Are Conventional Fertilizer Products Safe?

In short, yes. When used responsibly according to industry recommended rates, conventional fertilizers are not harmful to the environment.

Let's take a realistic look at them:

The rising popularity of organic and natural fertilizer products is a good thing that everyone benefits from but unfortunately it paints the rest of the fertilizers, the conventional fertilizers, in a negative way that makes them appear harmful when in fact most of them are anything but harmful. Conventional fertilizers are mostly derived from natural products and are not dangerous or damaging to the environment. A common misconception by the public is that conventional fertilizers are lumped together with chemical and pesticides which they simply are not.

As with most products, what their components break down to is what matters most.

The fate of any product that is released into the environment, organic or inorganic, is one of the most important factors used to evaluate its impact and suitability for a particular use. With conventional fertilizers one should look at their break-down products to determine whether they meet a given criteria for environmental impact before a decision is made to switch to other types of products.

The following is some basic information on the most common N, P and K nutrients derived from conventional fertilizers.

1. **Nitrogen (N):** Urea based nitrogen was invented in the 1800's. It is a carbon based compound (hence it is an organic molecule) derived by taking nitrogen from the air to make ammonia and then combined with carbon dioxide to make the urea molecule which is 46% N. Once applied in the environment, the fate of urea is to be broken down by enzymes and microbes to become plant available Ammonia-N and Nitrate-N with carbon dioxide CO_2 as a by product, just like all other sources of nitrogen including manures, composts, etc. THEY ALL END UP THE SAME and all contribute amounts of greenhouse gases. Natural sources are no better than urea based products for greenhouse gas contribution. In fact composting is a major contributor of greenhouse gases, a widely overlooked fact. With urea based nitrogen, because it is so concentrated the application rate is of critical importance. Overdoing it is not helpful. It provides surges in supply of quickly available N and is potentially a leaching source of nitrate which is an environmental issue. Application rate control is the key! When used correctly urea is not an environmentally harmful product.

   Nitrogen is an environmental problem today for a lot of reasons. Agriculture is one of them and it is not just from fertilizer sources like urea. Runoff and leaching from manure, compost, decomposition of organic wastes, various municipal and industrial sources are all part of the problem. Users of conventional fertilizer sources like urea are often pointed at as the main offender when in fact it is only when they are over-applied, like any other product that they offend. Organic and inorganic users of fertilizer must restrict application to only the amount that is needed for crop response and preferably in a form that provides slow release which further reduces the potential for negative environmental impact.

   Organic sources of N have an advantage of releasing small amounts of N daily during the growing season, as natural processes (microbes, enzymes, micro fauna, etc.) break down and release the N into the environment. Manufacturers have been mimicking the role of nature by creating products such as methylene urea (MU) stabilized N and coated urea (CRN) products that slowly release the N when the same processes (temperature, moisture, enzymes, micro fauna and microbes) cause it to be released. The question of the fate of the breakdown products of these 'additives' must be asked. Fortunately there are some products that pass muster quite handily and should be recommended for use over other sources.

   These good slow release products are much less likely to be a source of pollution as they release the nitrogen in a controled fashion using process quite similar to natural sources. The ultimate fate of these products is often no different than that of natural manures and composted sources of organic N. Agriculture Canada and the Canadian Food Inspection Agency, CFIA, have high standards and diligently review all new sources of nitrogen fertilizers before they are permitted for use. The fate of break-down

products of the coatings and substrates going into any of these products is high on their evaluation list. If a product is permitted for sale it has past a rigorous testing process.

2. **Phosphorus (P):** Referred to as phosphate. Phosphate based products are derived from hard or soft phosphate rock which is mined worldwide. It is treated to improve availability to plants, otherwise it is ineffective and would be too expensive to use in agriculture. Untreated phosphate rock has about 3% availability per year when used as fertilizer which is extremely low. To improve plant uptake, phosphate rock is treated and increased to 52% plant available form as indicated in the product 11-52-0. The fate of this form of phosphate is either to be taken up by plants or be tied up in the soil by other soil nutrients and made unavailable to plants. No matter what the source, organic or inorganic, phosphorus that is initially plant available gets tied up in the soil.

   Phosphate leaching has become a problem entering waterways and groundwater usually due to over application or misapplication in agriculture (from both manures and fertilizers) and often from industrial and municipal sources. Over application in agriculture causes the soil to eventually reach a level where the unavailable starts to become available again making it a source of leachate to groundwater and runoff. Applying only enough for crop uptake is critical in reducing the effect of agricultural contribution to phosphate problems in the environment. Using these amounts will not contribute to a build up of soil levels that become an environmental problem.

3. **Potassium:** Potassium (K) is derived from the mineral commonly called potash (a natural product which is potassium chloride) of which Canada is the world's largest supplier. Potassium is also availabe in sulfate form as potassium sulfate. The fate of potassium applied as fertilizer is to be taken up by plants or stored in the soil as available or unavailable to plants. Unlike nitrogen and phosphorus, potassium is generally not a nutrient of concern. Leaching and runoff are typically not an issue to aquatic life or livestock and impact on drinking water is rarely if ever an issue.

In summary, by using only the recommended amounts and in areas where leaching into groundwater will not occur, you significantly reduce the chance of adversely affecting the environment. Applying only the amount the plants need will also reduce your fertilizer costs. A win-win situation for you and the environment.