Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

Web of Agriculture: Journal of Agriculture and Biological Sciences
webofjournals.com/index.php/8

THE IMPORTANCE OF MULCHING IN THE CULTIVATION OF MEDICINAL PLANTS (MATRICARIA CHAMOMILLA L.) AND THE EFFECTIVENESS OF MULCHING METHODS

Chulieva M. T.
Samarkand State University

Abstract
This article analyzes the types of mulch materials, mulching methods, the effect of mulching on plant growth and yield, and also provides necessary information on the importance of mulching in maintaining soil moisture, controlling weeds, and stabilizing soil temperature.

Keywords: Types of mulch, mulching methods, soil fertility, organic mulch, inorganic mulch, medicinal plants.

Introduction

It is known that approximately 60-65% of the drugs produced by pharmaceutical enterprises worldwide are prepared from medicinal plant raw materials. In the development of the pharmaceutical industry of the Republic of Uzbekistan, as in most countries, the demand for medicinal plant raw materials is very high, and due to the limited reserves of naturally growing medicinal plants, satisfying the demand of pharmaceutical enterprises for medicinal plant raw materials requires the development of medicinal plant growing technology, the establishment of medicinal plant cultivation in specialized farms, forests, peasants and other forms of ownership of our country. Therefore, providing the pharmaceutical industry with high-quality, abundant, inexpensive and ecologically clean raw materials remains a major problem.

The only way to rationally use medicinal plant resources is to establish their cultivation and cultivation on industrial plantations. Therefore, the work carried out by the President of our Republic and the Cabinet of Ministers serves as a great impetus for the development of the sector and the implementation of practical work. In particular, the establishment of 7 pharmaceutical free economic zones in our Republic by the Decree of the President of the Republic of Uzbekistan No. PF-5032 dated May 3, 2017 "On the establishment of Nukusfarm, Zominfarm, Syrdaryopharm and other free economic zones" is evidence of the acceleration of this process. It is also reflected in the Resolution of the President of the Republic of Uzbekistan No. PF-4670 dated April 10, 2020 "On measures for the protection, cultivation, processing and rational use of available resources of wild medicinal plants."

Therefore, the establishment of large-scale plantations of medicinal plants is one of the tasks on the agenda.

However, climate change, rising air temperatures, and water shortages are limiting the possibility of growing agricultural products on irrigated lands. Therefore, increasing soil fertility, increasing

Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

Web of Agriculture: Journal of Agriculture and Biological Sciences
webofjournals.com/index.php/8

the yield of agricultural crops, and improving the quality of raw materials remain important tasks. To achieve these tasks, it is important to use innovative agro-technological measures in agriculture. One of such agro-technological measures is soil mulching. The practice of mulching in agriculture has a number of advantages. They protect the soil from physical, chemical, and biological damage and reduce irrigation requirements by saving water.

Mulching agrotechnical measure improves the temperature regime of the soil, allows for the efficient use of its moisture, improves the plant nutrition regime by optimizing microbiological processes in the soil, and increases productivity by shortening the vegetation period required for crop ripening.

Today, scientific work has been carried out on the effect of mulching on the growth, development and productivity of a number of agricultural crops in horticulture, namely cotton, potatoes, cabbage, cucumbers, sweet peppers, watermelons and some grain crops, but in recent years, the practice of mulching areas planted with medicinal plants, its scientific basis, i.e. its effect on soil properties and the growth, development and productivity of medicinal plants, has hardly been studied.

Therefore, in order to study and scientifically substantiate the above issues, we focused our scientific research on the cultivation of medicinal plants (Matricaria chamomilla L.) in the irrigated soils of the Forestry Department of the Jomboy district and the creation of a raw material base of medicinal plants.

Materials and Methods

In the ongoing scientific research, the work on mulching the cultivation of medicinal chamomile with polyethylene film and straw on irrigated meadow soils of the forestry of the Jomboy district is considered relevant, and the goal is to reduce the demand for medicinal plants in our republic and, at the same time, to provide recommendations on the organization of medicinal plant plantations.

