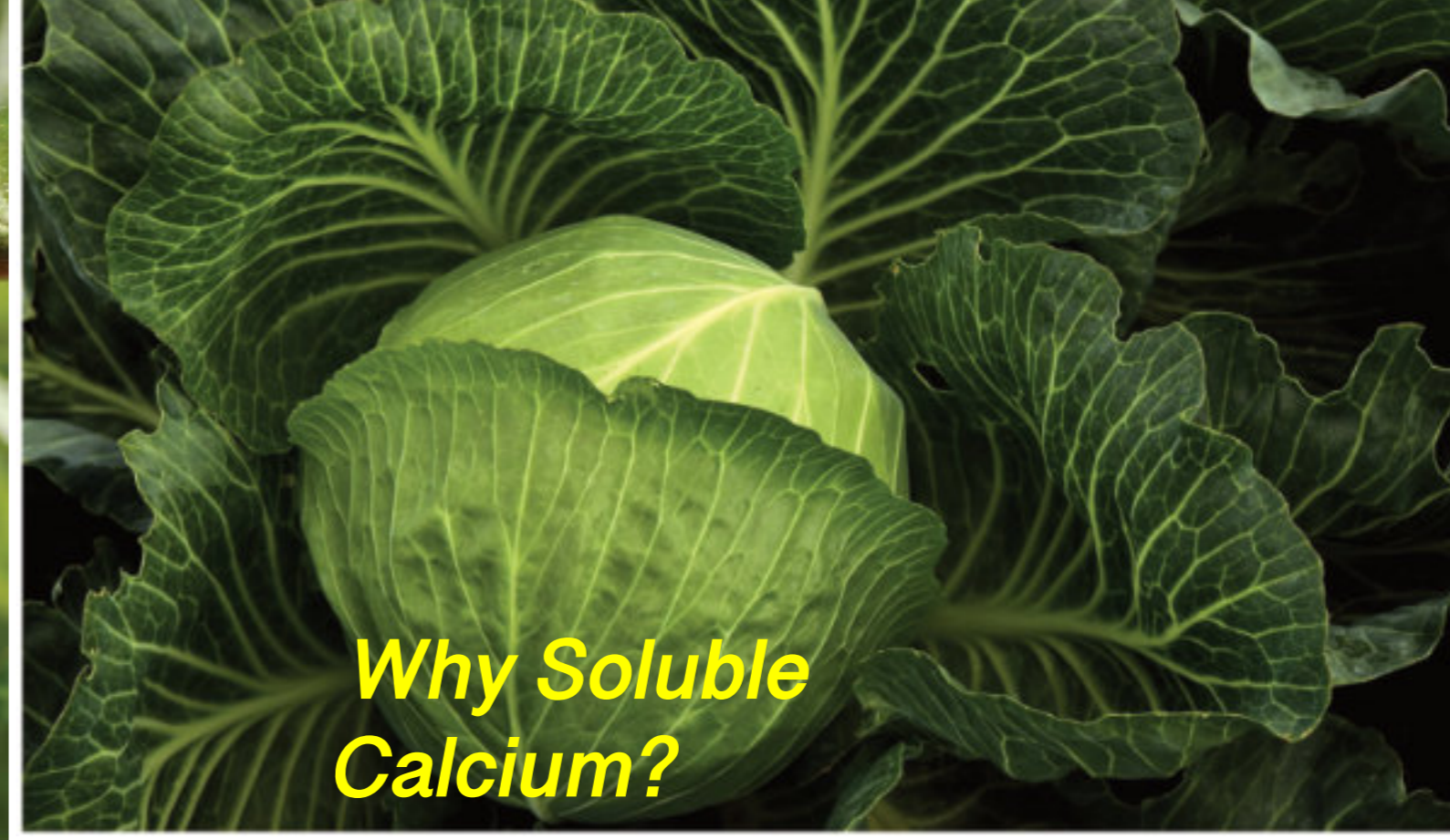
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## *Why do plants needs Calcium?*



