XXIII SEMANA DE LA FACULTAD
ARQUITECTURA E INGENIERÍA

Analysis of the urban heat island effect from Landsat satellite images and ArcGIS software in the municipality of Medellín.

Author: Ana María Giraldo Berrio.

Advisor: Carlos Hoyos.

Methodological Advisor: Andrea Tamayo Londoño.

Course: Preliminary research.

INTRODUCTION

The phenomenon known as the "urban heat island" (UHI) occurs when temperatures in cities are greater than those in their surroundings as a result of heat buildup in the lower atmosphere. This issue is influenced by urban expansion, a lack of planning, and a shortage of open spaces [1]. The UHI effect is lessened by vegetation since trees and other plants help to cool metropolitan areas. In addition to lowering air quality, a lack of green space increases the risk of respiratory and cardiovascular diseases [3][4][7]. Buildings and other hard surfaces that absorb solar heat, such pavements, have been built as a result of urban growth, contributing to UHI [8]. By reflecting heat, materials like white surfaces can help lessen this effect. There have been notable temperature variations in Medellín that are higher than usual.

OBJETIVE

GENERAL

Analyze the urban heat island effect from Landsat satellite images and ArcGIS software in the municipality of Medellín.

SPECIFICS

Utilizing the latest recent shapefiles from the POT and Geo Medellín, the official website of the Medellín Mayor's Office, ascertain whether vegetation cover exists in Medellín.

Utilizing Landsat photos altered with ArcGIS software, ascertain the rate of rise in Medellín's surface temperature.

Using geographic information maps, analyze the urban heat island temperature records for Medellín in relation to the amount of vegetation that is currently there, as documented in the POT.

Provide potential remedies to reduce the growing urban heat island effect in connection to surface temperature fluctuations and the amount of vegetation currently in place.

METODOLOGY

The Landsat satellite photos will be obtained using the EARTH EXPLORER portal in order to compute the LST.

To determine the vegetation cover, the shapefiles of the POT reported green areas were taken from GeoMedellin.

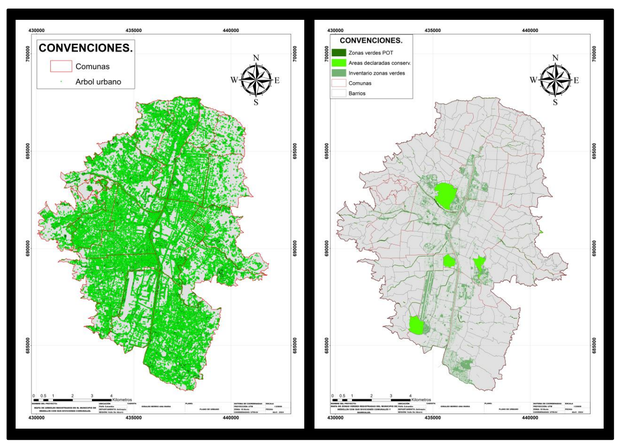
WGS 1984 zone 18 north coordinates were used, along with software to encrypt the satellite photos.

USGS science for a changing world

GeoMedellín

ArcGIS

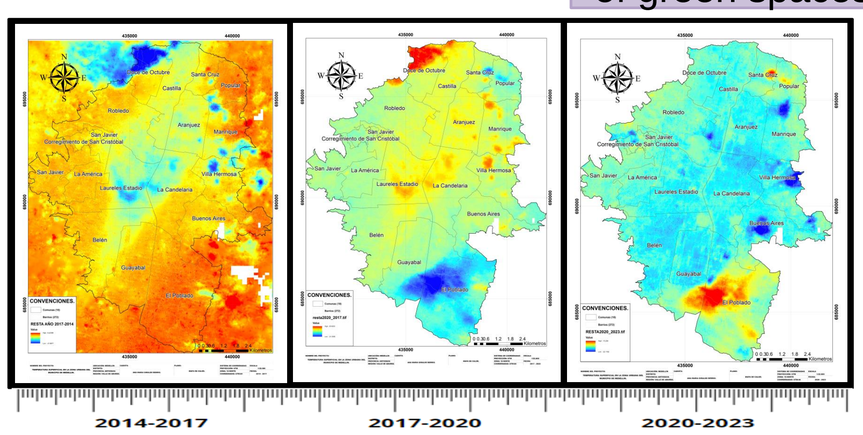
PARTIAL CONCLUTIONS

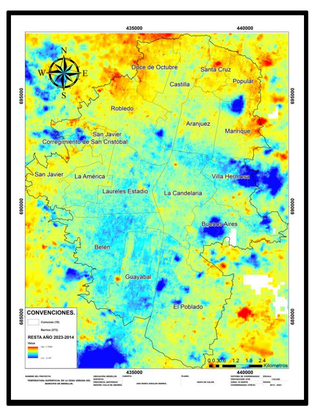


Área calculada.	m^2	%
area total del territorio urbano de medellín	101,618,901.15	100
zonas verdes registradas en el POT de medellin en su zona urbana.	11,218,498.48	11.04

Just 11% of Medellín's total metropolitan area is made up of greenery, according to data from the POT and GeoMedellín.

Since registered trees only indicate where they are located within a territory, not the precise amount of land they occupy, they were excluded from the percentage computation of green spaces.

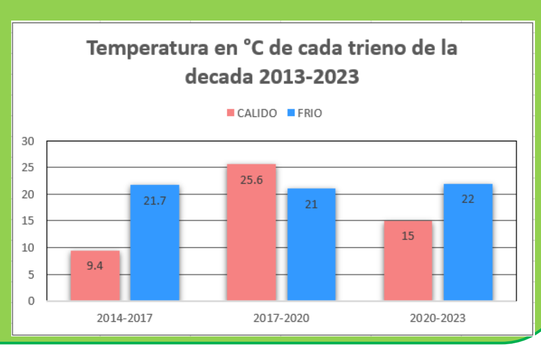




The data indicates a drop in surface temperature throughout the course of the decade, with the 2014–2017 triennium representing the most significant time with temperature increases of up to 9°C. In the years that followed, there was a notable drop in temperature; nevertheless, in the places where there were increases, such the Doce de Octubre region (which had a gain of 25°C) and El Poblado (15°C), there were notable increases.

PARTIAL CONCLUTIONS

While there are some places of the city where the surface temperature is rising, the general trend is falling. It should be observed, though, that temperatures were much higher during the first triennium than they were in later times. This is probably because of the El Niño phenomenon, which is linked to warmer weather. The city was also impacted by the La Niña phenomena in later centuries, which has a tendency to decrease temperatures.



SCAN ME

XXIII SEMANA DE LA FACULTAD

ARQUITECTURA E INGENIERÍA

Perception and Assessment of Compliance with Sound Pressure Levels at the IU Colegio Mayor de Antioquia according to Resolution 627 of 2006.

Ríos Ochoa, Isis Angélica & Tamayo Betancur, Ana María

Thematic advisor: Valentina Velez- Methodological advisor: Andrea Tamayo

INTRODUCTION

Noise, an omnipresent pollutant in urban environments, not only increases in volume and frequency but also significantly deteriorates physical and mental health. According to the WHO, exposure to various levels of noise can cause effects ranging from insomnia to progressive hearing loss [3]. In Colombia, Resolution 627 of 2006 sets permissible limits for environmental noise, with specific standards for educational settings at 65 dB during the day and 55 dB at night [2]. However, studies indicate that in Medellín, particularly in Comuna 7, Robledo, these limits are often exceeded due to unregulated commercial activities, affecting both students and instructors at IU Colegio Mayor de Antioquia [5][6][8]. This scenario underscores the urgent need to assess and mitigate noise pollution to safeguard the educational environment and promote effective learning.

