Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 2, Issue 6, June 2026
Website: usajournals.org

EFFECT OF CARROT CULTIVATION METHODS ON PRODUCT QUALITY AND YIELD

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Abstract
This article presents the results of research conducted to determine the effect of different carrot cultivation methods on product quality and yield. The study showed that mulching carrot crops with a glauconite-humus mixture in a 1:1 ratio resulted in the highest product quality and yield. The use of a humus-glauconite mixture in a 1:1 ratio increased yield by 7.9 t/ha, or 35.7%, compared to the control treatment.

Keywords: glauconite, mulching, humus, root weight, marketable yield, productivity.

Introduction

The species Daucus carota L., according to the classification of B.N. Sechkarov, includes two subspecies: the Western subspecies (ssp. occidentalis (Babasch) Setch) and the Eastern subspecies (ssp. orientalis (Babasch) Setch). In southern regions, five carrot varieties are widely cultivated: mediterraneus, asiaticus, japonicus, sijalacus, and atgonicus.

In recent years, several additional Eastern groups have been identified based on root color. Carrot is one of the most widely cultivated vegetable crops worldwide and occupies 6–8% of the total vegetable-growing area in Uzbekistan [2]. Carrots are rich in carbohydrates (about 8%) and carotene, the content of which may reach up to 20 mg%. Therefore, carrots are considered one of the main raw materials for vitamin A production. They are also rich in minerals and have traditionally been used in the treatment of liver, kidney, gastrointestinal, and anemia-related diseases. A medicinal preparation called Daucarin is obtained from carrot seeds and is used

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in the treatment of heart diseases [3].The demand for carrots in Karakalpakstan has been increasing annually. However, current production levels are insufficient to meet this growing demand. One of the main reasons is the lack of scientifically based recommendations for carrot cultivation. Therefore, our research was aimed at identifying the most effective cultivation methods for carrots.

Materials and Methods

Field experiments were conducted during 2023–2025 on the "Rafat-Raxat" farm in Kegeyli district of Karakalpakstan to determine the influence of cultivation methods on carrot quality and productivity.The experiments were arranged in four replications. The length of each furrow was 5 m and the width was 70 cm. The carrot variety **Nurli-70** was used in the study.Phenological observations, biometric measurements, total yield, and marketable yield were recorded. The methodology proposed by Azimov B.J. and Azimov B.B. (2012) for conducting experiments in vegetable, melon, and potato production was followed.

Results and Discussion

According to many researchers, mulching agricultural crops helps conserve soil moisture, improve aeration, suppress weeds, increase seed germination, and ultimately enhance crop yield. To evaluate the effectiveness of mulching under saline soil conditions, carrot crops were mulched using humus-glauconite mixtures at ratios of 1:1, 1:0.5, and 1:0.3.Phenological observations showed that in all mulched treatments, the period from seed germination to full emergence occurred 1–2 days earlier than in the non-mulched control plots.

Biometric measurements revealed that the number of leaves per plant reached:1 0.0 leaves with a 1:0.3 humus-glauconite mixture;10.4 leaves with a 1:0.5 mixture;11.5 leaves with a 1:1 mixture.These values exceeded the control treatment by 2.0–2.8 leaves per plant. The largest leaves in the mulched treatments were 4.5–6.6 cm longer than those in the control. Plants grown in mulched plots exhibited greater foliage development and vigor, which ultimately resulted in higher yields.The highest yield was obtained from plots mulched with the humus-

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glauconite mixture at a ratio of 1:1, reaching **30.0 t/ha**, which was **7.9 t/ha (35.7%) higher** than the control. Mulching with humus alone increased yield by 1.9 t/ha (8. 5%) compared to the conventional method (Table 1).

Table 1. Effect of Carrot Cultivation Methods on Yield (2023–2025)

Cultivation method	Average Yield, t/ha				Additional Yield	
	2023-yil	2024-yil	2025-yil	o‘rtacha	t/ha	Compared to Control%
Conventional method(control)	21,4	23,5	21,5	22,1	-	100
Humus	27,5	26,2	27,5	27,0	1,9	8,5
Humus -glauconite 1:1	31,5	30,3	28,4	30,0	7,9	35,7
Humus -glauconite 1:0,5	29,4	26,5	27,5	27,8	5,4	24,4
Humus -glauconite 1:0,3	26,5	27,2	26,8	26,8	4,7	21,2
EKT_{05}	2,58	1,72	1,94			
S_x	0,81	0,54	0,61			
$R_{\%}$	2,97	2,02	2,32			

Mulching also increased the proportion of marketable yield. Yield assessment showed that plots mulched with the humus-glauconite mixture at a 1:1 ratio produced **24.3 t/ha of marketable yield**, representing **147% of the control treatment**. The highest percentage of marketable roots (77–81%) was obtained when humus-glauconite mixtures were applied at ratios of 1:1, 1:0.5, and 1:0.3 (Table 2).

Table 2. Root Weight and Yield of Carrots under Different Mulching Treatments (2023–2025)

Cultivation method	Root Weight, g	Yield, t/ha		Marketable Yield Compared to control, %	Marketable Root percentage, %
		Total	Marketable		
Conventional method(control)	145	22,1	16,5	100	75
Humus	151	27,0	20,5	124	76
Humus -glauconite 1:1	158	30,5	24,3	147	81
Humus -glauconite 1:0,5	154	27,8	21,6	130	78
Humus -glauconite 1:0,3	152	26,8	20,6	124	77

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Conclusion

The use of humus and humus-glauconite mixtures (1:1, 1:0.5, and 1:0.3 ratios) as mulch helps conserve soil moisture, reduce weed infestation, and consequently increase carrot productivity.The highest yield (30.0 t/ha) was obtained using the humus-glauconite mixture at a 1:1 ratio, which exceeded the control treatment by 7.9 t/ha or 35.7%.The largest roots (152–158 g) were produced under treatments with humus-glauconite mixtures. The maximum root weight (158 g) was achieved with the 1:1 humus-glauconite ratio.

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