



Bio-Waste Management in Razi University by production of Leaf Mulch for the first time in world

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Abstract. Mulch is a type of protective covering placed on or spread over the soil surface. Mulches can be organic or inorganic and are available in many forms. Plastic film, proprietary mulch fabric, pinebark, straw, wood chips, newspaper, bark, grass clippings and leaf litter are examples. The use of tree leaves as mulch is very important to maximize the use of bio waste and reduce the environmental impact of waste and it is seen as both economically and environmentally sensible. Therefore, Leaf Mulch was produced for the first time in the world at Razi University by designing devices and using the technical knowledge of researchers. The aim of Leaf Mulch production, in addition to the optimal use of bio waste, was to maintain soil water, strengthen soil, control weeds and balance in soil temperature.

Keyword:

Bio-Waste Management, Leaf-Mulch, Maintain soil water, Strengthen soil

1. Introduction

Water conservation has become a vital reality in the world. In the future, with the increase in population and the need to increase food products on the one hand and the phenomenon of global warming on the other hand, this issue will become more important. The use of chemical herbicides and the reduction of soil fertility are serious problems of agricultural systems. Therefore, it will be necessary to use new methods to increase the crop in a sustainable state, without turning more natural areas into agricultural lands. One of the

methods of sustainable development is the design and implementation of cover mulches to protect water and soil that can be referred to as plastic [1] and paper [2] mulches.

Because leaves are a major part of food production in green plants and contain many nutrients for plants and animals, they play a very important role in the food cycle of animals and humans. Therefore, 'Leaf Mulch' as the first mulch produced from plant leaves, can be one of the new methods for multi-purpose use of natural mulch. This product is a type of protective coating that is placed on the soil. And its effective applications can include reducing water evaporation from the soil surface, controlling weeds, providing favorable conditions for the soil and thus the growth of microorganisms, balancing soil temperature, increasing yields, reducing plant mortality and more. The 'Leaf Mulch' is the first mulch produced in the world that is made directly from the leaves of trees according to technical knowledge and spreads on farmland and under trees. Eventually combined with the soil, it is completely decomposed by microorganisms and its components return to nature and do not add any toxic substances or contaminants to the soil. In addition, due to the use of tree leaves in this type of mulch, the production and implementation of this mulch will have low cost.

2. Design and production of Leaf mulch

2.1. Design and manufacture of production equipment

To produce mulch, several devices were needed, which were designed and manufactured by the researchers (paper authors) at Razi University. This equipment includes a crushing machine, heating machine, pulp pool and molds.



2.2. Production and implementation of leaf mulch

A certain amount of autumn leaves of the trees during the process of cleaning, crushing and heating became to pulp. It was then molded, dried and turned into leaf mulch.

Evaluating the impact of the paper mulch on water consumption, soil properties and weed population is being implemented for the first time in the Razi University of

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The thickness of the mulch can vary from a few millimeters to a few centimeters. It is usually produced in a square shape and is used to cover a seedling or tree, depending on their diameter. The dimensions of the produced mulch are usually 1 square meter. Furthermore, this mulch can be used for agricultural products.

After installing mulch under the plant, irrigation with different water requirements are compared in the form of different treatments. This comparison will be in order to increase tree growth, control weeds, strengthen plant soil and mulch durability according to the amount and intervals of irrigation in the control and experimental treatments.



3. The leaf mulch application

In the production of leaf mulch, new raw materials (tree leaves) can mainly be used as the main component, instead of the usual cellulose. The production and use of leaf mulch are protected by the University. It is produced purely mechanically and without chemical additives. Leaf mulch is suitable either as a supplement to raw materials or as a substitute for fresh fibers. The use of leaves in the production of leaf mulch allows us to achieve the highest quality indicators. Thanks to the unique color of the leaf, important messages about sustainability and the environment are transmitted reliably.

Leaf mulch can be used in the following cases:

- As mulch and cover for planting seeds, seedlings and agricultural products (in organic and inorganic agriculture)
- In Cretaceous and row farms (organic and inorganic)
- Trees and vineyards
- In forestry
- In landscapes and green spaces of cities
- Cover the soil of the pots
- As fertilizer and soil conditioner

4. Concluding

As leaf mulch production is the first in the world, there is no research in this regard. However, there are researches that compare organic mulches (wood and leaf chips) with non-organic mulches and their effect on soil properties, concluding that organic mulches increase soil organic matter and minerals [3]. Also, organic mulches such as tree residues control weeds and increase plant growth compared to plastic mulches [4,5]. Therefore, according to numerous researches on organic and inorganic mulches, it is concluded that the use of organic mulches, in addition to controlling weeds, reducing water consumption and reducing soil surface temperature, also strengthens soil and removal of environmental pollutants.

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