



MIRIMICHI GREEN™

Activate Nature.

Introduction

The purpose of this study was to evaluate the performance of the Mirimichi Green product CarbonizPN product compared to a standard 90:10 sand-peat mix typically used for greens construction, utilizing TifEagle ultradwarf bermudagrass as the turf species. Prior to construction, soil tests were conducted to determine the appropriate composition and amendments for the CarbonizPN mix.

During the reconstruction process, initiated in early June 2024, the top 4 inches of the existing green's soil profile were removed. Subsequently, a 5-inch layer of the new soil material was installed. Following soil placement, Basimid (dazomet) was applied for fumigation to ensure a sterile seedbed. Ten days later, on July 16, 2024, the green was sprigged with TifEagle ultradwarf bermudagrass.

The study extended through the end of September 2024 and included assessments of soil physical and chemical properties, as well as turf performance metrics. This timeline allowed for evaluation of establishment and initial growth under comparable environmental and management conditions.

Experimental Design and Methodology

This study evaluated the performance of six treatments applied to TifEagle ultradwarf bermudagrass on the Mississippi State research green. Treatments were arranged in a randomized complete block design with five replications per treatment. Each plot measured 9 ft × 9 ft. Treatments 1–5 incorporated CarbonizPN at an 87:13 (v:v) sand to CarbonizPN ratio into the soil profile, while Treatment 6 utilized a standard 90:10 (v:v) sand:Dakota peat mixture, consistent with USGA specifications. Treatment descriptions are as follows:

Treatment 1: CarbonizPN mix with 1 lb N/1000 ft² applied weekly using a rotation of agricultural-grade fertilizers (13-13-13, 33-0-0 S, and 46-0-0).

Treatment 2: CarbonizPN mix with 0.5 lb N/1000 ft² applied weekly using the same fertilizer rotation.

Treatment 3: CarbonizPN mix with 1 lb N/1000 ft² applied weekly using the same fertilizer rotation plus Release 2-0-2 at 7 oz/1000 ft² biweekly.

Treatment 4: CarbonizPN mix with 1 lb N/1000 ft² applied weekly using the same fertilizer rotation, Release 2-0-2 at 7 oz/1000 ft² biweekly, and ByoSpaxtrum at 6 oz/acre biweekly.

Treatment 5: CarbonizPN mix with 1 lb N/1000 ft² applied weekly using the same fertilizer rotation plus ByoSpaxtrum at 6 oz/acre biweekly.

Treatment 6: Standard 90:10 Dakota peat mixture with 1 lb N/1000 ft² applied weekly using the same fertilizer rotation.

Application Procedures

Spray solutions were prepared in 2-L bottles partially filled with water. Fertilizer and biostimulants were measured using a syringe, added to the bottles, and mixed thoroughly by shaking. The solutions were applied using a CO₂-powered backpack sprayer equipped with a spray boom featuring two TP8004-VS nozzles and a 3-ft spray width. Plots were sprayed in two directions to ensure uniform coverage. Granular fertilizers were weighed using a laboratory balance, mixed with sand, and applied uniformly over the plot surface using shaker jars.

Data Collection

1. Turf Color and Cover Analysis

After application, plot photographs were taken using a Canon Powershot G12 digital camera and a light box. Images were analyzed for Dark Green Color Index (DGCI) and percent cover using Turf Analyzer software.

2. Soil Enzyme Assay

Enzyme activity in the soil was assessed to understand how nutrients like carbon, nitrogen, and phosphorus are processed and cycled by soil microbes under different treatments. Enzymes are proteins produced by microorganisms in the soil that drive chemical reactions essential for breaking down organic matter into forms plants can use. Measuring enzyme activity gives us insight into soil health and microbial activity.

Here's how we performed the enzyme assay:

1. Soil Collection and Preparation

Soil samples were collected using a probe, ensuring each sample represented the top 7.5 cm of soil, where most root activity occurs. Before processing, any plant material (thatch, stems, and leaves) was removed. This ensured that the soil samples contained only what was necessary for testing microbial activity.

2. Creating a Soil Solution

- A small portion of soil (1 gram) was mixed with 120 mL of deionized water in a laboratory blender-like device called a “stomacher,” which shook and blended the soil for 30 seconds.
- The result was a liquid “soil soup” containing particles, microbes, and dissolved nutrients, ready for enzyme testing.

