

Field Prescription Application Rates

October 2, 2015

Field ID:	SE09-07-06EPM	
Land Area Available (ha):		62
2016 Crop:	Grain Corn	
2016 Target Yield:	130 bu/ac	
	lb/ac	kg/ha
Target Nitrogen recommended :	110	123.2
Fertilizer Phosphate (P2O5) Recommended:	40	44.8
1 x P2O5 Crop Removal @ target Yield:	55	61.6
2 x P2O5 Crop Removal @ target Yield:	110	123.2

Plant Available Nutrients Soil Test Data			
	SE-9 005 0-6N	SE-9 005 6-24N	
Sample Depth	0-15 cm	15-60 cm	Total Available
Units	mg kg ⁻¹		kg ha ⁻¹
Available Nitrate-N	11.0	7.1	65
Available Phosphate-P	04.9		10
Available Potassium	281		562
Available Sulfate-S	1000	1000	8,000

Steinbach Biosolids Characteristics and Analysis

Parameter Name	Parameter Description	Unit	Biosolid Analysis (Cell 2)
Estimated Biosolid Volume (+ 10% safety volume)	In-field	m ³	8,800
Specific Gravity	As Received	kg L ⁻¹	1.03
Estimated Biosolids		tonnes	9,064
Dry tonnes biosolids available (=wet tonnes x %solids)	Dried Basis	tonnes	774
Moisture	As Received	%	89.80
Total Solids	As Received	%	8.80
Total Volatile Solids	Dry Basis	%	29.7
Organic Matter	Dry Basis	%	17.00
Inorganic Content	Dry Basis	%	83.00
Total Organic Carbon	Dry Basis	%	2.00
C:N Ratio	Dry Basis	x:1	17.24
C:P Ratio	Dry Basis	x:1	4.34
N:P Ratio	Dry Basis	x:1	0.25
pH	Saturated Paste		6.87
Total Kjeldahl N	% Dried Basis	%	0.116
Total Kjeldahl N	Dried Basis	mg kg ⁻¹	1,160
Total Kjeldahl N	Dried Basis	kg Tonne ⁻¹	1.16
Ammonium - N	Dried Basis	mg kg ⁻¹	397.00
Ammonium - N	Dried Basis	kg Tonne ⁻¹	0.3970
Available Nitrate	Dried Basis	mg kg ⁻¹	-
Available Nitrate-N	Dried Basis	mg kg ⁻¹	-
Available Nitrate-N	Dried Basis	kg Tonne ⁻¹	-
Total Phosphorous	Dried Basis	mg kg ⁻¹	4,610

Amount of Biosolids Nutrient Available to Crop

Organic N (=TKN-ammonium N)	Dried Basis	mg kg ⁻¹	763.00
Organic N	Dried Basis	kg Tonne ⁻¹	0.763
Method of Application:			Injections
Anticipated Weather			Cool/dry
Anticipated Volatilization (%)	incorp within 1 days		15
Available Organic N	Dried Basis	kg Tonne ⁻¹	0.191
Ammonium nitrogen available	Dried Basis	kg Tonne ⁻²	0.34
Total available nitrogen (Year 1) (@25%)	Dried Basis	kg Tonne ⁻¹	0.53
Mineralization N Year 2 (@12%)	Dried Basis	kg Tonne ⁻¹	0.09
Mineralization N Year 3 (@6%)	Dried Basis	kg Tonne ⁻¹	0.05
Phosphorus	Dried Basis	kg Tonne ⁻¹	4.61
P ₂ O ₅ equivalent	Dried Basis	kg Tonne ⁻¹	10.60
Total Available P2O5	Dried Basis	kg Tonne ⁻¹	5.30

Application Rate based on Nitrogen				Land Area Required (Ha)
Nitrogen Based Application Rate	Dried Basis	tonnes ha ⁻¹	233.24	3
Amount of Available P2O5 applied	Dried Basis	kg ha ⁻¹	1,236.55	
P2O5 Application check		%	2,760.15	
Application Rate based on Phosphorous (1xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	12	67
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	6	
Additional Nitrogen required		kg ha ⁻¹	117	
Application Rate based on Phosphorous (2xCR)				Land Area Required (Ha)
Total Phosphorus Based Application Rate	Dried Basis	tonnes ha ⁻¹	23.24	33
Amount of Nitrogen applied	Dried Basis	kg ha ⁻¹	12.27	
Additional Nitrogen required		kg ha ⁻¹	110.93	
Selected Application rate based on:		2xCR	P2O5	
Selected Application rate based on P2O5	Dried Basis	tonnes ha ⁻¹	12	
		tons ac ⁻¹	5	
	Wet	tonnes ha ⁻¹	132	
		L ha ⁻¹	135,999	
		tons ac ⁻¹	59	
		igal ac ⁻¹	12,104	
Estimated Biosolids Volume Applied	Wet	Tonnes	8,186	
Estimated Biosolids Volume Remaining	Wet	Tonnes	878	

Notes

Available Ammonium N - Volatilization loss associated with different application methods (0% with Injection)
 Organic N - TKN - Ammonium N
 Available Organic N - Organic N x 0.25year 1
 Mineralization of Year 2 = 12%, Year 3 = 6%
 Plant Available Nitrogen= (NO₃-N)+Volatilization factor (NH₄-N)+Organic N Mineralization
 Phosphorous Total and Olsen methods.
 * See Estimates of Ammonium-N Retained After Biosolids application

C:N exceeds 30:1, N becomes a limiting nutrient for decomposer organisms, and this can reduce the rate of decomposition and results in N immobilization

C:P ratio between 200:1 and 300:1, mineralization and immobilization balance each other to result in no net release of P from the decomposing manure. When C:P is below this range, P is released.

When animal and municipal wastes have N:P ratios ranging from 1:1 to 1:2 are applied based on N rates on soils, over time P will accumulate