Despite the fact that this medicinal plant has been studied in other regions of our republic, the effect of the use of the agrotechnological method of mulching on soil properties and the growth, development and productivity of the medicinal chamomile plant has not been studied.

Mulching is one of the best soil and water management technologies that is very important for restoring soil moisture, reducing soil evaporation, changing soil temperature, maintaining soil health and increasing water use efficiency, as well as increasing crop productivity.

Mulch is a layer of material covering the soil surface, and mulching is an effective method of manipulating the growing environment of crops to increase soil infiltration, prevent soil erosion, and reduce surface runoff, conserve water, control soil temperature, maintain soil moisture, and reduce soil evaporation, thereby increasing crop yield and improving product quality.

Mulching materials are divided into three main groups: organic materials (straw, peat, humus, manure, plant leaves, straw, wood chips, etc.), inorganic materials (synthetic materials, polyethylene films), and special materials (geotextile fabrics).

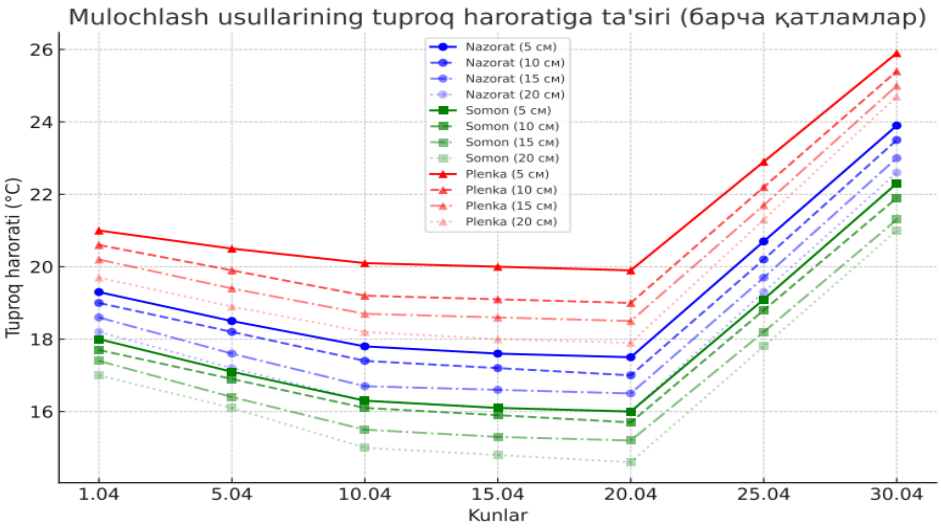
Each mulching material has its own characteristics, and various mulching materials are used in agriculture in different ways and for different purposes.

Mulching provides the following main benefits for soil and plants: Conserving soil moisture;- Mulch reduces the evaporation of water from the soil surface, which helps plants to maintain a

Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

Web of Agriculture: Journal of Agriculture and Biological Sciences
webofjournals.com/index.php/8

constant supply of moisture. Stabilizing soil temperature;- Mulch protects the soil from excessive heating or severe cooling by the sun. Preventing erosion;- Heavy rain or wind can wash away or blow away the topsoil. Mulch prevents this process and maintains the stability of the soil structure. This is especially important when farming on hills or slopes. As an effective weed control agent, mulch prevents weed seeds from germinating, as it does not allow enough sunlight to reach the soil surface. This helps to reduce the use of chemical herbicides in farming. Increasing soil fertility; -If organic mulch is used, it decomposes over time and enriches the soil with nutrients. It creates a favorable environment for microorganisms and beneficial earthworms, which improves soil structure. To prevent soil compaction; - Rainwater can compact the soil, which makes it difficult for the roots to get oxygen. Mulch protects the soil surface, helping it to be loose and well-ventilated.



In general, mulching creates favorable conditions for plant growth and development by improving the water regime of the soil, increases soil fertility, and helps to use water resources more efficiently.