3. Adding Fluorescent Substrates

- To measure enzyme activity, we used special molecules called “substrates” that mimic the natural materials enzymes break down in the soil. These substrates are bonded to a fluorescent dye, which is released when the enzyme breaks down the substrate. The dye glows under UV light, indicating enzyme activity.

- For each nutrient type, we used a specific substrate:
 - **Carbon (MUF G):** Measures enzymes that break down plant sugars and cellulose.
 - **Nitrogen (MUF NAG):** Measures enzymes that break down proteins and release nitrogen.
 - **Phosphorus (MUF P):** Measures enzymes that release phosphorus from organic compounds.

4. Mixing and Incubation

- Small amounts of the soil solution (100 microliters, about the size of a water droplet) were placed into tiny wells on a 96-well plate, similar to a mini muffin tray but for liquids. Each well acted as a test chamber.
- Substrates were added to the wells, and the plates were gently shaken to mix everything evenly.
- The plates were then incubated for a set time, allowing enzymes in the soil solution to react with the substrates.

5. Measuring Fluorescence

- After incubation, the plates were placed into a fluorometer, a device that shines UV light on the samples and measures how much light is emitted back. The intensity of the fluorescence shows how much of the substrate was broken down by the enzymes.
- Higher fluorescence means more enzyme activity, indicating a higher level of nutrient cycling and microbial life in the soil.

6. Why This Matters

- **Fluorescence as a Measure of Microbial Health:** If a sample showed strong fluorescence, it meant the soil had active microbes breaking down organic material and making nutrients available for plants.
- **Comparing Treatments:** By comparing fluorescence across treatments, we could determine which soil amendments (CarbonizPN vs. 90:10 sand-peat) and fertilizer programs supported better microbial activity and nutrient cycling.

In Summary

This method essentially “lights up” the activity of soil enzymes, letting us see how efficiently microbes in each soil treatment were working. Enzymes are like tiny workers in the soil, and by measuring their activity, we learn about the overall health and productivity of the soil ecosystem.

1. Root Analysis

Soil slabs were collected on August 29 and October 1, 2024, using a 3-inch AMS soil sampler. In the lab, roots were separated from the soil, washed in 10% Calgon solution, and dried with paper towels. Root samples were scanned with the WinRHIZO system to measure total root length, average diameter, and total root surface area.

2. Soil Carbon Analysis

Soil removed during root washing was analyzed for total organic carbon using loss-on-ignition (LOI). Ten grams of soil were placed in crucibles and combusted in a muffle furnace at 525°C for 24 hours, burning off organic matter.

Data Analysis

All data were recorded in Microsoft Excel and analyzed using SAS 9.4. The GLM procedure was used for analysis of variance, with means separated using the Student-Newman-Keuls method ($\alpha = 0.05$).

This comprehensive methodology ensured robust comparisons between treatments for soil enzyme activity, turf performance, root metrics, and soil carbon dynamics.

Results

Table 1 presents the cover percentage of TifEagle ultradwarf bermudagrass under six soil treatments measured at seven time points from July 31, 2024, to October 2, 2024. Statistical analysis using the Student-Newman-Keuls (SNK) method ($p < 0.05$) identified significant differences among treatments over time. Early in the study (July 31, 2024), no significant differences in cover percentage were observed among treatments ($p = 0.1277$). However, by August 9, 2024, significant differences emerged ($p = 0.0076$), with Treatment 3 (16.7%) showing superior growth compared to other treatments, while Treatment 90:10 (3.0%) demonstrated the lowest cover percentage. On August 28, 2024, Treatment 3 (29.6%) continued to outperform others, followed by Treatment 4 (20.8%) and Treatment 5 (18.8%), whereas Treatment 90:10 remained significantly lower at 4.6%.

During the mid-season period (September 4–25, 2024), treatments incorporating CarbonizPN (Treatments 1, 1/2 Rate, 3, 4, and 5) achieved substantially higher cover percentages (66.9–76.3%) compared to the 90:10 sand-peat mixture (24.8% on September 4). By September 18 and 25, Treatments 1 through 5 consistently maintained cover percentages exceeding 70%, while Treatment 90:10 exhibited significantly reduced cover, reaching only 34.6–45.3%. Late in the study, on October 2, 2024, CarbonizPN treatments continued to outperform the 90:10 treatment. Cover percentages for Treatments 1 through 5 ranged from 58.3% to 68.9%, whereas the 90:10 treatment achieved only 34.6%. Notably, cover percentages for all treatments declined slightly on the final measurement date due to a combination of scalping and topdressing associated with more intensive cultural practices, which temporarily disrupted the turf canopy.

