

Effect of Decay Level of SMC (Spent Mushroom Compost) and Media Diameters and Compound on Turfculture in Hydromulching Method

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ABSTRACT

Applying animal manure prevalent from past for turfculture but nowadays using of urban waste compost (biosolid) is increased. They disperse infectious and parasitism disease and have many weed seeds, unpleasant smell and waste things (especially in biosolid) so they increase environmental problem because of pollutant and using of chemical after using them. Therefore using a suitable alternative organic manure to solve the problems seems necessary. SMC (Spent Mushroom Compost) which is adult compost and waste of mushroom producing companies because of passing composting period and pasteurization process become completely free of pathogenic agents, weed seeds and pests' eggs and it has no bad smell so it can be a good choice. A study was performed in researching greenhouses of horticultural science Dept. of Tehran university to evaluate the effect of different decay level of SMCs (fresh, six month old and one year old) with zero and 50 percent clay on the growth traits and quality of bermudagrass (*Cynodon dactylon* L.) to assay the possibility of using SMC for turfculture through hydromulching method. Results shows that the cultures with 6- month old and one-year old SMCs without clay had the best results in both qualitative (uniformity and stabilization) and quantitative characteristics (increase in length and germination percentage).

Key Words: SMC (Spent Mushroom Compost); Hydromulching; Turfgrass; Bermudagrass (*Cynodon dactylon*) media

INTRODUCTION

The best ground cover plant for courtland and landscape is turf. Besides it has good wear tolerance and traffic tolerance traits and repeated mowing potential, high establishment ability can decrease air pollution. Applying animal manure prevalent from past for turfculture but nowadays using of urban waste compost (biosolid) is increased. They disperse infective and parasitism disease and have many weed seeds, unpleasant smell and waste things (especially in biosolid) so they increase environmental problem because of pollutant and using of chemical after using them (Haghighi, 2004a, 2004b; Kafi, 2001; Tehranifar, 2004). Therefore, using a suitable alternative organic manure to solve the problems seems necessary. SMC (spent mushroom compost), which is adult compost and waste of mushroom producing companies because of passing composting period and pasteurization process becomes completely free of pathogenic agents, weed seeds and pests' egg and it has no bad smell and because of different nutrition salts such as potassium that increase the potassium of soil and applying no more fertilizer, can be a suitable candidate for so-called manures (Wang, 1998; Varrina, 1996). Compost pasteurizing chamber has a high temperature (70 °C) so it can kill the insects' eggs, pathogen and weed seeds (Hessayon, 1997) in addition SMC have many benefits for Turfculture

(Haghighi, 2004a; Peter, 2001; Salardini, 1995; Btugors, 1994), e.g., (i) It releases water gradually so it may increase tolerance to drought (ii) It can provide a humid media for seeds for a long time so they can germinate faster and establish easier (iii) It doesn't need fertilizing for 10-12 week after establishment (iv) It has low cost because of high amount of SMC produced yearly.

It has been used for vegetable transplant producing as a soilless media and as a substitution for peat (Patritia, 1995). We tried to investigate the possibility of applying SMC for turfculture through hydromulching. Hydromulching is a method for turfgrass culture that the seed is mixed with media and water and distribute on the ground by means of pumps and is an efficient method for large area turf culture (Emmons, 1995)

MATERIALS AND METHODS

This study has been done in 2004 year at researching greenhouses of horticultural science Dept. of Tehran University SMCs with different level of decaying with and without clay and by different diameters cultured in planting dishes (34×37 cm), which were half-filled by sand to provide drainage. SMC with 3 degrees of decaying: fresh, six month old, and one year old. Diameter of distribution, 2.5 and 5 cm

Cynodon dactylon seed (Barunbrug Company,

Denmark) used 30 gr/m². The experiment was carried out on the base of complete randomized block design in factorial with 3 replications. The experiment were conducted twice. Seeds mixed with SMC, clay (if it was necessary) and water to become uniform then distributed in the dishes. Following characteristics were recorded regularly. Germination percentage (daily), height (daily), and qualitative traits (uniformity and density of plant weekly). For assaying the growth of bushes, the height was recorded daily and the mean calculated. Density and uniformity assayed visually and scored from 1 to 10. the data were analyses by MS-TAT-C and SPSS and comparison of means performed by Duncan's multiple rang test (DMRT).

RESULTS AND DISCUSSION

Fig. 1 shows the effect of different SMCs type on the germination. It is obvious that the highest germination has accrued in 6 month-old SMC, one year -old SMC, and fresh SMC respectively. we observed in fresh compost that as it was not decayed enough and was sticky, did not let a good germination, on the other hand its surface got too dried after 5 hours of irrigation. Fig. 2 shows the interaction effect between compost types, the amount of clay and diameter distributed mixture in the dishes on germination percentage. It was observed that six month -old SMC with 5cm diameter had a better germination and one year-old SMC showed no significant difference with it. It was observed that the result of 2.5 cm diameter was better than 5 cm diameter. it can be the result of easier germination for the seeds as they had to pass a shorter way toward the earth then 5 cm diameter. furthermore the seeds near the surface are more in 2.5 cm diameter. In all treatments with 50% clay germination was not satisfactory as the soil which contains more than 30% clay is classified as a clay soil and germination in such a soil is difficult, the seedlings can not germinate easily (Salardiny, 1995).

