



INDEPENDENT TRIAL OF TwinN IN BELL PEPPER, CALIFORNIA 2021

SUMMARY

The trial tested the effects on yield of bell pepper grown with 75% and 100% nitrogen rates, with and without TwinN microbial biofertiliser. At standard nitrogen rates (Grower Standard) two applications of TwinN increased total marketable yield by 6.9%. This translated to an increase in dollar returns/ac of \$1785/ac for red peppers and \$1020/ac for green peppers.

INTRODUCTION

TwinN is a freeze-dried microbial biofertiliser from Australia. It acts to increase yields by a number of mechanisms.

1. The microbes colonise the roots and fix nitrogen from the atmosphere into a steady supply of plant available nitrogen through the season. 2. The microbes produce plant growth factors, particularly auxins, that increase secondary root structure which allows improved capture of applied nitrogen fertilisers. This improves nitrogen use efficiency and also reduces leaching of nitrogen into waterways. 3. The microbes produce several other plant growth factors which stimulate plant growth and yield accumulation.

TRIAL DESIGN

The trial was performed by Holden Research and Consulting, an independent research provider, and was completed in November 2021. The trial site was near Somis, California. The bell pepper (*Capsicum annuum*) grown was var Double Up. Trial design was Random Complete Block with four replicates of four treatments. Plots were 5.33 x 20 ft. TwinN was applied once at transplant at the standard rate via tape to deliver the microbes into the root zone. A second TwinN application was made at 8 weeks post plant. Leaf analysis was performed near the end of the trial. In season SPAD, vigor and canopy development, of the developing pepper plants were measured.

Harvest data was based on four plants per replicate plot and production was quantified on the size and quality of the peppers produced. Only marketable peppers are reported here. The average marketable yields were extrapolated to 25 pound boxes per acre. Returns to the grower were calculated by price for pick day for red and green peppers (<https://www.marketnews.usda.gov>) less an estimated \$6.00 a box for picking labor, boxing, transportation, cooling charges, and any other additional costs from the packer. Net returns for reds came out at \$14 per box and greens at \$8 per box on the day of sample harvest.

TREATMENTS

Treatment 1 (Grower Standard) 100% fertiliser rate. No TwinN.

CRF 19-5-8 (100%) 500 lb/ac, pre-plant. CAN 17 (100%) 20 gal/ac, 4 weeks post plant. CAN 17 30 gal/ac, 7 weeks post plant.

Treatment 2 Grower Standard plus one TwinN at planting and a second application at 8 weeks post plant.

Treatment 3 75% N plus one TwinN at planting and a second application at 8 weeks post plant.

CRF 19-5-8 (100%) 500 lb/ac, pre-plant. CAN 17 (50%) 10 gal/ac, 4 weeks post plant. CAN 17 (50%) 15 gal/ac, 7 weeks post plant. One TwinN at planting and again at 8 weeks post plant.

Treatment 4 75% N. No TwinN.

RESULTS

SPAD, vigor, and Canopeo were used for in season evaluation of the developing bell pepper plants. No significant differences were found between treatments. Leaf analysis by A&L late and at the end of the season showed no noteworthy differences.

Table 1. Yield of marketable peppers and corresponding returns to growers

	Total marketable yield (boxes/ac)	Inc. versus relevant control	Returns for reds (\$/ac)	Inc. versus relevant control (\$/ac)	Returns for greens (\$/ac)	Inc. versus relevant control (\$/ac)
Treatment 1 (GS)	1867		26143		14939	
Treatment 2	1995	6.9%*	27928	1785*	15959	1020*
Treatment 3	1820	-	25473	371	14556	212
Treatment 4	1793		25102		14344	

* = Increase or decrease compared to Grower Standard (T1)

The highest yield occurred in Treatment 2, the Grower Standard plus two TwinN applications.

SUMMARY

TwinN application, in a trial that followed commercial practices in California, produced a 6.9% increase in yield and increased commercial returns to the producer. The grower would receive \$1785/ac additional revenue for red peppers and \$1020 for green peppers. Use of TwinN in bell peppers and other vegetable crops increases yields and commercial returns to producers. It also increases sustainability of production via improved capture of applied nitrogen fertiliser (see Leaching trial on www.mabiotec.com) which reduces nitrogen pollution of waterways and aquifers.

COMMERCIAL GROWER RECOMMENDATIONS

These are some guidelines for use of TwinN in bell pepper production.

- Apply the pre-plant fertiliser at standard rates
- Apply TwinN in combination with the standard N rate initially and include a test plot with 15% reduced N
- Make reductions to N as evenly across the season as possible
- Do not cut other nutrients such as P and K
- If TwinN is being applied in organic lettuce crops (TwinN is OMRI certified) do not reduce any organic nutrients. Apply TwinN on top of the organic nutrition program.
- Apply TwinN to the crop via fertigation immediately after transplant to speed early root growth and establishment
- Apply TwinN again at 8 weeks after the initial application
- Apply via fertigation. Be sure to avoid doing applications during hot sunny periods if there is a risk that black plastic irrigation lines can become hot in the direct sun.
- Do not co-apply TwinN microbes with agrochemicals including fertilisers. Avoid applying these for 24hrs before and after the TwinN application.
- Ensure the irrigation lines are free of agrochemicals before TwinN application
- Do not expose the TwinN microbes to chlorinated water during application. Chlorinated water can be used for the crop after TwinN application is complete.
- If only chlorinated water is available for application of TwinN de-chlorinate with sodium thiosulfate (STS). See www.mabiotec.com for instructions or contact your distributor. For organic methods to de-chlorinate see www.mabiotec.com.

TwinN is supplied by Mapleton Agri Biotec Pty Ltd, Australia. www.mabiotec.com

For information on locating distributors of TwinN in USA contact **DEWHOPS ENTERPRISES, LLC.**

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