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Perspective

Role and effects of chemical factors impacting the soil properties

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DESCRIPTION

Acidification

Nitrogen-containing fertilizers can cause soil acidification when added. This may lead to decrease in nutrient availability which may be offset by liming.

Cadmium

Problematic variations exist in the amount of cadmium present in phosphorus-containing fertilizers. For instance, the amount of cadmium in mono-ammonium phosphate fertilizer can range from 0.14 mg/kg to 50.9 mg/kg. The amount of cadmium in the phosphate rock used to make them might reach 188 mg/kg. (examples are deposits on Nauruand the Christmas islands) (examples are deposits on Nauru and the Christmas islands). Continuous application of high-cadmium fertilizer can contaminate soil and plants, as was demonstrated in New Zealand. The European Commission has thought about setting cadmium concentration restrictions for phosphate fertilizers. Nowadays, phosphate rock is chosen by manufacturers of fertilizers containing phosphorus depending on its cadmium content.

Fluoride

Fluoride concentrations are high in phosphate rocks. As a result, the concentrations of soil fluoride have increased due to the extensive use of phosphate fertilizers. It has been discovered that fluoride toxicity to livestock that consumes contaminated soils is a higher concern than fluoride contamination of food due to fertilizer since plants acquire relatively little fluoride from the soil. The effects of fluoride on soil microorganisms may also be cause for concern.

Radioactive elements

The radioactive content of fertilizers varies widely and is influenced by both the parent mineral's radioactivity levels and the fertilizer-making process. Picocuries per gramme (pCi/g) concentrations of uranium-238 can range from 1 to 67 pCi/g in phosphate fertilizers and from 7 to 100 pCi/g in phosphate rock. Uranium-238 concentrations in soils and drainage waters can be many times higher than are typically found when large annual rates of phosphorus fertilizer are employed. However, these increases have very little (less than 0.05 mSv/y) of an effect on the risk to human health from radinuclide contamination of food.

Other metals

Wastes from the steel industry, which are recycled into fertilizers due to their high zinc content (which is necessary for plant growth), can contain the hazardous elements lead, arsenic, cadmium, chromium, and nickel. Mercury, lead, and arsenic are the three most prevalent harmful substances found in this kind of fertilizer. It is possible to get rid of these possibly dangerous contaminants, but the cost will go up considerably.

Highly water-soluble fertilizers with blue colours used around homes, like Miracle-Gro, are arguably best recognized as highly pure fertilizers and are widely available. These highly water-soluble fertilizers are used in the plant nursery business and are available in larger packages at significantly less cost than retail quantities. Some inexpensive retail granular garden fertilizers are made with high purity ingredients.

Trace mineral depletion

The declining amounts of metals like iron, zinc, copper, and magnesium in various meals during the past 50-60 years have drawn attention. Synthetic fertilizers and intensive farming methods are widely cited as causes of these decreases, while organic farming is frequently cited as a cure. Despite the fact that NPK fertilizers' increased crop yields are known to lower other nutrient concentrations in plants, a large portion of the measured decline can be attributed to the use of progressively higher-yielding crop varieties that result in foods with lower mineral concentrations than their less productive ancestors. Therefore, it is unlikely that switching to organic farming or using fewer fertilizers will address the issue. Instead, it is suggested that producing high-nutrient foods will require the utilization of older, lower-yielding varieties or the creation of new, high-yielding, nutrient-dense types.

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