EFFECT OF PLASTIC MULCHING ON SUBSTRATE INDUCED SOIL MICROBIAL BIOMASS CARBON AND MINERALIZABLE NITROGEN IN MAIZE (*Zea mays* L.) UNDER TROPICAL DRY ZONE CONDITIONS.

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Plastic mulch films are widely used in agriculture to conserve soil moisture, regulate soil temperature, suppress weeds, and improve crop growth. However, their effects on soil biological processes under tropical dry zone conditions are not fully understood. Therefore, three field studies were conducted in maize (*Zea mays* L.) cultivated on Alfisol at the Field Crops Research and Development Institute, *Mahailupallama*, Sri Lanka. The site is located in the dry zone with a mean annual temperature of 27 °C and annual rainfall of 1000–1500 mm. The soil had a pH of 6.75 ± 0.1, and a total carbon content of 1.2%. Treatments used for the comparison were: no-mulch control, reflective low-density polyethylene (LDPE), black LDPE, and black biodegradable PFM. Soil samples were collected at the beginning and end of each season. Soil pH, electrical conductivity (EC), substrate-induced microbial biomass carbon (SIR-MBC), and potentially mineralizable nitrogen (PMN) were measured, and data were analyzed using two-way ANOVA. Soil pH showed variable responses, while EC mainly decreased from the initial to the final stage across seasons. Mulch treatment did not significantly affect SIR-MBC or PMN in season 1 initial stage, however, significantly higher SIR-MBC and PMN were observed in season 1 final stage, season 2 and season 3 ($p < 0.001$). The higher SIR-MBC and PMN under biodegradable plastic mulch in later seasons may be due to mulch degradation, which improved soil moisture, temperature regulation, and carbon availability for microbial activity. Overall, biodegradable plastic mulch showed potential to enhance soil microbial biomass carbon and mineralizable nitrogen under tropical dry zone conditions.

Keywords: biodegradable plastic mulch, microbial biomass carbon, plastic film mulch, potentially mineralizable nitrogen

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