## *Why Soluble Calcium?*

- Calcium is an essential element needed for the growth and development of plants under both non-stressed and stressed conditions.
- It thereby fulfills a dual function, being not only an important factor for *cell wall and membrane stability*, but also serving as a *second messenger in many developmental and physiological processes*, including the response of plants to biotic stress.
- Therefore, Calcium helps plants produce healthy new tissue, like roots, shoots, leaves, and buds. More mature plants need calcium to remain healthy as it helps to maintain the structure of cell walls

Water soluble calcium is ideal for farmers and gardeners who wish to give their plants and crops a quick calcium boost as opposed to solid form of calcium which may take longer to be readily available for plants.

It prevents crops and certain plants from overgrowing, increases the longevity and hardness of fruits, provides plants and crops with proper nutrition and encourages plant-life to absorb nutrients much easier.



# WHAT ARE INGREDIENTS?



**1. Eggshells:**



**2. Vinegar**



**3. Mason Jar or Polyethylene Container**

**4. Paper towel/any type of filter available**

**5. Rubber band**

**6. Grinding tool (optional)**

## Steps/Procedures to make the soluble Calcium from Eggshells



1. Break the cleaned eggshells into small pieces (1/4). Make sure the inner membrane of the eggshell has been removed prior crushing into small particles

2. Lightly roast or grill the shells in a frying pan or any container over low heat for approximately 45 minutes to remove any organic substances to avoid contamination.



**Note: Shells should be dry and lightly burnt to a light tan color but not charred.**

3. Slowly add roasted eggshells to a glass jar filled 2/3 full with brown rice vinegar at a 1:10 ratio by weight.

The eggshell fragments will float up and down within the vinegar, emitting carbon dioxide bubbles, while the calcium is being dissolved into the solution.

Seal the mouth

breathable cloth

such as muslin, or paper (not plastic) and secure with rubber bands or ties to keep out pests. Place the jar in a cool, dark location for 7 to 10 days.



5. Check if bubbles are present in the solution. If bubbles are not present, the solution is “saturated” – proceed to step 6. If bubbles are present, add more roasted eggshells and let stand for 1 to 2 more days. Repeat until the solution stops producing bubbles.

Strain the vinegar-and-eggshell solution through a colander into a clean glass jar to remove eggshells. Label the solution and store at room temperature out of direct sunlight ready to use.

### *Why do we use vinegar?*

Vinegar (acid) breaks apart the solid calcium carbonate crystals (base) in the eggshell into their calcium and carbonate parts. The calcium ions stay dissolved in the vinegar (calcium ions are atoms that are missing electrons), while the carbonate goes on to make carbon dioxide – the bubbles that you see.



## How to apply the soluble calcium solution to the plants?



- Water Soluble Calcium (WSC) is commonly diluted with water (1:1,000 ratio) and applied as a foliar spray to flowering and fruiting plants.
- The best times to spray are just after sundown or very early in the morning, to prevent leaf burn and allow sufficient time for absorption before evaporation from the leaf surface.
- Use a light mist; do not spray so heavily that the solution drips from the foliage (run-off).

- This solution can also be used as a seed-soaking solution prior to planting to improve seed germination and seedling vigor.

### Key insights to remember:

- Once you clean eggshells, allow them to dry.
- Slowly place your eggshells into the vinegar solution, little by little.
- The lack of bubbles means the eggshells and spaces in between them are saturated with vinegar.
- For any eggshells that sink to the bottom, remove the water soluble calcium solution and add in more vinegar to make more solution out of the leftover eggshells. This happens when there are too many eggshells in the vinegar, making it hard to melt.
- Know that your home/kitchen will smell vinegar and eggs, so ensure flow of air.
- Store your solution in a cool, shady area at room temperature.



Supported by the KHEA project

