

Sour Mulch

Wood mulch storage techniques significantly affect product quality.

Wood chips and bark nuggets have long been used as mulches in landscapes. While some landscape contractors produce their own wood mulches by grinding branch prunings, dead trees and other wood wastes, many obtain these materials from other sources including sawmills and pulping operations. The primary disposition of wood by-products from these sources is for fuel, but, to a lesser degree, they are also used for landscape purposes such as mulching.

The benefits of using wood by-products as landscape mulch are many. Organic mulches stabilize soil, moderate soil temperature, retard weed development, reduce evaporation of soil moisture and enhance the aesthetic qualities of landscapes. However, there is a significant, albeit rare, problem that may occur when using previously stockpiled wood by-products for mulching. This problem is illustrated in the following actual landscaper experience.

A local landscape contractor delivered a load of mulch to a residential client on a Saturday. On Sunday, the homeowner spread the mulch around shrubs, perennials and spring bulbs in a mixed border. Within one-half hour, many of the plants began to wilt. By Monday, foliage of tulips, Phlox, Astilbe and violets had turned white or light tan as if bleach had been thrown over the plants. Turf adjacent to the mulch also turned pale yellow, but Rhododendrons and daffodils in the border appeared unaffected.

Plant response was so rapid that herbicide contamination of the bark mulch was first suspected as the cause. However, a sample of the mulch product emitted a pungent odor and was warm and caustic to touch. A pH test verified the extreme acidity of the dark brown, mulch material.

Bollen and Lu (1966) reported that under certain conditions, stockpiled bark, wood chips and sawdust could produce volatile organic acids. This occurs when these wood by-products are piled so high that moist materials deep within the pile become compacted and heat up to high temperatures. This in turn results in the exclusion of oxygen and leads to anaerobic fermentation of the wood carbohydrates. The products of this fermentation include low molecular weight organic acids such as acetic, propionic and butyric acid.

Buildup of these organic acids can significantly lower the pH of wood mulches, creating so-called "sour mulch". A study (Zoch, et al., 1982) of changes occurring within piles of stored aspen bark showed a drop of pH from an initial value of 4.6 to values ranging from 2.6 to 3.3. Height of the bark piles studied was twenty feet. Andrew Baker (1992) of Forest Products Research Laboratory in Wisconsin has stated that wood chips and bark composted in piles higher than ten feet are prone to the type of anaerobic fermentation described by Bollen and Lu.

Baker recommends that wood by-products be piled in compost windrows less than ten feet high and be turned frequently to promote aerobic decomposition. Gouin (1992) suggests piling ground or chipped wood in windrows four feet high for best results.

Once mulch has soured, the problem may be corrected by spreading it out in a shallow layer and watering heavily to leach toxic chemicals (Rakow, 1992). Adding large amounts of limestone will neutralize acidity and restore the mulch to useable form.

Interestingly, in the case discussed at the beginning of this article, the homeowner was able to salvage plants injured by the sour mulch by pulling back the mulch and drenching the area around plants with water. Within a few weeks all of the affected perennial plants and the turfgrass recovered. The spring bulbs recovered and flowered again the following spring. With the increase in regulations prohibiting disposal of yard wastes and wood products in landfills, wood recycling and composting businesses are popping up faster than toadstools in autumn. One consequence is a glut of cheap mulch. However, with a lack of standards controlling quality of the finished products, landscapers need to be cautious of the materials they are buying and how they plan to use them.

Literature Cited:

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