OBJECTIVES

Assess the noise perception within the university community using a standardized Likert scale questionnaire

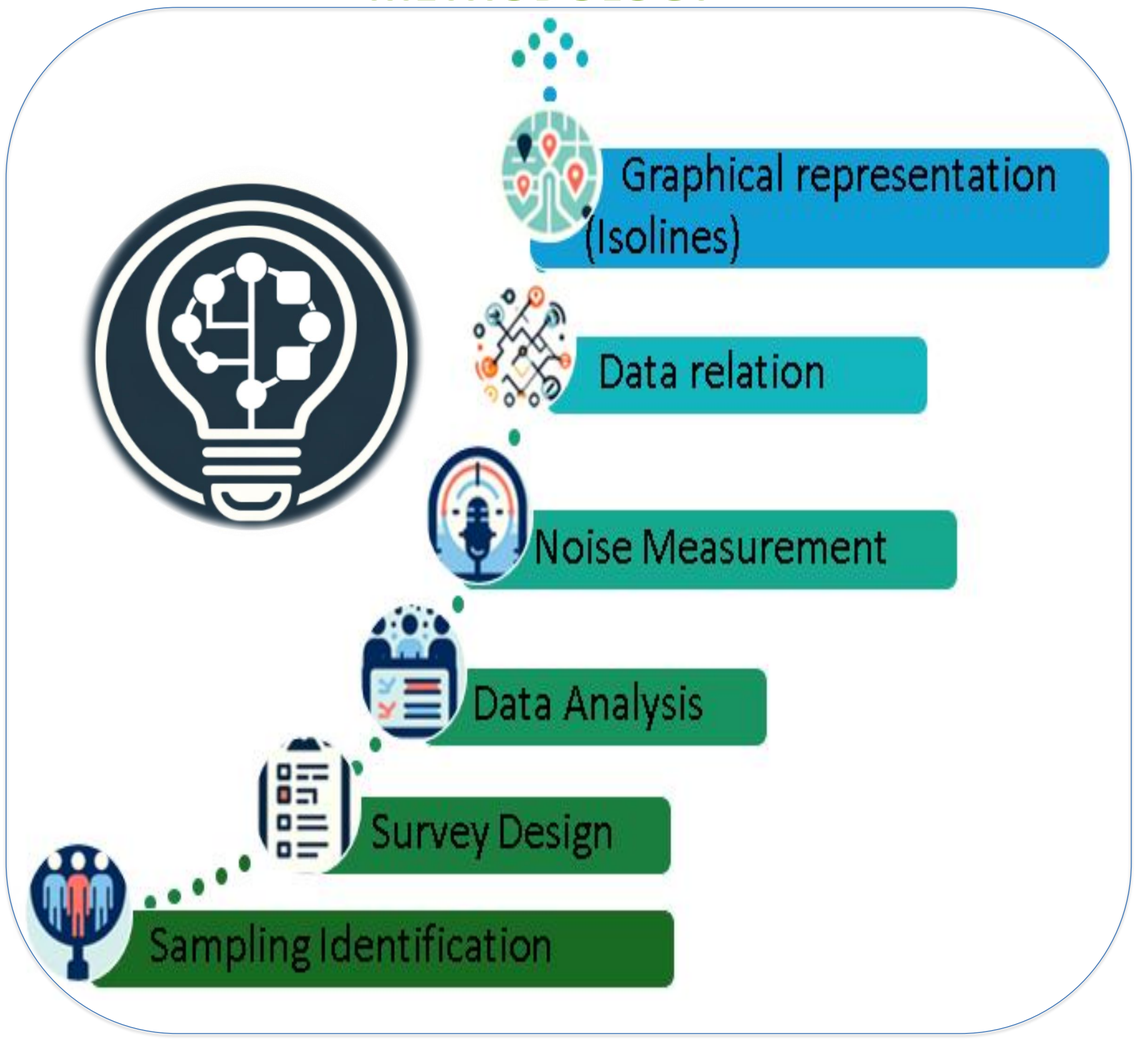
Develop a monitoring plan for sound pressure measurements based on noise perception for environmental monitoring, addressing identified critical areas.

Assess the university community's perception of sound pressure levels and based on these perceptions, conduct noise measurements and their compliance with Resolution 627 of 2006

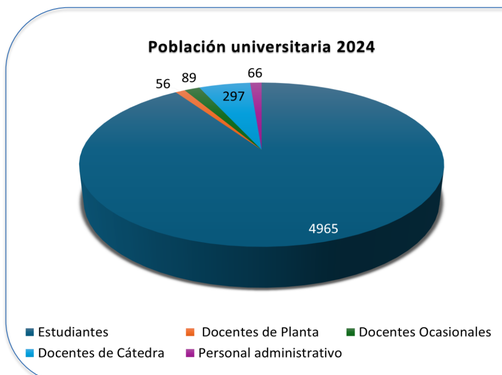
Compare the obtained results with the limits allowed in Resolution 627 of 2006 to evaluate the degree of compliance with current regulations.

Develop a graphical representation using isolines that integrates noise measurements to identify critical areas and guide the implementation of strategic interventions at the university.

METHODOLOGY



PARTIAL RESULTS



$$n = \frac{N Z^2 \ pq}{d^2 \ (N-1) + Z^2 \ pq}$$

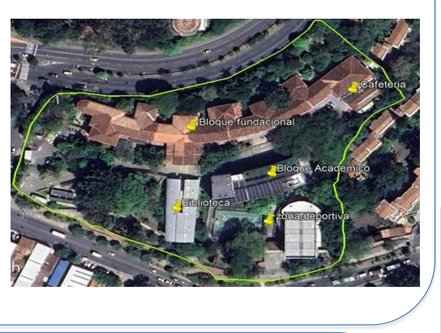
Where: p = 0.5; q=1-p=0.5;

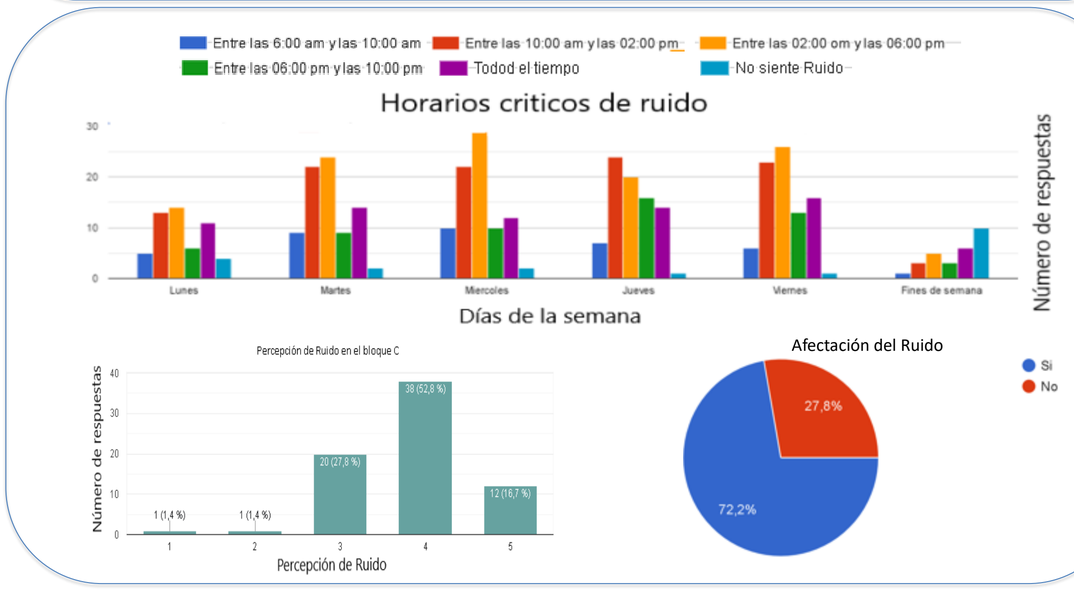
Z=1.96; d= 0.05; N= 5473

$$n = \frac{5473 * (1.96)^2 * 0.5 * 0.5}{(0.05)^2 * (5473-1) + (1.96)^2 * 0.5 * 0.5} = 359$$

NTC 6012.

