Challenges of producing nitrogen fertilizer from the renewable energy for farmers

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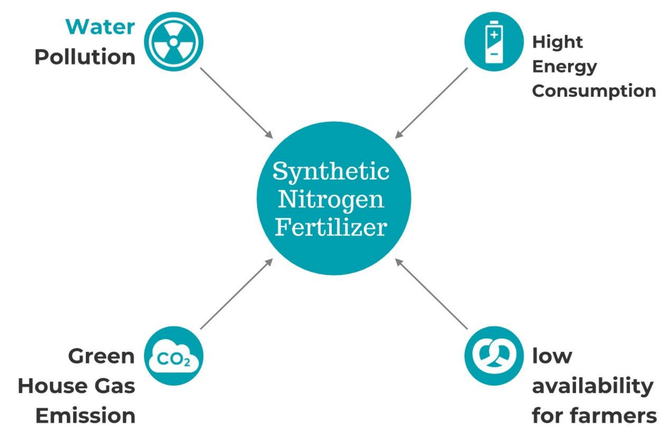
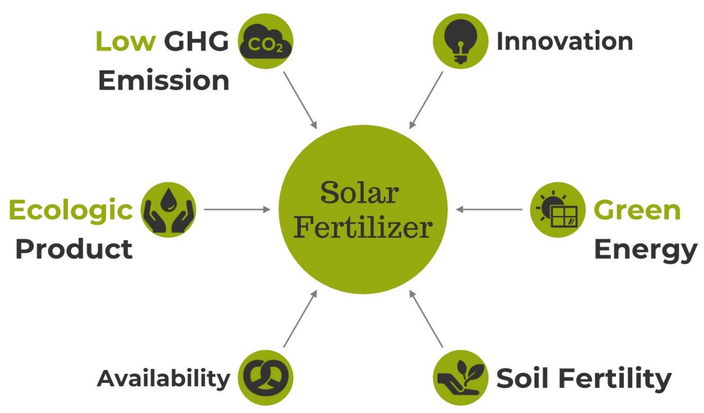
Introduction:

Nitrogen-based fertilizers account for the majority of fertilizer use, and these types of fertilizers require high energy consumption and specific high-pressure, high-temperature conditions. To this end, alternatives to produce nitrogen fertilizers with low energy consumption and low CO2 emissions will be a huge challenge and help farmers increase yields.