Overall, treatments incorporating CarbonizPN supported significantly higher cover percentages throughout the establishment and growth period compared to the 90:10 sand-peat mixture. This trend was especially pronounced during critical growth phases in August and September, indicating that the CarbonizPN soil amendment provided superior conditions for bermudagrass establishment and development. The 90:10 sand-peat mixture consistently was the lowest. The slight decline observed on October 2, 2024, reflects the impact of cultural practices rather than a decrease in the overall establishment success of the treatments.

Table 1. Cover percentage during grow in

Cover Percentage							
trt	7/31/2024	8/9/2024	8/28/2024	9/4/2024	9/18/2024	9/25/2024	10/2/2024
1	19.0	10.0 b	14.9 bc	67.8 a	78.7 a	90.4 a	68.9 a
1/2 rate	19.2	9.1 bc	16.0 bc	44.0 b	70.0 a	83.8 a	62.3 a
3	14.2	16.7 a	29.6 a	66.9 a	77.1 a	88.3 a	58.3 a
4	22.4	10.4 ab	20.8 ab	75.1 a	79.3 a	90.7 a	60.5 a
5	20.6	11.8 ab	18.8 ab	76.3 a	80.2 a	91.3 a	60.5 a
90:10	11.9	3.0 c	4.6 c	24.8 c	45.3 b	34.6 b	34.6 b
pvalue	0.1277	0.0076	0.0109	<0.0001	<0.0001	<0.0001	0.0037

*Means followed by the same letter are not different at the $p < 0.05$ value using SNK.

Table 2 presents the Dark Green Color Index (DGCI) of TifEagle ultradwarf bermudagrass under six treatments measured at seven time points from July 31, 2024, to October 2, 2024. Statistical analysis using the Student-Newman-Keuls (SNK) method ($p < 0.05$) identified significant differences in DGCI among treatments at specific dates. DGCI reflects the intensity of green coloration in the turf canopy, an indicator of turf health and vigor.

At the first measurement on July 31, 2024, significant differences were observed among treatments ($p = 0.0206$). The 90:10 treatment exhibited the highest DGCI (0.83 a), significantly outperforming all other treatments (0.77–0.80 b). However, by August 9, 2024, no significant differences were detected ($p = 0.8703$), with DGCI values ranging from 0.81 to 0.84 across all treatments. Similarly, no significant differences were observed on August 28, 2024 ($p = 0.9658$), with all treatments maintaining DGCI values of approximately 0.88.

By September 4, 2024, significant differences re-emerged ($p = 0.0003$). Treatments incorporating CarbonizPN (1, 3, 4, and 5) achieved the highest DGCI values (0.89–0.90 a), while the 90:10 treatment and the 1/2 Rate treatment displayed lower values (0.87 b). On September 18 and 25, 2024, all treatments except for 90:10 maintained statistically similar DGCI values (0.91–0.92 a), while the 90:10 treatment was significantly lower (0.89 b on September 18 and 0.82 b on September 25). This trend persisted on October 2, 2024, where treatments 1 through 5 exhibited DGCI values of 0.90–0.91 a, significantly higher than the 90:10 treatment (0.82 b, $p < 0.0001$).

Overall, treatments incorporating CarbonizPN consistently supported high DGCI values, particularly from September onwards, indicating superior turf color and health compared to the 90:10 sand-peat mixture. The 90:10 treatment exhibited high DGCI early in the study but lagged significantly behind the CarbonizPN treatments during the critical mid-to-late growing season.

Table 2 Dark green color index (DGCI)

DGCI							
trt	7/31/2024	8/9/2024	8/28/2024	9/4/2024	9/18/2024	9/25/2024	10/2/2024
1	0.79 b	0.82	0.89	0.89 a	0.91 a	0.92 a	0.91 a
1/2 rate	0.77 b	0.81	0.88	0.87 b	0.91 a	0.92 a	0.91 a
3	0.77 b	0.83	0.88	0.90 a	0.91 a	0.92 a	0.91 a
4	0.80 b	0.81	0.88	0.89 a	0.91 a	0.91 a	0.90 a
5	0.78 b	0.84	0.88	0.90 a	0.91 a	0.91 a	0.91 a
90:10	0.83 a	0.81	0.88	0.87 b	0.89 b	0.82 b	0.82 b
pvalue	0.0206	0.8703	0.9658	0.0003	0.0018	<0.0001	<0.0001

*Means followed by the same letter are not different at the $p < 0.05$ value using SNK.

