

# Organic Wastes for Mulch

waste from packing houses processing organic materials studied for possible agricultural use

E. L. Proebsting

**End-product wastes** of some industries which process different types of organic materials are desirable as mulching materials in agricultural practice.

The solid pomace—the end-product waste from California wineries—consists mostly of skins and seeds and is a very satisfactory material for use in vineyards and orchards. The liquid effluent from brandy stills, however, is likely to kill trees or vines to which it is applied.

Another material which was tried with distinctly unfavorable results was the residue from vanilla beans after extraction. The small amount of vanillin remaining was enough to cause damage to young trees in pots in greenhouse tests. A layer about an inch thick applied to peach trees in an orchard eliminated weed growth but injured the trees.

More recently, in a search for a suitable mulching material, other things have been tried. A mulching material for the climate of the interior valleys of California requires somewhat different characteristics than in more cool and humid situations. It must be not only cheap and non-toxic, if not actually having some fertilizer value, but must be fire resistant. Straw, grass, sawdust, rice hulls, and similar materials have the defect of igniting easily. When present in a thick enough layer to serve as a successful mulch the temperatures created when they burn are high enough to kill or severely damage trees. There are several examples of heavy loss due to fire where these materials have been used and burned. It is possible that sprinkler irrigation may reduce the fire hazard. The mulching material should be one which will not float to the end of the run if a flooding method of irrigation is used.

Two materials—available in limited quantities—which approach meeting the requirements have been tried on a small scale. One of the materials is the residue from coffee which has been processed for powdered coffee.

Test plots were laid out in a walnut orchard in San Joaquin County. To a portion of the plots coffee waste was applied in 1949. More was used in 1950. The material is well leached but samples were found to contain 1.4–2.4% total nitrogen. Potassium was less than 0.1% and phosphorus from .04–.40%.

Soil samples from plots receiving the

coffee waste at the rate of about 10 tons per acre show a change in soil reaction from neutral—pH 7.0—to slight acidity of about pH 6.2 in the surface foot. Water soluble K (1–1)—potassium—is slightly higher and nitrate slightly lower than the check plots. Leaf analyses of samples taken in July and September of 1951 showed no significant differences between the two treatments on either date for the elements nitrogen, phosphorus, potassium, calcium, magnesium and sodium. Tree condition is about the same under the two treatments but the soil, a heavy clay, has a better surface structure in the treated than in the untreated areas. The coffee waste will burn but it does not ignite readily and has not created a fire hazard.

The second material considered—spent hops—can be ignited only with difficulty and will not support the fire even when the material has been oven dried. A sample obtained from Stockton for test on almond trees at Davis in 1949 contained 4.3% nitrogen but negligible amounts of phosphorus and potassium. Applied around the trees to a depth of about four inches, it prevented nearly all weed growth. Although essentially a very light material, it forms clumps which resist washing away with basin irrigation.

Leaf analyses were made of samples collected on three dates in 1950 and on five dates in 1951. There seems to be no significant difference in composition with the possible exception of a slightly higher potassium content in the mulched trees in 1951. There was no apparent difference in tree behavior.

The usefulness of organic residues varies tremendously with the source and previous treatment. The indiscriminate use of material simply because it is of organic origin may be dangerous. Materials of this type which are beneficial can be of use in different ways.

Grape pomace has about the same value as stable manure as a fertilizer, though more slowly decomposed but spent hops, with a higher nitrogen content is decomposed too slowly to be considered a satisfactory source of nitrogen. The use of spent hops should be as a relatively inert mulch to reduce cultivation or eliminate it and thereby aid in improving the soil structure and rate of water penetration.

An ordinary analysis of an end-product waste material is of little value without some information on the rate of release of the nutrients it contains, its physical properties and the possibilities of its containing minute amounts of material which may be highly injurious.

The theory—sometimes advocated—which holds all organic matter as material for addition to the soil may have severe limitations.

*E. L. Proebsting is Professor of Pomology, University of California College of Agriculture, Davis.*

*F. M. Charles, University of California Farm Advisor, San Joaquin County, co-operated in the tests with the coffee waste.*

## AVOCADO

Continued from page 13

at Riverside is from April to August. This variety has been a consistent producer of medium to heavy crops.

The Hass may be considered for commercial planting in the warm locations of the interior area.

## Other Varieties in Test

The varieties included in the original planting that have been found to be poor producers under the conditions prevailing at Riverside are: E 28, Karen, Middleton, Leucadia, Gottfried, Frances, Nabal, MacArthur, Wurtz, Campbell, Encanada, Edranol, Taft, Hellen, MacPherson, and Kimmel. They include nearly one half of the original varieties. Of the remaining varieties of the first planting, several are in the doubtful class and need further observation.

The following varieties have been added to the orchard since 1943: Kimball, Sonora, Hartman, Courtright, Ge-Hee, Rincon, Strong, Boley, Monica, Silliman, Santa Barbara, Routh, Mayo, Bacon, Tantos Fuerte, Harms, Wright, Geib, Dr. White, DeBard, Lois, Fuerte, Larry, and Wilhorne. None of them has been under trial long enough to draw definite conclusions.

*M. M. Winslow is Senior Administrative Assistant, University of California College of Agriculture, Riverside.*

*The above progress report is based on Research Project No. 1434.*