

## Response of Warm-Season Vegetables to FUSN™ in the Desert Southwest

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### Introduction:

Ammonium nitrate is coming under increased scrutiny and regulations because of its explosive properties. A product that fuses ammonium nitrate with ammonium sulfate was created by Honeywell. This product, marketed by Simplot as FUSN™, is far less detonable. FUSN reduces risk of explosion, either as part of intentional terrorist acts or in farm accidents.

### Challenge:

While FUSN carries low risk of detonation, research is needed to determine its effectiveness as a fertilizer. The southwestern deserts are an important producer of warm-season vegetables, and if FUSN was proven to be effective in growing such crops as sweet corn, cantaloupes, and chili peppers, the region's growers could rely on this safe alternative to ammonium nitrate.

### Research:

Dr. Charlie Sanchez of the University of Arizona studied the effects of fertilizing sweet corn, cantaloupes, and chili peppers with urea or FUSN during the spring and summer of 2015.

### Methodology:

Corn and cantaloupes were seeded in the field while chili peppers were transplanted from a greenhouse. Urea and FUSN were applied at 0, 100, 200, and 300 lbs nitrogen (N) per acre. Half the N was applied at planting and half was applied midseason. All plots used sub-surface drip irrigation.

### Results:

Sweet corn yields increased as application rate increased, with FUSN tending to produce slightly higher yields than urea. Melon yields also increased with the N rate; FUSN yields were 18% higher than those with urea. Pepper total yields were similar regardless of N rate or source.

### Practical Applications:

Fusing ammonium nitrate with ammonium sulfate creates a safe and effective alternative to ammonium nitrate. Growers of warm-season vegetables may be able to increase yield with FUSN over urea.

Treatment	N Rate (kg/ha)	N Source	Soil NH <sub>4</sub> -N (mg/kg)	Soil NO <sub>3</sub> -N (mg/kg)	Leaf N (%)	Yield (Mt/ha)
1	0	-	3.2	7.0	1.1	0.2
2	100	Urea	4.1	14.3	1.1	1.4
3	200	Urea	13.7	30.0	1.0	0.9
4	300	Urea	10.2	34.0	1.1	2.1
5	100	FUSN	4.8	38.6	1.0	1.1
6	200	FUSN	7.4	42.8	1.0	1.8
7	300	FUSN	4.1	37.7	1.2	4.3
Stat.	N Rate		NS	L**	Q*	L**
	N Source		NS	*	NS	NS

Table 1. Sweet corn response to FUSN and urea during spring and summer 2015.

Treatment	N Rate (kg/ha)	N Source	Soil NH <sub>4</sub> -N (mg/kg)	Soil NO <sub>3</sub> -N (mg/kg)	Midrib nitrate-N (mg/kg)	Yield (Mt/ha)
1	0	-	3.8	35.5	30207	9.7
2	100	Urea	4.2	32.7	36593	10.2
3	200	Urea	4.3	37.7	34363	8.2
4	300	Urea	5.0	43.8	45735	8.1
5	100	FUSN	4.1	32.3	44188	9.1
6	200	FUSN	4.6	30.3	26365	11.2
7	300	FUSN	1.0	50.0	28967	10.7
Stat.	N Rate		NS	L*Q*	NS	NS
	N Source		NS	NS	NS	NS

Table 2. Cantaloupe response to FUSN and urea during spring and summer 2015.

Treatment	N Rate (kg/ha)	N Source	Soil NH <sub>4</sub> -N (mg/kg)	Soil NO <sub>3</sub> -N (mg/kg)	Leaf N (%)	Yield (Mt/ha)		
						6/22	6/28	Total
1	0	-	3.8	2.4	2.18	3.1	3.3	6.3
2	100	Urea	3.7	3.2	2.37	2.7	4.0	6.7
3	200	Urea	8.7	15.1	2.41	5.3	2.6	7.9
4	300	Urea	4.1	5.3	2.32	3.2	3.3	6.5
5	100	FUSN	3.8	3.8	2.25	4.3	3.4	7.7
6	200	FUSN	4.1	3.7	2.25	4.3	2.9	7.3
7	300	FUSN	4.4	4.9	2.25	4.6	3.5	8.1
Stat.	N Rate		NS	NS	NS	L*	NS	NS
	N Source		NS	NS	NS	NS	NS	NS

Table 3. Chili pepper response to FUSN and urea during spring and summer 2015.

\* = P < .10

\*\* = P < .05