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Rice straw is an agricultural material which is used as an alternative feed for ruminant. But its high lignin and low protein content has decreased its nutritive value and digestibility. Mushrooms, a group of white-rot fungi, can decrease lignin content and thus improving nutritional value of the rice straw. In this study 13 edible mushrooms, which included Schizophyllum commune, Pleurotus sajor-caju #1, Pleurotus sajor-caju #2, Ganoderma lucidum, Pleurotus ostreatus, Corrinus fimetarius, Agrocybe cylindracea, Auricularia auricula, Pleurotus flabellatus, Pleurotus foridanus, Pleurotus eous, Lentinus edodes and Volvariella volvacea were grown on rice straw for 4 weeks by solid state fermentation. It was found that Pleurotus eous could decrease lignin, cellulose and hemicellulose content of rice straw by 61.67%, 7.80% and 14.67%, respectively. The mushroom has also increased crude protein content of rice straw from 4.19% to 6.35% and increased in vitro dry matter digestibility (IVDMD) from 44.27% to 58.06%. The optimal fermentation period was found to be 3-4 weeks.

Addition of Phaffia rhodozyma and Saccharomyces cerevisiae on rice straw fermented with Pleurotus eous had no effect on protein content as well as the degradation of cellulose, hemicellulose and lignin in the rice straw. Addition of 1.5% urea or rice bran to the fermented rice straw in the ratio of 1:1 by wet weight could increase crude protein content of the fermented product but decrease lignin degradation. The application of baby corn stem and rice straw in the ratio of 1:1 as fermented substrate could not increase crude protein content but stimulate mycelial growth of the mushroom. Addition of .5% urea to the mushroom fermented substrate which consists of rice straw, rice bran and baby corn stem in the ratio of by weight could increase the crude protein content from 15.98% to 17.48% while the in vitro dry matter digestibility (IVDMD) increased from 43.19% to 49.06%.

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