

USE OF EFFECTIVE MICROORGANISMS (EM) AND UREA IN DECOMPOSING RICE STRAW

H.M.I.K. HERATH, W.M.A.E.B. WICKRAMASINGHE* AND R.B. MAPA

*Department of Soil Science, Faculty of Agriculture, University of Peradeniya
* Rice Research & Development Center, Bathalagoda, Ibbagamuwa*

Paddy straw is the most common organic material available to rice farmers in significant quantities. At present, only few farmers use rice straw as organic manure due to the difficulties in spreading and incorporating it to soil, caused by the fibrous nature and slow rate of decomposition. Pre-treatments, such as mixing with urea are recommended by the Department of Agriculture to increase the rate of decomposition of rice straw. In addition, effective microorganisms (EM) which is a live formulation of beneficial microorganisms, has been used in many countries to enhance decomposition of organic materials. The objective of this study was to investigate the effect of applying EM and urea on the decomposition of rice straw.

A greenhouse experiment was conducted to compare the rate of decomposition of newly harvested rice straw using four treatments; control, EM (10 ml of EM solution/ kg of straw), urea (3.5g of urea/ kg of straw) and urea with EM. The rate of decomposition during an eight-week experimental period was evaluated using three parameters; C: N ratio, weight loss and tensile strength with time.

The C: N ratio of straw decreased from 50 to 27 and 23 in the control and EM applied treatments, respectively, at the 5th week of incubation. Urea and urea with EM treatments showed significantly faster decomposition rates. At the end of the 8th week, the C: N ratio of straw in control treatment decreased to 18.5. To attain the same C: N ratio, the treatments EM, urea, and urea with EM took only 6.5, 5 and 4 weeks, respectively. This shows that the fastest decomposition of straw was obtained by urea together with EM. All the treatments showed a higher weight loss than the control treatment throughout the experimental period. Weight loss indicated by the percentage remaining in EM treatment after 4, 6 and 8 weeks were 77, 51 and 37% respectively, which were significantly lower than in the control treatment. The highest weight loss was shown by urea with EM treatment throughout the experiment. The tensile strength in EM treatment was lower than the control throughout the experimental period. In urea applied treatments, the tensile strength dropped markedly than in the control, even at the initial stages of the study due to the rapid decomposition rate facilitated by lower C: N ratio. Similar to the other parameters, the lowest tensile strength was observed in urea with EM treatment throughout the experimental period.

This study reveals that the application of EM increased the rate of decomposition of straw, but when urea was applied the decomposition rate was higher. When the cost of application and environmental aspects are considered, use of urea as a nitrogen source to increase the activity of indigenous microbial population for enhancing straw decomposition seems to be more beneficial than applying EM of unknown composition, which may contain invasive micro flora or fauna.