Table 3 presents soil enzyme activity and moisture content (MC) for TifEagle ultradwarf bermudagrass under six treatments on September 30, 2024. The enzymes analyzed include MUF G (carbon cycling), MUF NAG (nitrogen cycling), and MUF P (phosphorus cycling), with statistical comparisons made using the Student-Newman-Keuls (SNK) method ($p < 0.05$). Moisture content (MC) reflects the water retention in the soil profile, which directly influences microbial activity and nutrient cycling.

Moisture content varied significantly among treatments ($p = 0.0015$). Treatment 5 had the highest moisture content (12.6 a), while Treatment 90:10 exhibited the lowest (6.9 c). Higher moisture levels in Treatments 1, 3, 4, and 5 likely supported more favorable microbial conditions, as evidenced by increased enzyme activity. Enzyme activity for carbon (MUF G) was significantly higher in Treatments 1 (24,928 a) and the 1/2 Rate (24,158 a) compared to all other treatments, with Treatment 90:10 showing no measurable activity (0 b, $p = 0.0302$). For nitrogen cycling (MUF NAG), Treatments 1, 3, and 4 exhibited the highest activity levels (54,664–83,282 a), whereas Treatment 90:10 was significantly lower (10,143 b, $p = 0.0429$). Phosphorus cycling (MUF P) activity was also markedly higher in the CarbonizPN treatments (116,154–189,323 a) compared to Treatment 90:10 (6,804 b, $p = 0.0031$).

Although Treatments 3, 4, and 5 demonstrated strong enzyme activity, they were not consistently as high as Treatment 1 across all metrics. One potential explanation is the variability in moisture content. For example, Treatment 5 had the highest moisture content (12.6 a), which may have diluted enzyme concentrations or altered microbial activity. Conversely, Treatments 3 and 4, with slightly lower moisture contents (10.1 ab and 9.8 b, respectively), may have experienced temporary microbial stress or reduced microbial diversity due to differences in fertilizer and biostimulant applications. Treatment 1, with a balanced moisture content (10.5 ab), coupled with consistent nutrient inputs, likely provided optimal conditions for microbial activity and nutrient cycling.

Treatment 90:10 consistently performed poorly across all enzyme activity metrics, reflecting inadequate microbial activity and nutrient cycling. Its significantly lower moisture content (6.9 c) further underscores its inability to retain sufficient water for microbial processes. Lastly, the enzyme assay from 8/30/24 is not being displayed due to lack of enzymatic activity in the soil. There were no significant differences on that sampling date, due to such low microbial activity in the soil. It also should be noted that this

sampling date was preceded by 28 days of minimal rainfall (0.03 inches) and very high temperatures and humidity (averages 94 and 91% relative humidity) (Appendix 1). Although the green received irrigation nightly, these harsh conditions may have affected the soil microbiome.

Table 3. Enzyme assay for 9/30/24

MG 9/30/24 Enzyme				
trt	mc	mufg	mufnag	mufp
1	10.5 ab	24928 a	54664 ab	116154 a
1/2 rate	10.2 ab	24158 a	42171 ab	162110 a
3	10.1 ab	10962 ab	83282 a	180513 a
4	9.8 b	15281 ab	45748 ab	189323 a
5	12.6 a	18593 ab	37359 ab	158882 a
90:10	6.9 c	0 b	10143 b	6804 b
p value	0.0015	0.0302	0.0429	0.0031

*Means followed by the same letter are not different at the $p < 0.05$ value using SNK.

Table 4 presents the results of a WinRhizo Root Analysis conducted on August 29, 2024, for TifEagle ultradwarf bermudagrass under six treatments. The root parameters measured included root mass (g), length (cm), average diameter (mm), and surface area (cm²). Statistical significance was determined using the Student-Newman-Keuls (SNK) method at $p < 0.05$.

Root surface area showed significant differences among treatments ($p = 0.0407$), while root mass, length, and average diameter did not show statistically significant differences ($p > 0.05$). Treatment 4 demonstrated the largest surface area (36.9 a), significantly higher than Treatment 90:10 (24.0 b). Surface area values for Treatments 1, 1/2 Rate, 3, and 5 (24.8–31.3 ab) were intermediate and not significantly different from either Treatment 4 or Treatment 90:10. The 90:10 treatment consistently showed the lowest numerical values for all root parameters, including mass (0.133 g), length (239.2 cm), and surface area (24.0 cm²), indicating weaker root development compared to the CarbonizPN treatments.