Mulch plays an important role in regulating the temperature regime of the soil. For this purpose, during the research, the medicinal chamomile plant was planted in the experimental field under mulch and thermometers were placed to measure the soil temperature, and the soil temperature at a depth of 5-10-15-20 cm was measured every 10 days (decade), every 3 hours, i.e. at 05:00, 08:00, 11:00, 14:00, 17:00, 20:00, 23:00, 02:00 using a soil thermometer. The level was measured on the soil surface using a penetrometer, and the intensity of weeds was observed visually. 25 plants from each mulched option were taken as model plants and labeled to measure the mulching diameter. Studies show that when mulching with polyethylene film, the soil temperature increased by approximately 5°C at a depth of 5 cm and by 4°C at a depth of 10 cm. This provides a comfortable and stable temperature environment for plant roots, which has a positive effect on their growth and development.

Conclusion

For these reasons, the widespread use of mulching agrotechnology not only in the cultivation of agricultural products, but also in the pharmaceutical industry, allows for the cultivation of

Volume 3, Issue 6, June - 2025
ISSN (E): 2938-3781

medicinal plants, increasing their productivity, accumulating raw material reserves, and most importantly, increasing the variety of repeated crops while preventing soil fertility and water waste, as well as obtaining early and high-quality harvests from medicinal plants.

References:

1. Турапов И.Т., Холиқулов Ш.Т. Некоторые особенности воздушного режима хлопкового поля при мулчировании почвы полиетиленовой плёнкой // Ж. Док. акад. наук. Узб ССР.-1977. -№9. - С. 69-79
2. Эrmatov A., Axmurzaev Sh. Chigit ekish muddatlari va mulchalash usullarining tuproq agrokimèviy xususiyatlariga ta'siri// J. O'zbekiston agrar fani xabarnomasi. Toshkent 2012 yil 1-2 son.116-117 betlar
3.M. Yakubov. Mulchalash afzalliklari. O'zbekiston qishloq xo'jaligi jurnali, 22 bet.
4. Nchenko E.V., Engalichev D.I., Engalicheva N.A., Alekseeva K.L. Shirin qalampir mevalarining mahsuldorligiga, biokimyoviy tarkibiga va sifatini saqlashga mulchalash materiallarining ta'siri.
5. Adeboye, O.B., Schultz, B., Adekalu, K.O., Prasad, K., 2017. Soil water storage, yield, water productivity and transpiration efficiency of soybeans (Glycine max L.Merr) as affected by soil surface management in Ile-Ife, Nigeria. Int. Soil Water Conserv. Res. 5, 141–150.
6. Akhtar, K., Wang, W., Khan, A., Ren, G., Afridi, M.Z., Feng, Y., Yang, G., 2019. Wheat straw mulching offset soil moisture deficient for improving physiological and growth performance of summer sown soybean. Agric. Water Manag. 211, 16–25.
7. Allen, R., Pereira, L.S., Raes, D., Smith, M., 1998. Crop evapotranspiration: Guidelines for computing crop requirements. Irrig. Drain. Pap. No. 56, FAO 300.
8. Cass, A., Campbell, G.S., Jones, T.L., 1984. Enhancement of thermal water vapor diffusion in soil. Soil Sci. Soc. Am. J. 48, 25–32.
9. Chang, J.H., 1970. Global distribution of net radiation according to a new formula. Annals of the Association of American Geographers, 60, 340–351.
10. Chen, L.J., Feng, Q., Li, F.R., Li, C.S., 2014. A bidirectional model for simulating soil water flow and salt transport under mulched drip irrigation with saline water. Agric. Water Manag. 146, 24–33.
11. Chen, B., Liu, E., Mei, X., Yan, C., Garré, S., 2018. Modelling soil water dynamic in rain-fed spring maize field with plastic mulching. Agric. Water Manag. 198, 19–27.
12. Kader, M.A., Senge, M., Mojid, M.A., Ito, K., 2017a. Recent advances in mulching materials and methods for modifying soil environment. Soil Tillage Res. 168, 155–166.

Web of Agriculture: Journal of Agriculture and Biological Sciences
webofjournals.com/index.php/8