- Noise Sensitivity: Scale from 0 to 10.
- Peak Noise Hours: Identification of periods with highest perceived noise levels.
- Noise Level Perception: Scale from 1 to 5.
- Impact of Noise on Well-being: Evaluation of the effect of noise on health and mood.





PARTIAL CONCLUSIONS

- 359 surveys were conducted with a 5% margin of error at a 95% confidence level, suggesting that the collected data is highly significant for the research.
- The use of the NTC Technical Standard 6012 in the questionnaire allowed for effective questions regarding noise perception in the university. The Delphi methodology was used to evaluate the questionnaire, enabling the identification and correction of potential deficiencies and improving its effectiveness.
- It is evident that during weekdays, from 10:00 am to 2:00 pm and from 2:00 pm to 6:00 pm, are consistently perceived as the noisiest times, according to survey responses. In the survey, which measures noise perception on a scale from 1 (barely perceptible) to 5 (highly perceptible), 52.4% of respondents rate the noise level as 4. Furthermore, 72.2% of participants report that the noise adversely affects their well-being, health, or mood

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RERERENCES

The references can be consulted in the QR

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Effect of biofertilization of digestates enriched with *Azospirillum brasilense* on the development of *Zea Mays* seedlings

Researchers: Ana Judith Zapata Manco – Verónica Jaramillo Saldarriaga
Adviser- Laura Osorno Bedoya, Course teacher - Carlos Fidel Granda Ramírez

RESEARCH PROBLEM

According to the FAO specialized agency of the UN, the demand for agricultural crops will increase up to 60% by the year 2030 [1] which may result in an increase in the excessive use of chemical fertilizers to the soil in addition to generating negative impacts on the environment. such as the reduction in the water retention capacity of the soil, which generates a soil poor in nutrients, low productivity, increased compaction and high acidification, with the latter altering the composition of bacterial communities [3]. Another problem is that which occurs in bodies of water through leaching, causing eutrophication and an increase in greenhouse gases in the air [4]. This is why ecological techniques must be included in these agronomic processes that allow the soils themselves to enhance their own microflora and functional capacities [5].

https://dcs.uas.edu.mx/noticias/4175/uso-de-agroquimicos-y-riego-excesivo-han-degradado-el-suelo-de-sinaloa

OBJECTIVES

GENERAL

Evaluate the effect of biofertilization of digestates enriched with *Azospirillum brasilense* on the development of *Zea Mays* seedlings.

SPECIFIC

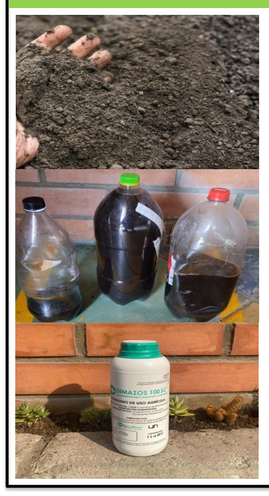
- Stabilize a digestate from an anaerobic fermentation reactor of organic waste for agricultural use.
- Characterize the soil physically-chemically and microbiologically to know the initial conditions.
- Evaluate the effect of the application of digestate enriched with *Azospirillum brasilense* on the growth of *Zea Mays* plants.

MATERIALS AND METHODS

METHODOLOGY

- Soil: Horizon A, Barbosa
- Seedlings: *Zea Mays* planted in pots with a of 1 Kg.
- Stabilization of the digestate by means of transfer for 20 min.
- *Azospirillum brasilense*: DIMAZOS concentrated at 1x10^8 CFU/ml.
- Statistics: ANOVA with a differential test of means by Duncan and a p < 0.5 in Sthatgraphics Centurion.

MATERIALS



Soil

Digestate

Azospirillum brasilense

EXPERIMENTAL DESIGN

FACTOR	LEVEL
Biofertilizer	*Azospirillum brasilence*
	Digestate
	Azospirillum brasilence + *Digestate*

Number of factors: K=1
Number of levels: n=3
Number of essays: E= $n^k = 3^1 = 3$
Number of controls: C=1
Number of replicas: r=3
Total number of experiments:
(E+C) * r = (3 +1) * 3 = 12

Exp	*Azospirillum brasilence*	Digestate
1	Yes	No
2	No	Yes
3	Yes	Yes
C	No	No

TREATMENTS

[T_A] *Azospirillum brasilense* — 5 ml/plant One-time planting of the seedling

[T_D] Digestate — 50 ml/plant Once a week

[T_AD] *Azospirillum* + Digestate — 5 ml *Azospirillum*/plant just one time. 50 ml/ plant Once a week of digestate.

[T_C] Control — 100 ml H_2O/plant

RESULTS

PHYSICOCHEMICAL ANALYSIS OF THE SOIL

PHYSICOCHEMICAL ANALYSIS OF THE SOIL

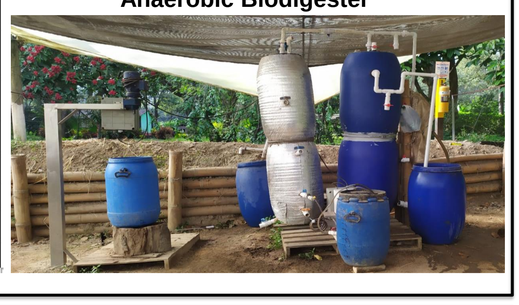
Parameter	Result	Units	Range
Sand	50	%	20--70
Silt	20	%	30--50
Clay	30	%	10--25
Class	Sandy clay loam	-	Frank
pH	5.5		5.5--6.0
CE	0.15	Ds/M	1--2
MO	5.6	%	5--10
P3-	5	mg/kg	15--30
S^{2-}	47	mg/kg	6--12
Al^{3+}	0	Cmol (+)/kg	<1
Ca^{2+}	7.2	cmol (+)/kg	3--6
Mg^{2+}	2.2	Cmol (+)/kg	1.5—2.5
K^{+}	0.33	Cmol (+)/kg	0.15--0.30
CIC ef	9.76	Cmol (+)/kg	5--10
Fe^{2+}	53.3	mg/kg	25--50
Mn^{2+}	7.8	mg/kg	5--10
Cu	3.7	mg/kg	3--5
Zn	2.4	mg/kg	3--5
B	0.2	mg/kg	0.5--1.0

PHYSICOCHEMICAL ANALYSIS OF DIGESTATE

PHYSICOCHEMICAL ANALYSIS OF THE DIGESTATE

Parameter	Units	Technique	Rule	NTC 5167/2022	Result
CO	g/l	Titrimetric	NTC 5167	>20	0.99
pH (Straight)	U pH	Standard method		2.5--8.5	7.08
C.E. (1/100)	dS/m			-	0.043
N-Org. Total	g/l	Titrimetric	NTC 370	>15	0.594
C/N	-	Mathematical calculation		-	1.66
Total solids	g/l	Standard method	NTC 5167	<40	10.6
Fixed solids	mg/l		NTC 897	-	4272
Volatile solids	mg/l	Standard method		-	6328
DQO total	mgO 2/l	Standard method	SM 5220-D	-	5450