While root mass and length varied numerically among treatments, they did not reach statistical significance. Treatment 4 exhibited the highest root length (409.3 cm) and the greatest average diameter (0.300 mm), which likely contributed to its superior root surface area. The enhanced root system in Treatment 4 may be attributed to a combination of CarbonizPN and biostimulant inputs, which likely promoted optimal soil structure and nutrient availability. Conversely, the 90:10 treatment was the lowest across all root metrics.

Table 4. Root analysis on 8/29/24

WinRhizo Root Analysis 8/29/24				
Treatment	Mass (g)	Length (cm)	ave. diameter (mm)	surface area (cm ²)
1	0.232	369.9	0.269	31.3 ab
1/2 rate	0.138	284.6	0.246	24.8 ab
3	0.147	372.7	0.249	29.0 ab
4	0.249	409.3	0.300	36.9 a
5	0.192	353.1	0.272	30.1 ab
90:10	0.133	239.2	0.249	24.0 b
p value	0.6172	0.3815	0.3560	0.0407

*Means followed by the same letter are not different at the $p < 0.05$ value using SNK.

The WinRhizo Root Analysis conducted on October 1, 2024, (Table 5) revealed significant differences in root development metrics across treatments for TifEagle ultradwarf bermudagrass. Treatment 4 consistently outperformed other treatments, exhibiting the highest root mass (0.433 g a), root length (803.6 cm a), and root surface area (73.9 cm² a). These results suggest that the combination of CarbonizPN and biostimulants in Treatment 4 created optimal conditions for root growth, enhancing both the biomass and the functional capacity of the root system. Root mass and length were also significantly lower in the 90:10 treatment, which showed the lowest mass (0.199 g b) and shortest root length (364.4 cm c), indicating its inability to support robust root development.

Intermediate root mass and length values were observed in Treatments 1, 3, and 5 (0.296–0.305 g and 595.8–651.8 cm), with Treatment 1 achieving a root surface area (61.4 cm² a) statistically similar to Treatment 4. The 1/2 Rate treatment exhibited lower root length (454.1 cm bc) and surface area (36.9 cm² bc), potentially due to reduced nutrient input, which may have limited root expansion. Average root diameter did not differ significantly among treatments ($p = 0.8705$), suggesting that treatments primarily influenced root system size and surface area rather than root thickness.

The results underscore the superior performance of Treatment 4 in promoting root system development, likely due to its optimal combination of soil amendments and biostimulants. In contrast, the 90:10 treatment consistently underperformed across all metrics. The enhanced root surface area in Treatments 4 and 1 suggests their increased capacity for water and nutrient uptake, critical for bermudagrass establishment and performance.

Table 5. Root Analysis on 10/1/24

WinRhizo Root Analysis 10/1/24				
Treatment	Mass (g)	Length (cm)	ave. diameter (mm)	surface area (cm ²)
1	0.296 ab	651.8 ab	0.275	61.4 a
1/2 rate	0.257 b	454.1 bc	0.257	36.9 bc
3	0.303 ab	631.2 ab	0.288	58.4 ab
4	0.433 a	803.6 a	0.290	73.9 a
5	0.305 ab	595.8 abc	0.288	53.9 abc
90:10	0.199 b	364.4 c	0.284	33.9 c
p value	0.0112	0.0311	0.8705	0.0145

*Means followed by the same letter are not different at the $p < 0.05$ value using SNK.

The analysis of organic matter percentage determined through Loss on Ignition (Table 6) revealed significant differences among treatments. Treatments 1 through 5 had organic matter levels ranging from 0.834% to 0.901%, with no statistical differences among them, as indicated by the shared grouping letter "a." In contrast, the 90:10 treatment exhibited a markedly lower organic matter percentage of 0.534%, placing it in a separate statistical group ("b"). The p-value of 0.0105 confirms that the differences in organic matter content among the treatments are statistically significant at the 5% level. These results suggest that the 90:10 treatment had substantially less organic matter levels compared to the other treatments, while treatments 1 through 5 appear equally effective at maintaining organic matter during an ultradwarf bermudagrass greens grow in.

Table 6. Organic matter percentage

Loss on Ignition	
trt	Organic Matter %
1	0.901 a
2	0.834 a
3	0.870 a
4	0.868 a
5	0.868 a
90:10	0.534 b
p value	0.0105

*Means followed by the same letter are not different at the $p < 0.05$ value using SNK.

