

## Organic or Inorganic: Which Nutrient Source Is Better for Plants?

**A quick answer to the question asked in the title is that neither organic nor inorganic (manufactured or mineral) nutrient sources are better for plants.** Both have their places and should be used where appropriate. Each has its advantages and disadvantages. Their relative merits need to be explored further, however.

**Organic materials such as animal manures and biosolids should be viewed as economic and agronomic nutrient supplements along with mineral fertilizers in the production of crops.** They contain varying amounts of plant nutrients and provide organic carbon (C). They improve the biological, chemical, and physical properties of soils. There are, however, concerns associated with their use.

- In the case of animal manures produced in confined geographic areas, nutrient loading can occur in crop fields near production facilities. This can pose a threat of excessive nitrate ( $\text{NO}_3^-$ ) leaching to groundwater and phosphorus (P) moving into surface waters through runoff and erosion. Their relatively fixed nutrient ratios can result in excessive P loading in heavily manured soils because crops usually require much less P compared to nitrogen (N) than that contained in the manure. Significant amounts of ammonia ( $\text{NH}_3$ ) can also be lost to the atmosphere.
- Indiscriminate use of animal manures and human waste (sewage sludge) can create human health hazards through the accumulation of heavy metals and pathogens in the soil.

**There are other disadvantages associated with the use of organic sources.** They are usually low in nutrient content. It is also virtually impossible to time the release of the nutrients they contain so as to match the needs of the growing crop and minimize residual amounts that can impact the environment. Further, their relative low analyses make it uneconomical to transport them far from their point of production.

**On the other hand, mineral fertilizers contain precise—guaranteed—levels of nutrients, in forms that are readily available for plant uptake and use.** Their application can be timed to meet crop requirements, assuring efficient nutrient use and minimizing any potential impact on the environment. Because of their high nutrient content, mineral fertilizers are easy and economical to ship to great distances from their point of production.

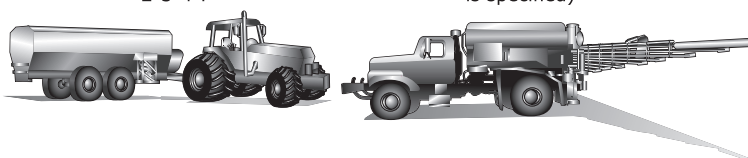
**It should also be understood that crop plants can take up and use nutrients only in the inorganic form—as is found in mineral fertilizers.** Nutrients in organic materials cannot be used until the materials decompose and release them to the inorganic soil nutrient pool. **EB**

*Storage, handling, weather, and other factors result in big differences in nutrient content of organic materials, while the nutrient content of inorganic (mineral) fertilizers can be carefully determined.*

### What's the N-P-K Analysis?

**Livestock manure**  
4-3-2 ?  
2-4-2 ?  
2-3-4 ?

**Commercial fertilizer**  
12-12-12  
(or whatever analysis  
is specified)



*Nutrient content of livestock manures and other organic material varies considerably. Inorganic commercial fertilizers contain guaranteed ratios of nutrients and can be easily adjusted to crop and soil needs. Relatively low analyses usually make it impractical to transport organic sources very far.*



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