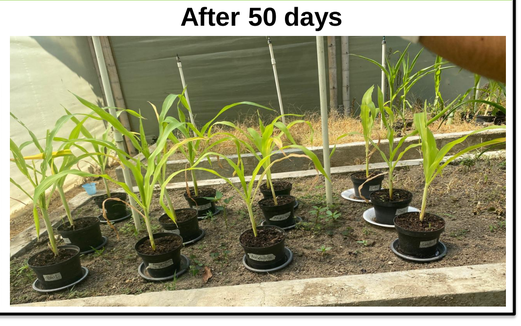
Anaerobic Biodigester



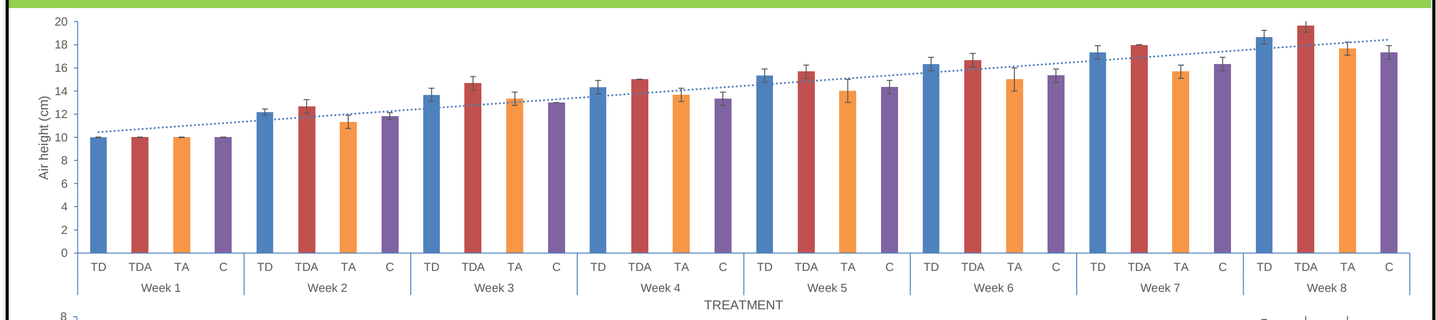
APPLICATION OF TREATMENTS

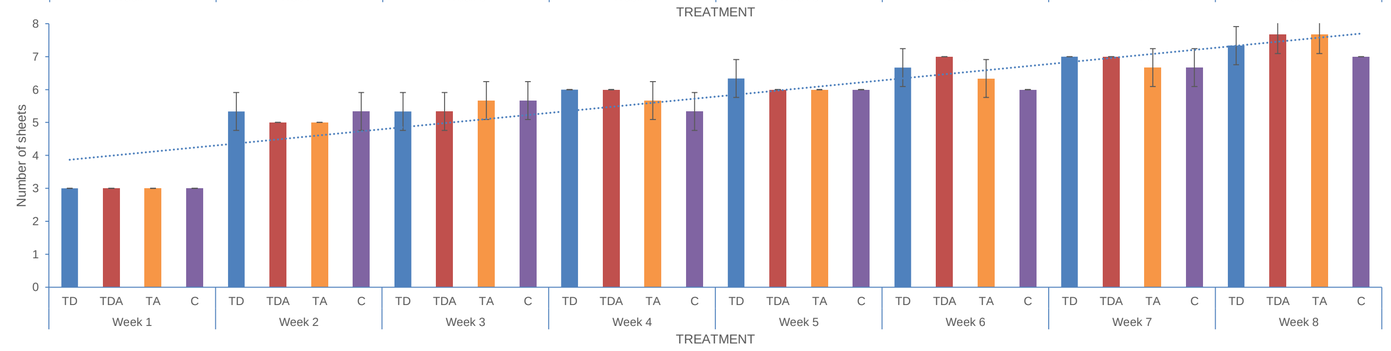
Before 1 day

After 50 days



BIOMETRIC DATA





CONCLUSIONS

- According to the soil analysis, it was determined that it is a sandy clay loam with a slightly acidic pH characteristic of the soils Colombians, which allows us to demonstrate the effect of the implementation of new technologies such as biofetilization combined with rhizobacteria.
- In the characterization of the digestate it is evident that It is poor in organic nitrogen, whichmakes it suitable for the experiment since when combining it with *Azospirillum* it will promote the transformation from N_2 to NH^+_4 and NO^-_3 assimilable by the plant.
- The application of the three treatments has generated changes at the level of aerial biomass. The height demonstrates a progressive growth in which the seedlings with the *Azospirillum* + Digestate treatment stand out, followed by the digestate, *Azospirillum* treatment and finally the control. The seedlings present chlorosis, this is an abnormal physiological condition in which the foliage produces insufficient chlorophyll, demonstrating a deficiency of macronutrients such as nitrogen, iron and magnesium, which is not being provided by the digestate.

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REFERENCE

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XXIII SEMANA DE LA FACULTAD ARQUITECTURA E INGENIERÍA

Analysis of the Current Situation of Domestic Water Security in the Brisas del Picacho Community and the SODIS Process as a Possible Alternative Solution

RESEARCH PROBLEM

Access to clean and safe water is essential for health and the economy. However, more than 700 million people worldwide lack drinking water, leading to disease and death. Water quality and domestic water security are particularly relevant in informal settlements in Medellín. These neighborhoods often lack adequate water supply infrastructure, which leads to greater vulnerability in terms of access to clean and safe water, and measures such as the Water Quality Risk Index (WQRI) and the use of solar disinfection (SODIS) are promoted. The Brisas del Picacho neighborhood lacks a basic water supply, and efforts are underway to improve the quality of the water resource through community participation and the implementation of alternatives such as solar disinfection.

OBJECTIVES

General
To provide the brisas del Picacho community with information about domestic water security and ways to improve it by discussing available alternatives.

1. **Specific** Conduct a risk assessment of domestic water security in the Brisas del Picacho community.
2. Evaluate the SODIS method as a possible solution for meeting water sanitation standards in the Brisas del Picacho community.
3. Promote methods of action with the Brisas del Picacho community to socialize domestic water security in the sector.