Conclusion

The results of this study have important implications for golf course greens construction and management. The superior performance of CarbonizPN treatments highlights the potential for this soil amendment to enhance turf establishment, improve soil health, and reduce the time required for grow-in periods. This, in turn, could lead to cost savings and earlier playability, critical factors in golf course management. Furthermore, the increased microbial activity and nutrient cycling observed with CarbonizPN align with sustainable management goals by improving soil health and reducing reliance on chemical fertilizers. Enhanced soil water retention associated with CarbonizPN also offers potential benefits for water use efficiency, an increasingly important consideration in turf management.

While the study demonstrated clear advantages of CarbonizPN, additional long-term research is needed to evaluate its performance under different environmental conditions, and management practices. Future studies could explore its durability and sustainability over multiple growing seasons, assess compatibility with alternative fertilizers and biostimulants, and investigate its economic feasibility in large-scale applications. In conclusion, this study provides evidence that CarbonizPN is a viable alternative to the traditional 90:10 sand-peat mixture for greens construction. By supporting superior turf establishment, health, and soil microbial activity, CarbonizPN offers a pathway toward more sustainable and effective greens management practices. These findings underscore the importance of innovative soil amendments in advancing turfgrass science and enhancing the performance of intensively managed systems like golf course greens.

Appendix. Weather Data

Max Temp			
Treatment	Mass (g)	Length (cm)	ave. diameter (mm)
07/15/2024	95	96	0.31
07/16/2024	97	89	0
07/17/2024	93	93	0.06
07/18/2024	90	95	0.33
07/19/2024	84	95	0.05
07/20/2024	90	94	0.01
07/21/2024	91	96	0
07/22/2024	91	92	0
07/23/2024	88	95	0.08
07/24/2024	78	96	0.64
07/25/2024	82	97	0.29
07/26/2024	88	97	0
07/27/2024	92	95	0
07/28/2024	90	95	0
07/29/2024	93	96	0
07/30/2024	96	93	0
07/31/2024	97	96	0
08/01/2024	97	93	0
08/02/2024	96	95	0.76
08/03/2024	91	96	0.01
08/04/2024	94	96	0
08/05/2024	95	95	0
08/06/2024	96	94	0
08/07/2024	98	94	0
08/08/2024	88	93	0
08/09/2024	91	91	0
08/10/2024	88	83	0
08/11/2024	90	88	0
08/12/2024	93	90	0

08/13/2024	95	94	0
08/14/2024	92	93	0
08/15/2024	99	94	0
08/16/2024	99	93	0.03
08/17/2024	98	94	0
08/18/2024	100	92	0
08/19/2024	92	82	0
08/20/2024	89	86	0
08/21/2024	89	79	0
08/22/2024	95	86	0
08/23/2024	92	94	0
08/24/2024	92	94	0
08/25/2024	96	91	0
08/26/2024	98	96	0
08/27/2024	99	87	0
08/28/2024	99	88	0
08/29/2024	98	90	0
08/30/2024	97	94	0
08/31/2024	94	96	0.48
09/01/2024	96	96	0.04
09/02/2024	94	95	0
09/03/2024	96	93	0
09/04/2024	89	93	0
09/05/2024	88	90	0
09/06/2024	78	92	0.09
09/07/2024	85	96	0
09/08/2024	82	71	0
09/09/2024	92	88	0
09/10/2024	90	95	0
09/11/2024	86	95	0.04
09/12/2024	77	95	1.26
09/13/2024	83	94	0
09/14/2024	79	95	0.36
09/15/2024	77	96	3.31

09/16/2024	76	96	0.03
09/17/2024	89	97	0
09/18/2024	88	97	0
09/19/2024	88	97	0
09/20/2024	93	97	0
09/21/2024	94	96	0
09/22/2024	95	96	0
09/23/2024	92	96	0
09/24/2024	91	95	0.23
09/25/2024	80	96	0.04
09/26/2024	82	93	0
09/27/2024	73	93	0.09
09/28/2024	76	93	0
09/29/2024	78	95	0
09/30/2024	81	96	0
10/01/2024	84	96	0
10/02/2024	84	94	0
10/03/2024	88	96	0
10/04/2024	90	96	0
10/05/2024	89	97	0
10/06/2024	88	97	0
10/07/2024	84	95	0
10/08/2024	79	87	0
10/09/2024	83	90	0
10/10/2024	83	88	0
10/11/2024	83	95	0
10/12/2024	86	96	0
10/13/2024	88	93	0
10/14/2024	73	91	0
10/15/2024	73	92	0
Average	89.12	93.13	0.09
Total			8.54