

Homogenized and liquid fertilizers are manufactured in a manner that ensures uniform distribution of nutrients in all granules.

The amounts of micronutrients in pesticides used on crops should be considered when planning a micronutrient fertilizer program. Micronutrients from pesticides can accumulate in the soil from leaf runoff and from decaying plant material. In many production areas, micronutrients have built up in the soil to levels such that no additional micronutrients from fertilizers are needed.

As mentioned above, micronutrients can be produced in fritted form. Frits are made by mixing micronutrients with molten glass, then cooling and grinding. The micronutrients are, therefore, slowly available to plants and are less likely to leach. This form of micronutrient fertilizer is not widely available. If you want fritted micronutrients, be sure that the fertilizer you are purchasing is actually fritted, since mislabeling has been a problem in this area. For more information on this, see *Vegetarian 85-1*, a Vegetable Crops Department monthly newsletter. For information regarding specific articles, consult your local agricultural extension office.

**Table 5.** Average nutrient content of selected organic fertilizers.

Product	N	% composition	
		P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
dry weight basis			
Blood	13	2	1
Activated sewage	6	3	0.2
Fish meal	10	6	0
Bone meal	3	22	0
Cotton seed meal	6	3	1.5
Peanut meal	7	1.5	1.2
Soybean meal	7	1.2	1.5
dried commercial manure products			
Stockyard	1	1	2
Cattle	2	3	3
Chicken	1.5	1.5	2
Hog	2	2	1

**Organic fertilizers.** Organic fertilizers, such as manure, can be good fertilizers (Table 5). Not only do they supply nutrients, but also they add organic matter to the soil to increase its water-holding capacity and tilth if applied in large quantities. However, for most situations, transportation cost reduces the economic return from the use of organic fertilizers. In addition, most organic sources cannot readily supply enough of all nutrients so that, in most cases, supplementing with "chemical" fertilizers is needed.

**Slow release fertilizers.** Several brands of slow-release fertilizers are available for supplying nitrogen. Research at Gainesville has shown increases in yields of some vegetables when slow-release fertilizers, such as sulfur-coated urea or isobutylidene-diurea, were used to supply a portion of the nitrogen requirement. Although more expensive, these materials may be useful in reducing fertilizer losses through leaching, in decreasing soluble salt damage, and in supplying adequate fertilizer for long-term crops such as strawberry or pepper.

**Fertilizer movement in the soil.** Nitrates, chlorides, and sulfates move readily with the upward or downward movement of water in the soil. These salts can accumulate at the soil surface where water evaporates or can be leached from the root zone by heavy water application. On very sandy soils, potassium, magnesium, and boron also may be subject to leaching. Phosphorus, however, does not readily move in most soils. Because of this, phosphorus fertilizer needs to be placed in the root zone.

**Soluble salts.** Overfertilization or placement of fertilizer too close to the seed or root leads to soluble salt injury or "fertilizer burn" (Fig. 6). Fertilizer sources differ in their capacity to cause soluble salt injury (Table 6). Therefore, where history has shown soluble salt problems, or where irrigation water is



**Figure 6.** Soluble salt injury from improper fertilizer placement for cabbage near Immokalee in Collier County.