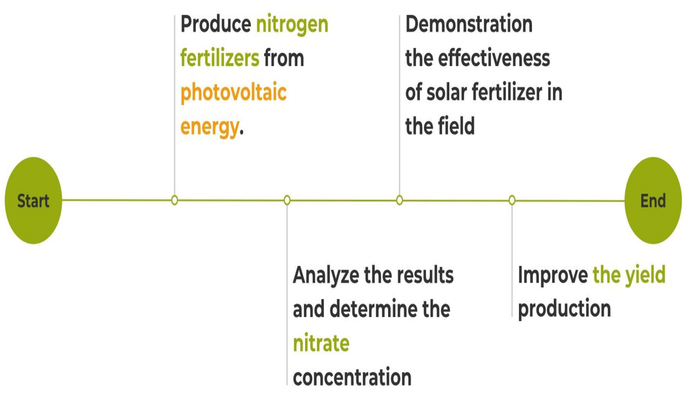
Problems



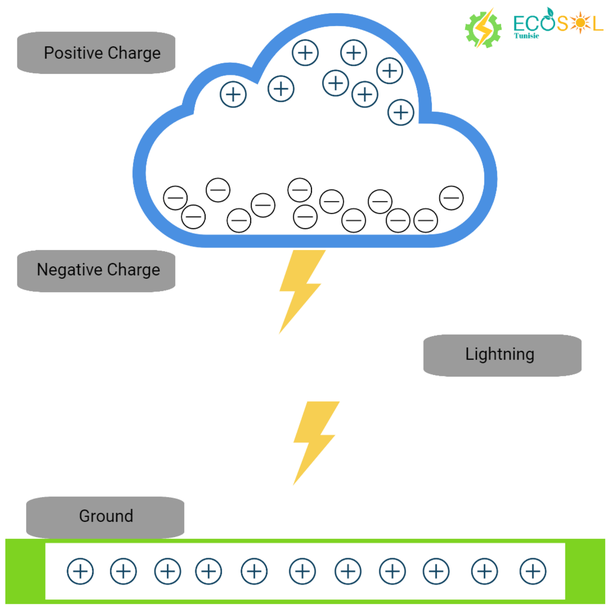
Solution & Impact



Milestones



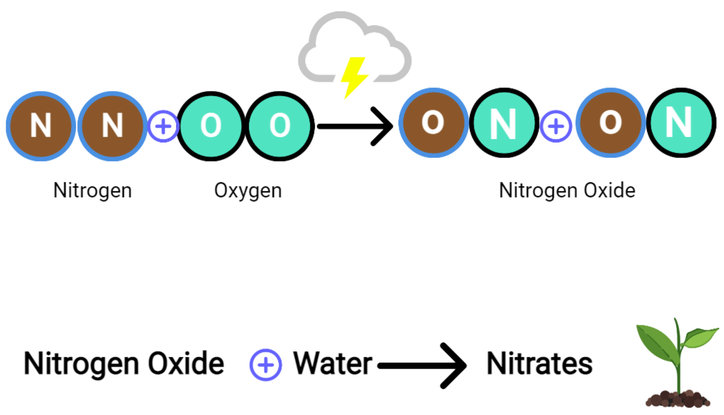
Methods



- Airflows in thunderclouds carry very little water
- Water droplets and ice crystals are denser Soft hail falls.
- When they collide, ice crystals positively charged and give way to hail become negatively charged. so, Genting is positively charged, Its base is negatively charged.

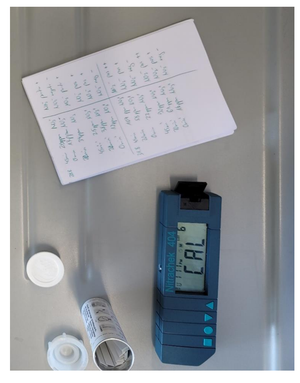
- Lightning ionizes air molecules in its path.
- The bluish purple of the flash is Excited
- Light Emission Sequence nitrogen and hydrogen atoms.

- Under the high temperature that produces lightning.
- Nitrogen and oxygen combine to form Nitrogen oxides.
- These dissolve when it rains Forms nitrates, important for plant growth.



Experimental Preparation

- To prepare PAW, 50 ml of normal water was taken in the graduated cap.
- The power supply was turned on for desired activation time (ta), which generated the plasma arc around the air with water agitation.
- We repeat this operation 2 times to obtain a representative result.
- After the desired ta= 45 min , we proceed oxygenation to observe the impact on producing (No3-).
- For the quantification of (No3-) we used quick test by Nitachek 404.



Results

After the quick test realized by the instrument Nitrachek we obtain this result of the nitrate content which increased from 19 ppm to 98,5ppm in 45 min.
After oxygenation the (NO3-) increase until 234ppm

Tab 1: Quantify the Nitrate (NO3-) content after activated time

Acivated Time	NO3- (ppm)	Average NO3- (ppm)	NO2-
0 min	22		-
0 min	16	19	-
20min	58		+
20 min	61	59.5	+
45 min	107		++
45 min	90	98.5	++
45 min with Oxygination(3h)	179		++
45 min with Oxygination(3h)	290	234.0	++

Conclusion

- The nitrate concentration depends on the activation time by plasma.
- Nitrate (NO3-) increases with the oxidation process.
- A mixture of oxidizing and electric plasma jets ensures high concentrations (NO3-).
- (NO3 -) the best formula for plant absorption
- Solar nitrogen fertilizers could be a great solution to help farmers smartly increase yields.

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