

## Narrative Review

# Food safety and the effect of fertilizers on human health.

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## Abstract

Threats to the environment and the economy significantly worsened human health, greatly outweighing any gains associated with increasing food production. Numerous heavily fertilized crops are used as animal feed, contributing to global food inequalities and unbalanced diets, even in wealthy countries. Hazardous fertilizers have been linked to an excessive burden of communicable and non-communicable diseases, which significantly increase yields and pose considerable environmental and public health risks. The rate at which nitrogen fertilizers are applied is closely related to the buildup of toxins in the surrounding area, groundwater, and leafy and root crops. Consumption of diets including these ingredients has contributed to a significant risk to human health.

## Keywords

Food Safety, Fertilizers, Foodborne Illness, Pesticides, Organic Food.



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## Introduction

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Food security is a global issue that has gained increasing attention over the years<sup>1</sup>. It is a condition in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Food infected with harmful bacteria, viruses, parasites, or chemical substances causes more than 200 disorders ranging from diarrhea to cancer<sup>2</sup>. In this review, we will explore the effects of fertilizers on human health and discuss some ways to minimize their harmful impacts.

Fertilizers are an essential component of modern agriculture, helping to increase crop yields and maintain soil fertility. However, their use can also have negative impacts on human health<sup>3</sup>. Fertilizers are designed to provide essential nutrients to plants, such as nitrogen, phosphorus, and potassium. They are typically made up of chemical compounds that are synthetically produced, such as ammonium nitrate, urea, and superphosphate. While they are effective at boosting crop yields, fertilizers can also have negative effects on human health<sup>4</sup>.

One of the most significant risks associated with the use of fertilizers is the contamination of groundwater and surface water. Nitrate, a common component of fertilizers, can easily dissolve in water and contaminate water sources. When consumed in high concentrations, nitrate can be harmful to human health, particularly for infants and pregnant women. It can cause a condition called methemoglobinemia, also known as "blue baby syndrome," which can reduce the oxygen-carrying capacity of blood and cause serious health problems. Another risk associated with the use of fertilizers is exposure to toxic chemicals<sup>5</sup>. Many fertilizers contain heavy metals such as lead, arsenic, and cadmium, which can accumulate in the soil and eventually end up in the food chain. Exposure to these toxins can lead to a range of health problems, including cancer, neurological disorders, and reproductive problems<sup>6</sup>.

In addition, the overuse of fertilizers can lead to soil degradation and loss of biodiversity. This can result in decreased crop yields and reduced food security, which can have negative impacts on human health. To minimize the negative impacts of fertilizers on human health, it is important to adopt sustainable agricultural practices. This can include the use of organic fertilizers, such as compost and manure, which are less likely to contaminate water sources and cause health problems<sup>7</sup>. It can also involve adopting integrated pest management techniques, which can reduce the need for chemical fertilizers and pesticides.

Food safety and the use of fertilizers are critical issues that have a significant impact on human health. The safety of our food supply is a growing concern for many people, particularly in light of recent foodborne illness outbreaks. Using fertilizers, while necessary for crop production, can also negatively affect human health if not properly managed. In this narrative review, we have examined the critical themes related to food safety and the effect of fertilizers on human health. Following are the major five themes.

### 1. Foodborne Illness

One of the most significant threats to food safety is a foodborne illness. Every year, millions of people become ill from consuming contaminated food. Pathogens such as Salmonella, E. coli, and Listeria can be present in food and cause illness if proper food handling and processing procedures are not followed. Preventing foodborne illness requires a multi-faceted approach that involves education, regulation, and enforcement.

### 2. Pesticides

The use of pesticides on crops can have a significant impact on food safety. Pesticides can enter the food chain through residues on fruits and vegetables, and excessive exposure to some pesticides has been linked to cancer and other health problems. It's essential to carefully manage the use of pesticides to minimize risks to human health.

### 3. Antibiotics

Antibiotics are often used in animal agriculture to prevent and treat disease, but overuse of antibiotics can lead to the development of antibiotic-resistant bacteria. This can seriously affect human health, as antibiotic-resistant infections can be more challenging to treat.

### 4. Fertilizers

The use of fertilizers can increase crop yields, but excessive use of fertilizers can lead to environmental contamination and can also have adverse effects on human health. Nitrate contamination of water sources can cause methemoglobinemia, also known as "blue baby syndrome," which can be fatal to infants.

### 5. Organic Food

Organic food is often perceived as safer than conventionally grown food because it is produced without synthetic pesticides and fertilizers. However, organic food can still be contaminated with pathogens, and there is debate over whether organic food is healthier than conventionally grown food.

Food security is essential for the health and well-being of individuals, families, and communities. However, despite progress in some regions, food insecurity remains a significant challenge for many people around the world. According to the United Nations Food and Agriculture Organization (FAO), over 820 million people worldwide suffer from chronic hunger and malnutrition, and this number is on the rise<sup>7,8</sup>. Food insecurity is caused by a complex set of factors, including poverty, conflict, climate change, natural disasters, and limited access to education and healthcare. It affects the most vulnerable populations, including children, women, the elderly, and people living in rural areas.

To address food security, a multi-dimensional approach is required<sup>9</sup>. This involves improving agricultural productivity, increasing access to markets, enhancing social protection, promoting nutrition education, and empowering women and smallholder farmers. Investments in sustainable agriculture and rural development are critical for

reducing poverty and hunger. Sustainable agriculture practices can help to conserve natural resources, protect the environment, and increase yields. Additionally, investing in infrastructure, such as roads, irrigation systems, and storage facilities, can improve market access and reduce food waste<sup>10,11</sup>.

Furthermore, social protection programs, such as food assistance, cash transfers, and school feeding programs, can provide a safety net for vulnerable populations and help to break the cycle of poverty and hunger. Promoting nutrition education and empowering women are also crucial for improving food security. Nutrition education can help to promote healthy eating habits and reduce malnutrition, while empowering women can increase their access to resources and improve their ability to provide for their families.

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## Conclusion

For food security, the importance of fertilizer is widely recognized, and research has also shown that nutrient management may boost the health-promoting components of plant-based foods and feed. This is significant because plant health, mineral macro-and micronutrient application, and animal and human nutrition have direct and indirect links. In conclusion, food safety and using fertilizers are complex issues that require careful management to ensure that human health is protected. Preventing foodborne illness, carefully managing the use of pesticides and antibiotics, and promoting sustainable farming practices are all critical components of a comprehensive approach to ensuring the safety of our food supply. By taking a multi-faceted approach to these issues, we can help to ensure that our food is safe and healthy for everyone.

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## Conflicts of Interest

We have no conflicts of interest to disclose.

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