

# UTILIZATION OF SUGARCANE BAGASSE MULCH IN TOMATO [*Lycopersicon Lycopersicum* (L) KARSTEN] PRODUCTION<sup>1</sup>

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Three sets of studies (greenhouse test, laboratory and field experiments) were conducted to find out how to maximize the utilization of sugarcane bagasse-mulch in tomato production using the cultivar marikit,

The greenhouse tests consisted of two consecutive plantings on earthen pots 16-cm in diameter. The treatments comprised of five levels of nitrogen: 0.30, 60, 90 and 120 kg/ha and three thicknesses of mulch; 5, 10 and 15 cm. Four-month old sugarcane bagasse was used as mulch. Unmulched pots and pots with 2-month old rice straw mulch applied 5 cm. thick were provided as controls. The second planting was done right after the termination of the first crop using the same soil and mulch. No fertilizer was added except for 100 ml starter solution per plant.

The germination and seedling studies were done in the laboratory using petri dishes, seed boxes, and sugarcane bagasse of different ages. It was aimed

to determine the age of sugarcane bagasse tolerated by germinating tomato seeds and to explain the results obtained in the greenhouse tests.

The field experiment was done at Barangay Lagundi, Canlubang, Laguna in an area previously cropped to sugarcane for several years. The treatments consisted of four levels of nitrogen: 30, 90, 150 and 120 kg/ha and three thicknesses of 8-month old bagasse-mulch: 5, 7.5 and 10 cm. The nitrogen rates and age of bagasse-mulch used were based on the results and observations of the previous studies.

The initial greenhouse study showed that the 4-month old bagasse had unfavorable effects on the growth of transplanted tomato especially when applied 15 cm thick. These effects were a) the burning of the lower leaves, b) yellowing of the succeeding leaves, c) stunted growth and d) 65 per cent less yield than those mulched with rice straw. The 2-month old rice

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straw did not show any unfavorable effect. Four months later, the same bagasse-mulch favored the growth and increased the yield of the second crop.

The seedbox study indicated that yellowing and stunting were due to substances given off by the 1 to 5 month-old sugarcane bagasse. The petri dish test proved that these toxic substances were water soluble and were present at higher concentration on the 1 to 5 month-old bagasse. Its low concentration on the 6 to 8-month old bagasse stimulated the growth of tomato seedlings.

The final test in the field showed that plants mulched with 8-month old bagasse tended to be taller than the unmulched plants. Increasing the thickness of bagasse mulch delayed the flowering; induced greater chlorophyll synthesis; and increased the number of flowers per plant, dry matter weight<sup>2</sup> and yield of transplanted "Marikit" tomato when combined

with nitrogen fertilization. The unmulched plants had the earliest flowering date and the least chlorophyll content, number of flowers per plant, oven-dry weight of plant tissues and of yield. Those unmulched with rice straw had intermediate amounts in the five factors mentioned. Bagasse-mulched from 7.5 to 10 cm in thickness increased the soil organic matter after 4 months, which fast resulted in lower bulk density. The high moisture conserved on these treatments reduced the daily maximum temperature and favored the growth of decomposing microorganisms, ultimately contributing further to the organic matter content of the soil.

Substantial amount of nitrogen fertilizer, however, is needed to get maximum benefits. The thicker the mulch the more nitrogen. Therefore, 90, 150, and 210 kilograms of nitrogen were used respectively. These treatment combinations gave the highest net income and return per peso invested.

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<sup>2</sup> The drying was done by exposing the whole plant to sunlight for three days, followed by overnight oven-drying until the plant tissues were free from molecular moisture.