METHODOLOGY

Table 1. Experimental Design

Experiment	Surface type	Concentrator type	Irradiation
1	Curve	Black	Yes
2	Curve	Aluminum	Yes
3	Plana	Black	Yes
4	Plana	Aluminum	Yes
C1	Plana	N/A	Yes
C2	N/A	N/A	No

Meeting with JAL and plumber → Data collection through surveys → Water characterization (Water quantity and quality) → IRCA Application → Study área mapping (POT) and risk mapping → SODIS Evaluation → Promote SODIS method with the community

PARCIAL RESULTS

Table 2. Flow study

Flow rate of Brisas del Picacho sector	Basic consumption flow rate (Res. CRA 750/2016)
777,2 L/Day*Person	433,3 L/Day*Person

Table 3. IRCA of raw water in the Brisas del Picacho sector

Feature	Sample	Score
Total Coliforms	3183,33 UFC	15
Escherichia Coli	66,67 UFC	25
pH	8,617	1,5
Apparent Color	0 UPC	6
Alkalinity	49,67 CaCO3	1
Turbidity	0,7 NTU	15

Table 4. Characterization of water in the Brisas del Picacho sector

Feature	Res. 2115 de 2007	Sample	Compliance
Total Coliforms	0 UFC	3150 ± 287 UFC	✗
Escherichia Coli (E. coli)	0 UFC	90 ± 12 UFC	✗
conductivity	1000 µS/cm	214 µS/cm	✓
pH	6,5 - 9.0	8,617	✓
Apparent Color	15 UPC	0 UPC	✓
Alkalinity	200 CaCO3	49,67 ± 3,40 CaCO3	✓
Turbidity	2 NTU	0,7 ± 0,0163 NTU	✓

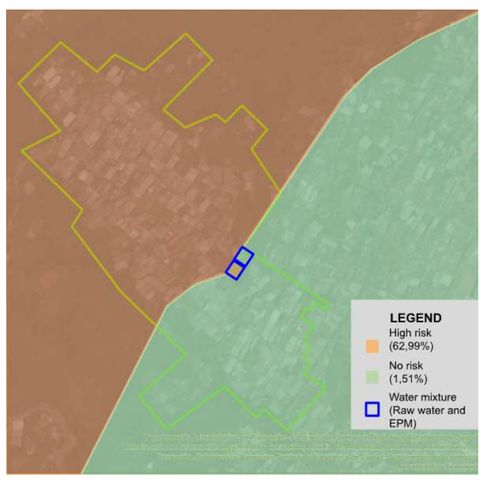


Figure 1. Water risk map, Brisas del picacho

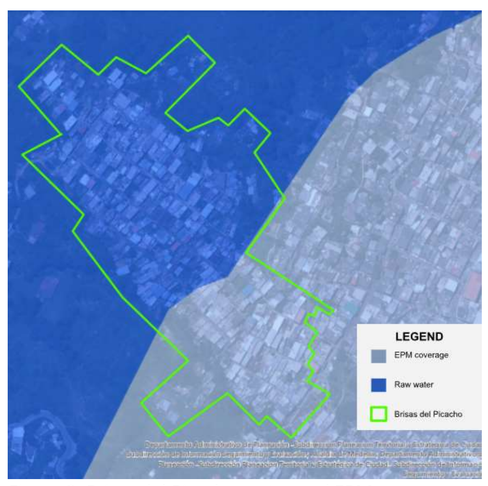
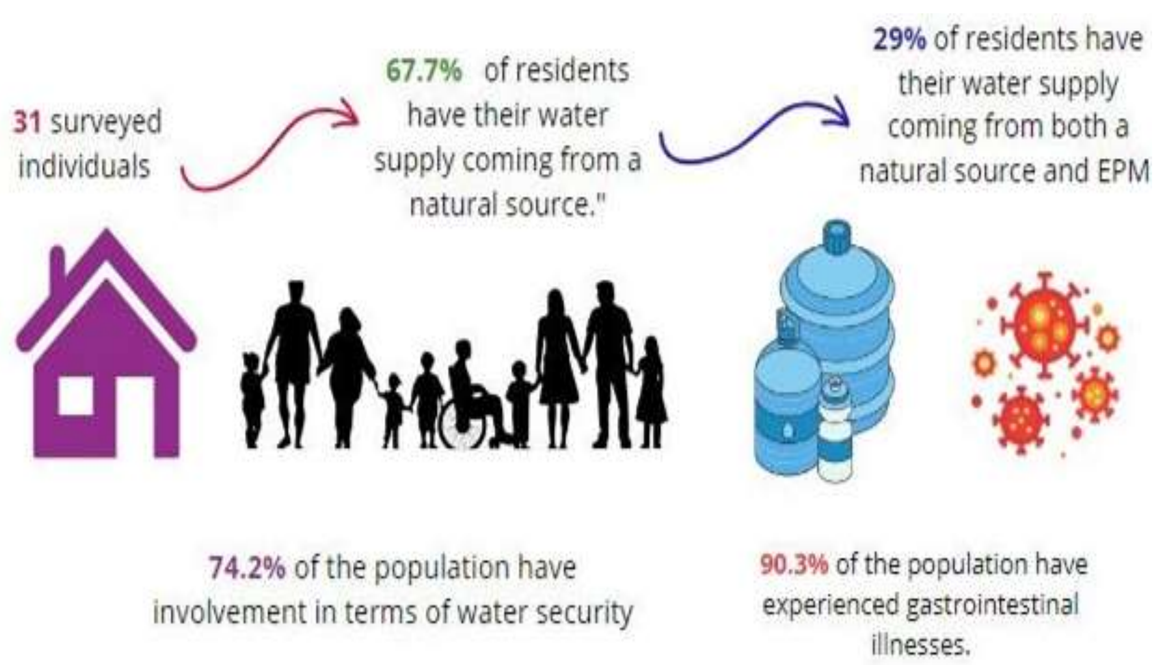


Figure 2. Brisas del Picacho sector and EPM converge

Figure 3. Brisas del Picacho sector and public space area



PARCIAL RESULTS

IRCA %= Risk score assigned to unacceptable characteristics Risk score assigned to all analyzed characteristics*100 (2)

IRCA (%) = 15+2515+25+1,5+6+1+15*100 = 62,99%

Equation 1.IRCA result

PARCIAL CONCLUSIONS

- According to the characterization, those who consume untreated water in Brisas del Picacho face a high risk of gastrointestinal illnesses, with symptoms such as nausea, vomiting, diarrhea, and fever.

Conclusion 1

- The water in the Brisas del Picacho area meets the standards established for electrical conductivity, pH, color, alkalinity and turbidity according to Resolution 2115 of 2007. However, microbiological contamination was detected in the raw water sample, indicated by high levels of total coliforms and E. coli.

Conclusion 2

- The risk map analysis has identified that the community is exposed to a high risk of infectious diseases due to the presence of microbiological contamination in the water.

Conclusion 3

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Autores: Yenifer Paola Arcila Ossa , Julieth Darlenis Bohorquez Caicedo, Karen Dayana Tautiva Villarraga, Frank David Robledo Córdoba
Asesores temáticos: Carlos Fidel Granda Ramírez, Sol Ochoa Osorio
Asesores metodológicos: Andrea Tamayo Londoño, Carlos Fidel Granda Ramírez

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XXIII SEMANA DE LA FACULTAD
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Applicability of products derived from residual biomass in agricultural production.

Ana María Gómez Perea - Manuela Velásquez Sánchez - David Esteban Villada Puerta.
Thematic advisors: Julian López - Andrea Tamayo - **Methodological advisor:** Carlos Fidel Granda