Fig. 3 shows the interaction effect between SMC type and diameter on the height of turf. There is no significant difference between six month-old and one year -old SMCs, at both level of clay and also fresh SMCs with 2.5 cm diameter. So it can be concluded that the final height don't depends on SMCs type because of the poor germination in fresh compost with 5 cm diameter, the turf could not reach to its final height. Fig. 4 shows interaction between SMCs type and uniformity and density. In this case we saw that six-month compost is better than the other ones.

EC and pH in six month -old SMC is 6.08 ds/m² and 7.4 and for one -year old SMC is 6.48 ds/m² and 7. So they are nearly the same but the microorganism activity in six month-old SMC is more than one year-old SMC because the six month-old SMC hasn't finished the decay process and has a high microbial activity and releases nutrition gradually but one year-old SMC has completed the process and have a low microbial activity (Lessani, 1995; Malakoti,

Fig. 1. The effect of SMCs on germination percentage

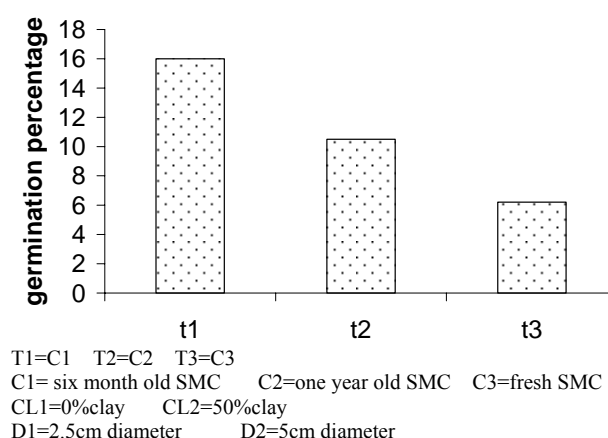


Fig. 2. The effect of media on seed germination

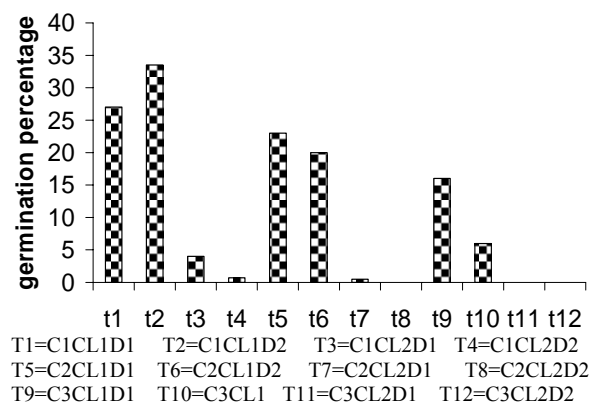
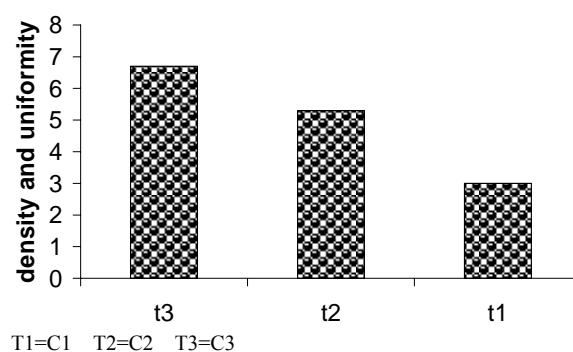
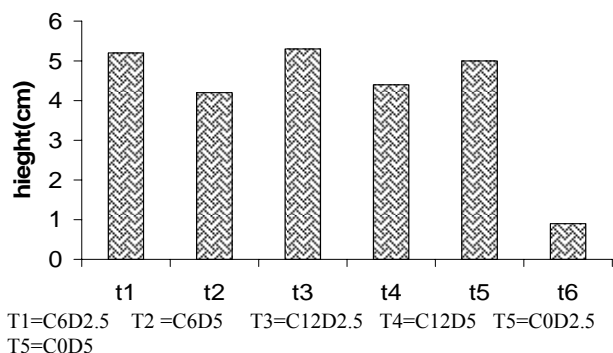


Fig. 3. Effect of SMC type on density and uniformity



1996) These are probably the causes of better result of six month-old SMCs. This study was a pre-experiment to determine the ability of SMC in hydromulching turf culture. At now the field experiments is doing by using the result, of this study at turfgrass research site of horticulture science, Dept. of Tehran University.

Fig. 4. Effect of SMC type and diameter of distribution on height

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