

# UF/IFAS Nutrient Management Recommendation Series: Hemp<sup>1</sup>

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This publication presents to growers the official UF/IFAS nutrient management recommendations for hemp based on crop nutrient requirements determined by the UF/IFAS hemp program and soil tests performed by the UF/IFAS Extension Soil Testing Laboratory.

## General Information

- UF/IFAS fertilization and liming recommendations are advisory in nature and emphasize efficient fertilizer use and environmentally sound nutrient management without losses of yield or crop quality.
- Recommendations assume that nutrients will be supplied from commercial fertilizer, and expected crop yields and quality will be typical of economically viable production.
- Recommendations assume straight fertilizers (i.e., single nutrient sources) will be used to apply nutrients. If multi-nutrient fertilizers will be used, the fertilizer analysis should align with recommended nutrient rate ratios.
- Consider UF/IFAS recommendations in the context of the overall nutrient management strategy. Evaluate fertilizer rates, timing, placement, and source for efficiency and consider return on fertilizer investment.
- If organic soil amendments are applied, understand and account for nutrient contributions and other benefits of adding organic matter.

- For best results, follow these recommendations in their entirety. The UF/IFAS recommendation is a holistic combination of fertilizer rates plus nutrient management aspects including irrigation.

## Soil Test Interpretations for Hemp

Table 1. For crop production on acidic, mineral soils. Extractant: Mehlich 3.

Nutrient	Interpretation (mg/kg)		
	Low	Medium	High
P	≤25	26 – 45	>45
K	≤35	36 – 60	>60
Mg	≤20	21 – 40	>40

Table 2. For crop production on calcareous soils of Miami-Dade County. Extractant: Mehlich 3.

Nutrient	Interpretation (mg/kg)		
	Low	Medium	High
P	≤76	77 – 104	>104
K	≤85	86 – 150	>150

1. This document is SL521, one of a series of the Department of Soil, Water, and Ecosystem Sciences, UF/IFAS Extension. Original publication date August 2024. Visit the EDIS website at <https://edis.ifas.ufl.edu> for the currently supported version of this publication. © 2024 UF/IFAS. This publication is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)

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## Fertilizer Rates

Table 3. Target pH range and recommended annual nitrogen (N), P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O fertilizer rates for hemp. Phosphorus and potassium rates are based on interpretation of a Mehlich-3 soil test.

Crop	Plants/acre	Target pH	lb/acre/cropping season						
			N	P <sub>2</sub> O <sub>5</sub>			K <sub>2</sub> O		
				Low	Med	High	Low	Med	High
Hemp for fiber	300,000 plants/acre	6.25–7.5	50	30	15	0	50	50	50
	750,000 plants/acre	6.25–7.5	150	30	15	0	100	100	100
Hemp for seed	100,000 plants/acre	6.25–7.5	50	30	15	0	50	50	50
	300,000 plants/acre	6.25–7.5	150	30	15	0	100	100	100
Hemp for flower	3,000 plants/acre	6.25–7.5	150	30	15	0	50	50	50
	15,000 plants/acre	6.25–7.5	150	30	15	0	100	100	100

- Maximum nutrient uptake of vigorous hemp crops has been demonstrated in trials outside of Florida to be 225 lb N, 50 lb P<sub>2</sub>O<sub>5</sub>, and 300 lb K<sub>2</sub>O per acre per cropping season (Kaur et al. 2023). Uptake of N at rates above those listed in the table has been demonstrated to be excessive under Florida conditions and results in a plateau or decline in plant production and crop quality.
- Recommended fertilizer applications of sulfur (S), calcium (Ca), magnesium (Mg), and other micronutrients may be identified through soil or leaf tissue tests. If sulfur is required, apply 15–20 lb S/acre.

## Fertilizer Timing

- Apply all the P<sub>2</sub>O<sub>5</sub>, 30% of the K<sub>2</sub>O, and 30% N in a preplant or at-planting application.
- Apply the remaining K<sub>2</sub>O and N in one or two more side-dressings spaced approximately four weeks apart.
- Liquid fertigation can also be applied in weekly dosing for flower production under plasticulture up to 150 lb N/acre equivalent.

## Fertilizer Placement

- Consider banding the P<sub>2</sub>O<sub>5</sub> next to the plant row.

## Fertilizer Sources

- N applications have been studied as granular fertilizer, though operation efforts have been deployed in other trials involving enhanced efficiency (controlled release) fertilizer. Use of liquid fertilizer has also been effective (Anderson et al. 2021).
- Apply S as sulfate (e.g., gypsum, ammonium sulfate, magnesium sulfate, potassium sulfate, potassium magnesium sulfate) because elemental S will convert to sulfate too slowly to supply the sulfur needs of the current crop.
- Apply Mg using potassium magnesium sulfate or magnesium sulfate.

## Water Management

- Seeds and transplants require adequate moisture at planting for optimum establishment.
- Well-drained soils are preferred for hemp cultivation. Flooding that exceeds 12–18 hours may substantially damage the crop and further expose it to disease.
- Based on operational experience, ½-to-1-inch irrigation per week is appropriate for fiber and seed crops by overhead and flower crop through drip. Consider using a soil moisture meter and increasing irrigation as needed per plant growth and soil moisture.
- Fertilizer and water management are linked. Maximum fertilizer efficiency is achieved only with close attention to water management. Supply only enough irrigation water to satisfy crop requirements. Excess irrigation may lead to N and K leaching, creating possible plant deficiencies.

## References

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