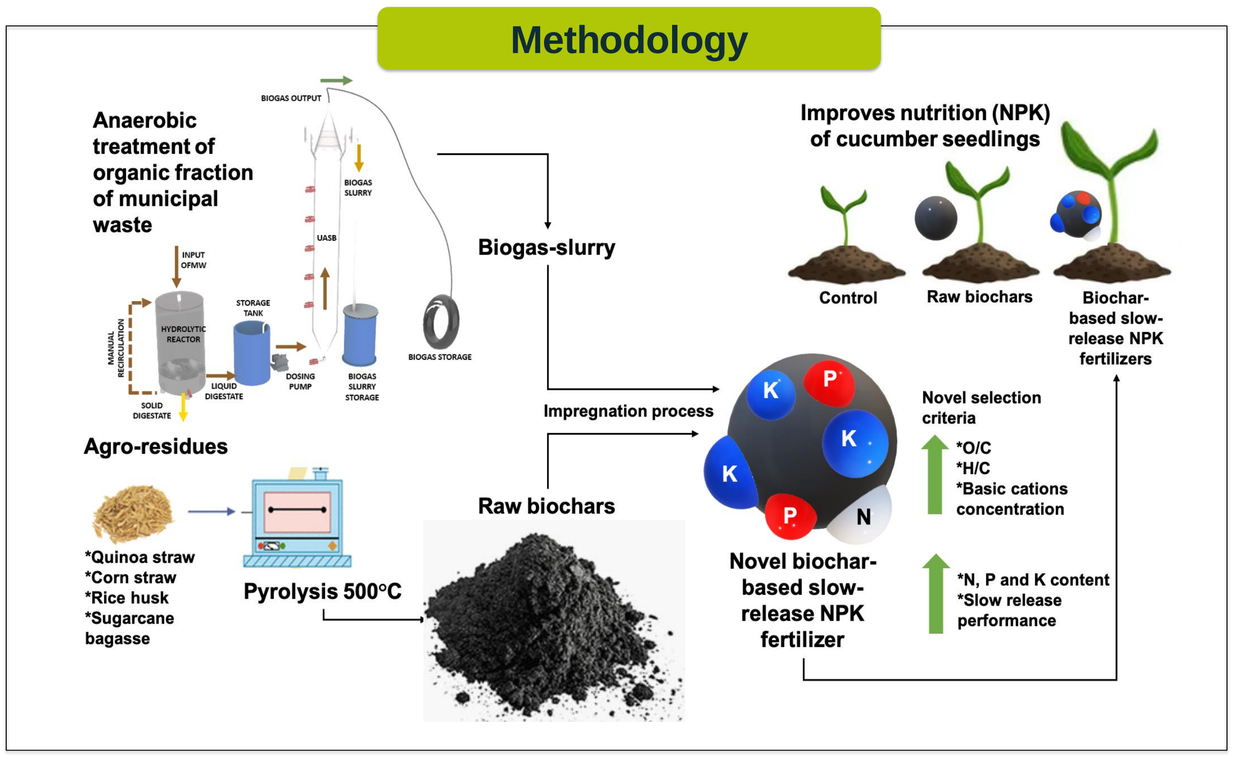
Research problem:

The increasing population growth forces agriculture to supply more food, which drives the use of chemical fertilizers, but their excessive use generates an accumulation of chemical pollutants in the soil, which causes damage to the soil and the environment, in addition to being an inefficient practice since crops cannot absorb a significant amount of nutrients and are lost in natural processes such as erosion, leaching, volatilization, among other.

Theoretical framework:

- Digestate as a potential source for biogas-based fertilizer production.
- Use of biochar as a support matrix and transport of nutrients.
- Capacity of biochar to gradually release nutrients into the soil.

Methodology



General objective

To evaluate the agricultural applicability of bioproducts formulated from digestate and biochar.

Specific objectives

Formulate bioproducts based on digestate and biochar from different wastes.

Surface and physicochemical characterization of the formulated bioproducts.

Evaluate the effect of the formulated bioproducts on plant nutrition.

Partial results

Table 1. Characteristics of biochar-based fertilizers.

Characteristics	QS-BF	CS-BF	RS-BF	SCB-BF
EC (µS cm−1)	1750 ± 2.3 a	1752 ± 11.4 a	1711 ± 4.8 b	1694 ± 5.1 c
pH	8.9 ± 1.1 a	8.9 ± 0.9 a	9.0 ± 0.4 a	8.8 ± 1.0 a
Ash content (%)	30.2 ± 3.5 a	28.5 ± 2.8 a	17.3 ± 2.1 b	22.4 ± 1.3 b
P (g kg−1)	60.0 ± 0.0 b	194 ± 0.0 a	1.7 ± 0.0 d	2.8 ± 0.0 c
K (g kg−1)	17.7 ± 0.0 b	35.1 ± 0.0 a	2.9 ± 0.0 d	5.2 ± 0.0 c
TKN (g kg−1)	63.0 ± 0.0 a	54.0 ± 0.0 b	33.0 ± 0.0 d	41.0 ± 0.0 c

Data presented as mean of three replicates ± standard error. Different letters indicate statistical significance at p <0.05. EC: electrical conductivity. TKN: Total Kjeldahl Nitrogen. QS-BF: quinoa straw biochar-based fertilizer. CS-BF: corn straw biochar-based fertilizer. RS-BF: rice husk biochar-based fertilizer. SCB-BF: sugarcane bagasse biochar-based fertilizer.

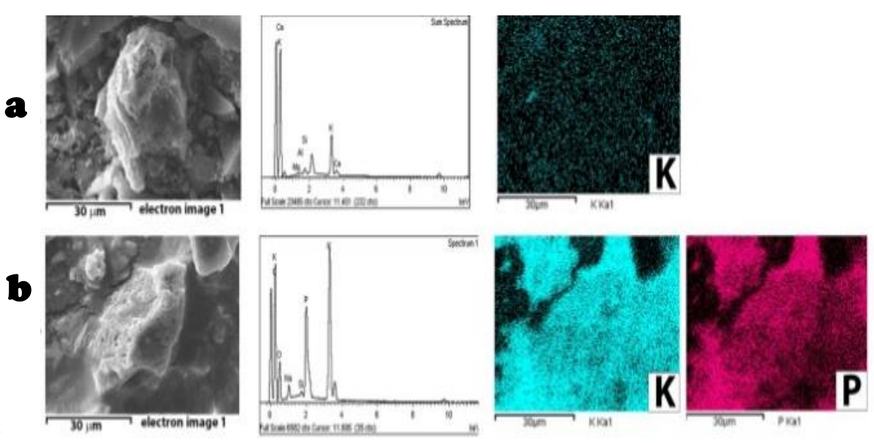


Fig. 1. SEM images, EDS spectrum, and SEM-EDS maps. The following information is displayed for each material from left to right: SEM image, EDS spectrum, and SEM-EDS map. (a) QS: quinoa straw-derived biochar. (b) QS-BF: quinoa straw biochar-based fertilizer.

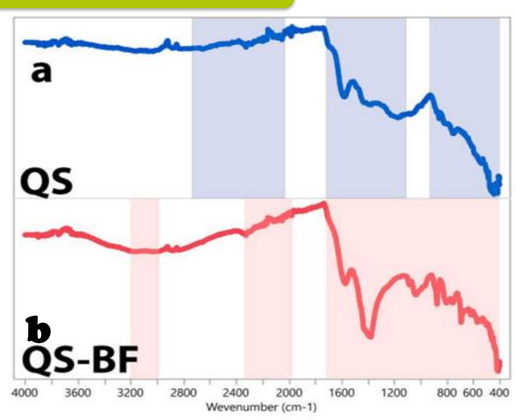


Fig. 2. FTIR spectra of the raw biochar and the biochar-based fertilizers. The shaded areas indicate the regions where the characteristic functional groups are present in each material. (a) QS and QS-BF.

Analysis of partial results

- When digestate, which contains acidic components [22], comes into contact with biochar, the biochar can adsorb these hydrogen ions to form hydrogen bonds[13], the release of H+ from the digestate causes a decrease in the pH of the surrounding.
- The good incorporation of nitrogen and phosphorus could be attributed to the highly porous structure provided by the biochar and its absorption capacity. [22]
- After impregnation, a greater distribution of K and/or P is observed on the surface. This observation is supported by SEM analysis. Additionally, evidence of nutrient loading is provided through FTIR analysis in a similar manner. [11].

