

benefit of VAM colonization having been demonstrated in many native and agriculture plants (O'Keefe and Sylvia, 1990).

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Research Notes

Efficiency of traditional jaggery making furnace

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At village level small-scale cottage industries, jaggery making is done using juice obtained after crushing sugarcane at the site with a crusher. The bagasse left after crushing is sun dried in open yard for reducing the moisture content and used as fuel in the furnace for jaggery making. A study was conducted to evaluate the overall heat utilization efficiency of these furnaces.

A typical jaggery making furnace consists of fuel feeding, opening, grate, fire place, chimney and ash chamber. It is constructed with brick and mud below the ground level. The smoke produced during combustion is made to go out through a chimney of the oven. The bagasse is fed continuously through the fuel feed opening manually at regular interval of time. The sugarcane juice is kept in a GI vessel of 660 litre capacity placed over the fire place and boiled.

In order to evaluate the system performance of the jaggery making furnace, various details such as the juice recovery obtained after crushing sugarcane, amount of bagasse obtained, the moisture

content before and after sun drying, the amount and frequency of feeding bagasse into the oven were noted. The temperature of juice during boiling and the temperature of smoke were also observed. Fourteen jaggery making furnaces owned by farmers who manufacture jaggery locally were inspected and all the above data were collected.

The study revealed that 650 kg of juice and 350 kg of bagasse (50% M.C., wb) were obtained from one tonne of sugarcane crushed. The bagasse was sun dried to bring down the moisture from 50% to 20% (wb) and after drying, 245-250 kg was obtained from 350 kg bagasse. The observations indicated that 65 kg of juice was boiled per batch to get 13 kg of jaggery. In the above process, 500 kg of water was evaporated from juice and 2 kg of slag (mud) was removed while boiling. The bagasse required per batch was about 50 kg which cannot be met from one tonne of bagasse crushed in one batch. So 250 kg of additional bagasse or any other fuel was required for one batch. This requirement is as met b

the jaggery units using other fuels like wood, agricultural residues and even old tyres etc.

The smoke emitted from the jaggery making furnace was sent out through a chimney at a temperature of 350-375°C. The temperature of flame during bagasse combustion was about 500°C maximum. The time of operation per batch was about 3.75 to 4.25 hours. The feeding of bagasse was carried out by a labourer exclusively and each time about 0.2 kg was fed. Frequency of manual feeding of bagasse was about 600 times per hour which was cumbersome to the labourer.

The thermal efficiency of the traditional jaggery making process was determined from the field data by calculating the heat energy input made through bagasse, heat utilized for the evaporation of water from sugarcane juice and heat loss particularly through chimney.

Heat energy input per batch = 8990 MJ

Heat energy output required = 195.6 MJ

for heating the juice

Total latent heat of vaporization of water = 1130 MJ

Total heat of evaporation required was = 1326 MJ

Thermal efficiency = Heat output / Heat input
= (1326/8990) x 100

The thermal efficiency of the existing furnace was found to be 14.75% which was low. The bagasse used was 3.85 kg/kg of jaggery manufactured. The study revealed that use of gasifiers for such thermal applications can lead to considerable increase in efficiency and development of a suitable bagasse based gasifier to generate producer gas for concentrating juice appears to be promising.

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Research Notes

Screening plant growth regulators (PGRs) and chemicals for the induction of early and vigorous rooting in broadcasted rice seedlings

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The widely practiced transplanting of rice seedlings in main field involves high cost of labour owing to labour scarcity and warrants timely operation especially when water sources are adequately available which ultimately results in over aging of the seedlings (Varughese et al. 1993). A suitable alternate method of planting the seedlings would be of great advantage to overcome the labour scarcity and to minimize the cost of cultivation. Planting rice seedling by means of broadcasting from a uniform height in a prepared main field would greatly facilitate timely planting (Matsushima, 1979). But such practice poses problems like poor rooting, poor establishment, late tillering and late maturity. As the initiation of rooting is delayed, seedlings

result in poor establishment and delayed growth, which finally reflects on the yield. To overcome these problems, induction of early and vigorous rooting is essential. Root induction with the use of PGRs and other chemicals may enhance initial establishment, early anchorage, absorption of nutrients and ultimately growth, grain and straw yield (Henckel, 1964). In the study, the main objective was to screen the different chemicals and PGRs based on their effectiveness in the induction of early and vigorous rooting in rice seedlings.

Experiments were carried out to find out the effectiveness of different PGRs and chemicals on root induction in broadcasted rice