Partial conclusion

The impregnation process promotes the existence of physicochemical interactions, facilitating the adsorption of essential nutrients. Creating a support matrix that allows the gradual and controlled release of NPK.

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Bibliographic references

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Alcaldía de Medellín Distrito de Ciencia, Tecnología e Innovación

XXIII SEMANA DE LA FACULTAD
ARQUITECTURA E INGENIERÍA

Analysis of the environmental and social indicators disclosed in the sustainability reports of Colombia companies in the period 2022 – 2023 using the GRI standars as a reference

Cano Zapata, Yurley Stefanny & Mejía Valenzuela, Sharoon Corey
Thematic advisor: Lopez Correa, Julian - Methodological advisor: Tamayo Londoño, Andrea

Introduction

Sustainability reporting is gaining importance, leading more companies to share their sustainability efforts in public reports. Despite this increase, questions persist about what information these reports should include and how they should be organized [1]. Organizations commonly use the Global Reporting Initiative (GRI, 2015) framework to communicate their sustainability performance clearly and uniformly to stakeholders [3]. Colombia, as a UN member, has committed to the goals set in 2015 through CONPES 3918 and External Circular 100-000008 of July 12, 2023. Therefore, this study focuses on analyzing Colombian companies' reports aligned with the GRI standard to identify commonly reported indicators and provide recommendations to enhance understanding of environmental and social performance disclosure.

Objetives

General: To analyze environmental and social information disclosure in sustainability reports from 2022 to 2023 of Colombian companies using GRI standards as a reference, aiming to identify the most recurrent indicators used to communicate performance.

Specific:

- Identify and gather sustainability reports under GRI standards from various economic sectors in Colombia for 2022–2023.
- Analyze environmental and social indicators reported in sustainability reports under GRI standards for 2022–2023.
- Determine recurrent environmental and social indicators reported by selected companies.

Methodology

Stage 1: Selection of Colombian companies reporting under the GRI standard

Stage 2: Compilation of sustainability reports for 2022-2023

Stage 3: Content analysis and identification of recurring indicators

Step 4: Information analysis

Partial Result

Figure 1. Illustrates the counts of GRI social benchmarks reported by companies

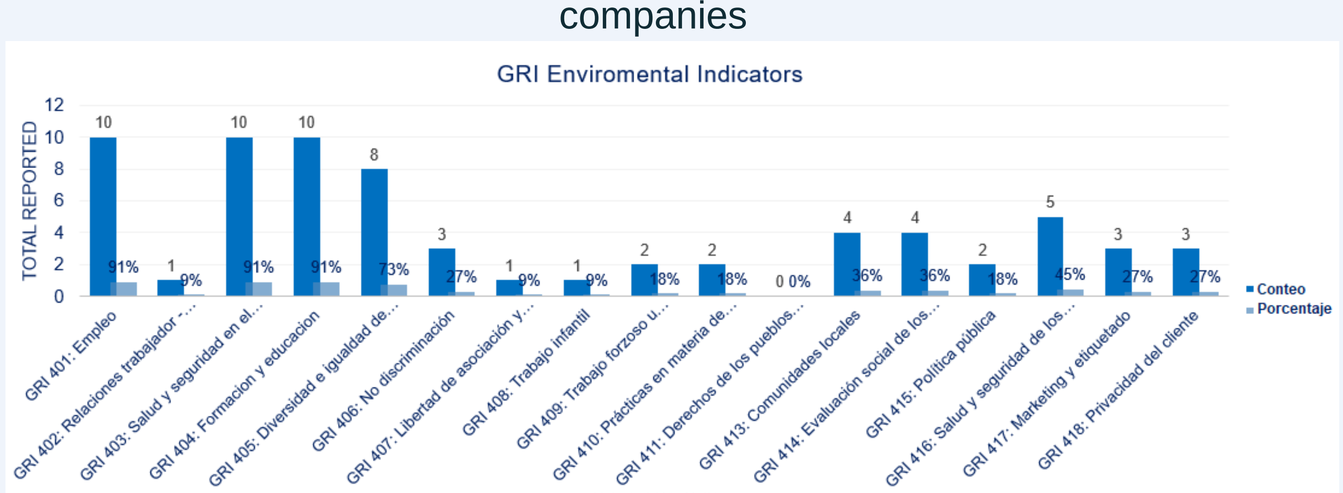
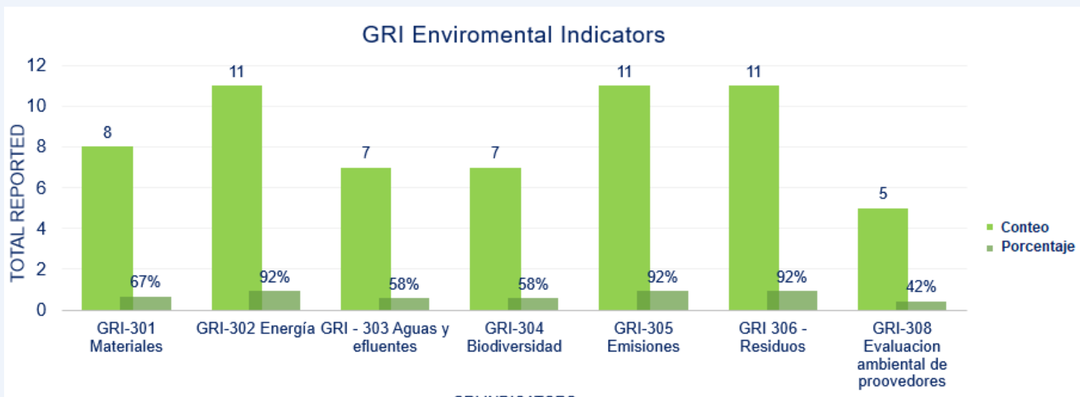


Figure 2. Shows the number of GRI environmental parameters reported by the companies



Partial Conclusions

- Twenty-six companies from various sectors were chosen from the "Most Responsible Companies" category on the official Merco Ranking website.
- The sustainability reports reveal that the most commonly reported social indicators are employment, occupational health and safety, and training and education, with a 91% occurrence. Regarding environmental indicators, energy, emissions, and waste are the most frequently reported, with a 67% occurrence.
- Although companies mention following the GRI guidelines, in some cases, the information is presented in a general manner.

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References

The references can be consulted in the QR

methodological advisor

XXIII SEMANA DE LA FACULTAD
ARQUITECTURA E INGENIERÍA

Effect of Construction and Demolition Waste residues as amendments in soil enriched with soil microorganisms *Penicillium janthinellum* and *Bacillus megaterium*

Members: Elián Andrés Chancí López – Brian Alexis Rojas Guisao
Thematic advisor: Laura Osorno Bedoya **Methodological advisor:** Carlos Fidel Granda Ramírez

Research Problem

Excavation, demolition, repair, civil works and construction improvements.

CDW accounts for 50% of the total annual solid waste generated worldwide.

CDW is classified as follows: susceptible to use and not susceptible to use.

In Colombia, they represent 40% of total solid waste: 22 Tons.

Between 60-90% of CDW is deposited in authorized sites, only 20% is recycled.

Theoretical Framework

Circular economy: Innovative approach to resource and waste management.

The reuse of CDW in crops could be an alternative for its reduction.

Bio - solubilization.

The nutritional status of plants depends on the macro and micronutrients in the soil.

Penicillium janthinellum and *Bacillus megaterium.*

Liming effect.

Objetives

General: Evaluate the effect of construction and demolition waste (CDW) as amendments enriched with soil microorganisms *Penicillium janthinellum* and *Bacillus megaterium*.

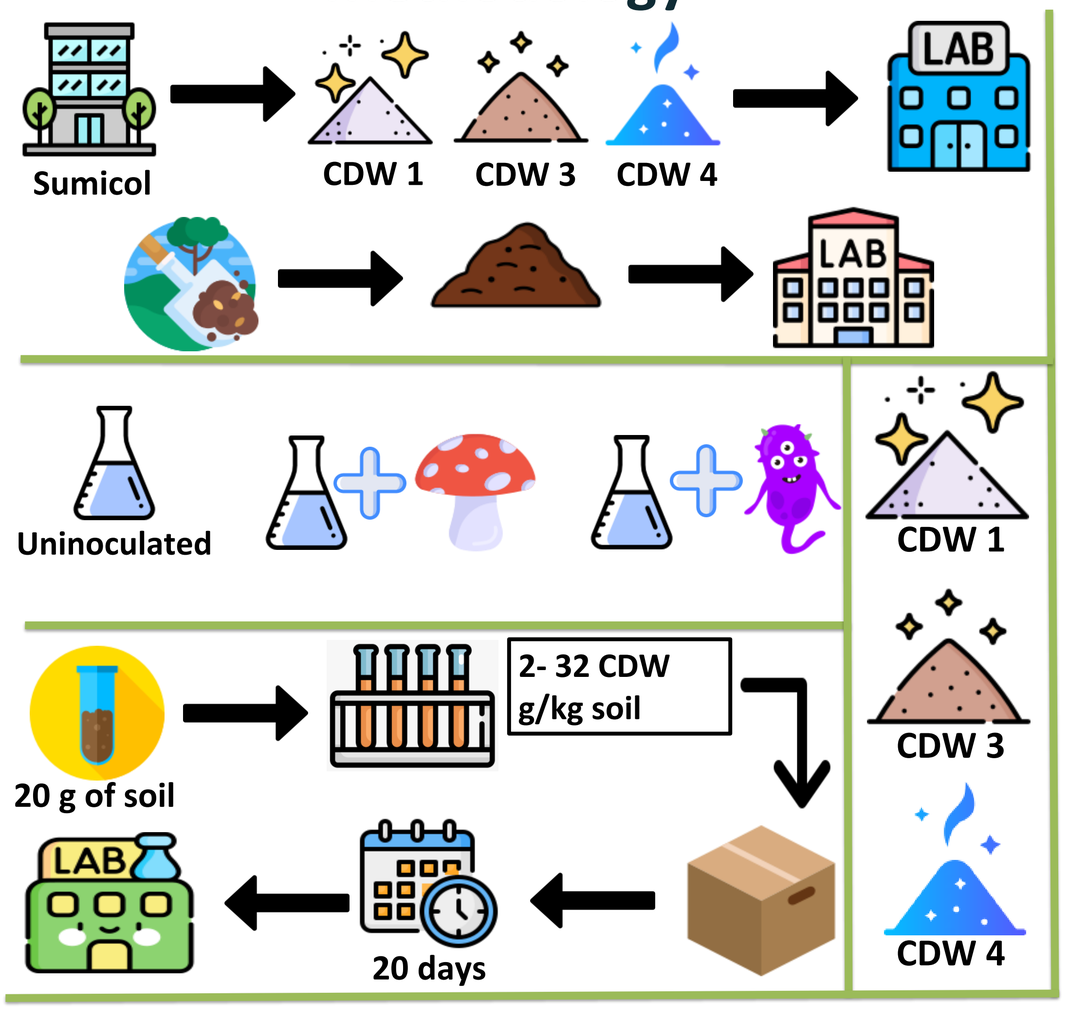
Specifics:

1. Characterization physico-chemical of soil and CDW.

2. Evaluate the biosolubilization of CDW under *in vitro* conditions with *Penicillium janthinellum* and *Bacillus megaterium*.

3. Determine the liming and nutritional effect of CDW in soils.

Methodology



Partial Results

Table 1. Characterization physico-chemical of soil

PARAMETER	Result	Range	Analysis
Mg (cmol (+)/kg)	0,7	1,5-2,5	B
S (mg/kg)	18	12-15	A
pH	5,7	6,0-6,5	B
Ca (cmol (+)/kg)	1,1	(3-6)	B
Si (mg/kg)	6,9	20-30	B
CICE (cmol (+)/kg)	3,31	(5-10)	B

Table 2. Characterization physico-chemical of CDW (X-ray fluorescence)

PARAMETER	CDW 1	CDW 3	CDW 4
CaO (%)	0,262	0,259	0,300
MgO (%)	0,080	0,000	0,000
S (%)	0,660	0,080	0,082
SiO2 (%)	0,179	0,423	0,423

Table 3. Initial pH of CDW

PARAMETER	CDW 1	CDW 3	CDW 4
pH	10.780	11.770	11.583

Figure 1. pH variation

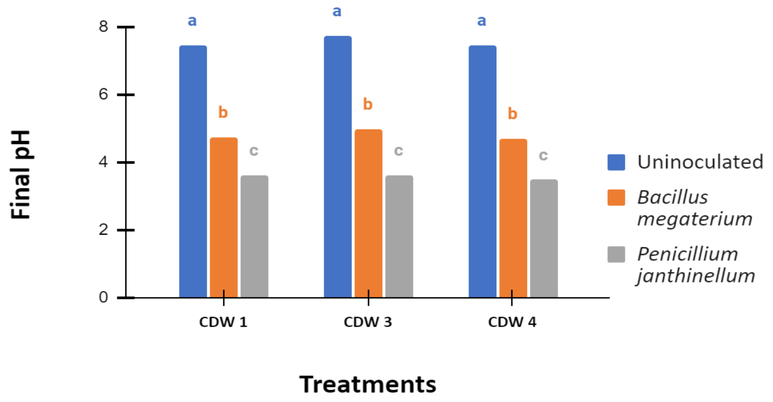
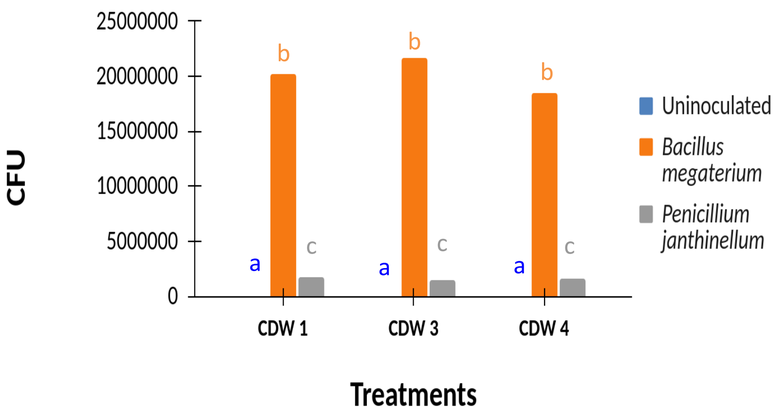


Figure 2. Microorganism count



Partial Conclusions

1. It was possible to evaluate the effect of Construction and Demolition Waste (CDW) as amendments enriched with soil microorganisms, *Penicillium janthinellum* and *Bacillus megaterium*
2. The physicochemical characterization of the soil and CDW was carried out correctly.
3. Biosolubilization of CDW was achieved under in vitro conditions with *Penicillium janthinellum* and *Bacillus megaterium*
4. According to the results obtained, the liming and nutritional effect of CDW in acidic soils was determined.

Bibliographic references

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