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Superintendência  
de Relações  
Internacionais



UNIVERSIDADE  
ESTADUAL DO  
MARANHÃO

# Sessão Internacional Caderno de Resumos Book of Abstracts



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# **SESSÃO INTERNACIONAL DA UEMA**

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## APRESENTAÇÃO

A Sessão Internacional é realizada pela Superintendência de Relações Internacionais com o objetivo de dar oportunidade aos estudantes de vivenciarem a experiência de apresentar trabalhos em inglês. A intenção é que os alunos se sintam motivados a participar de eventos internacionais. Ao apresentar a pesquisa em outras línguas nesse tipo de evento, há visibilidade nacional e internacional para o trabalho e para a instituição. A ação abre portas para colaborações científicas, por exemplo.

A segunda edição da Sessão Internacional, realizado no dia 01º de dezembro de 2021, é parte da programação do VII Café Internacional da UEMA.

O **VII Café Internacional**, realizado pela Superintendência de Relações Internacionais da Universidade Estadual do Maranhão de 30 de novembro a 02 de dezembro de 2021 tem o objetivo de discutir a temática de internacionalização com a comunidade acadêmica e o público geral.

A programação contém debates sobre a Política de Internacionalização da UEMA, ações da Política Linguística para Internacionalização da UEMA, Workshops Temáticos e convidados nacionais e internacionais. Além disso, o Café é um momento para o público conhecer detalhes das atividades desenvolvidas pela Superintendência no processo de internacionalização da universidade.

A novidade desta edição do Café é a realização conjunta da Sessão Internacional, voltada para estudantes que têm interesse em apresentar trabalhos em língua inglesa.

## PROGRAMAÇÃO VII CAFÉ INTERNACIONAL

### ***30 DE NOVEMBRO DE 2021***

9h - **Cerimônia de Abertura:** Prof. Dr. Gustavo Pereira Costa (Reitor da UEMA), Prof. Dr. Walter Cannales Sant'Anna (Vice-Reitor da UEMA), Prof. Dr. Thales Passos de Andrade (Superintendente de Relações Internacionais da SRI) e demais convidados.

10h - Palestra - **Política Linguística para Internacionalização Institucional.** Profa. Dra. Denise de Paula Martins de Abreu e Lima (UFSCar – Universidade Federal de São Carlos) e Prof. Dr. Thales Passos de Andrade (Superintendente de Relações Internacionais da UEMA)

11h - Palestra Magna: **International Association of Universities (IAU) - a associação, seus benefícios e a importância da internacionalização para as universidades.** Prof. Dr. Giorgio Marinoni, Gerente, HE e Internacionalização da IAU.

14h - Palestra: **Competências digitais para formação de professores: uma fluência tecnológica necessária.** UEMAnet (UEMA) e Prof. Dr. José Antônio Moreira (Universidade Aberta de Portugal)

15h - Palestra: **Curso de Português como Língua Estrangeira da UEMA e CELPE-bras/UEMA.**

Professores Departamento de Letras do Campus Balsas.

16h - Palestra: **Nuclin: Conhecendo as ações e oportunidades ofertadas pelo Núcleo de Línguas da UEMA** - Profa. Dra. Jeanne Ferreira de Sousa da Silva - Coordenação NUCLIN.

### ***01 DE DEZEMBRO DE 2021***

9h - 12h30 - **Sessão Internacional:** Apresentação de trabalhos em língua inglesa. Salas temáticas

virtuais e simultâneas para apresentação em Inglês dos resultados de pesquisa dos alunos da UEMA. Temas: Resultados dos Projetos de Iniciação Científica/Pesquisa; Projetos de Extensão; Objetivos de Desenvolvimento Sustentável (ODS); Temática livre.

14h30 - **Curso de Curta Duração:** Relações Internacionais humanitárias, Movimento Antidiscriminação e Agenda 2030 da ONU - Prof. Dr. Thiago Allisson Cardoso de Jesus (Diretor do bacharelado de Relações Internacionais da UEMA)

15h30 - **Conferência:** Peticionamento perante a Corte de Direitos Humanos - Profa. Dra. Maria da Glória C. S. Gonçalves Aquino (Pesquisadora no U/Minho Portugal e Universidade Federal

do Maranhão) 16h30 - Mesa de Diálogos: Bacharelado em RI - um curso na UEMA para pensar e intervir no mundo - Prof. Dr. Thiago Allisson Cardoso de Jesus (Diretor do Bacharelado de Relações Internacionais da UEMA), Prof. Me. Christian Burle, Fabiana Moura (Internacionalista do Programa Cidadão do Mundo), Stefanie Zerba Monteiro (Internacionalista da UEMA).

## ***02 DE DEZEMBRO DE 2021***

9h - 11h00 - **Workshop Temático Universidade Estadual do Maranhão e Universidad Santo Tomás, Chile. Área de Excelência: Ciências Agrárias**, ODS: 2, 12, 13, 14 e 15. Profa. Dra. Rita de Maria Seabra Nogueira (Docente Permanente do Programa de Pós-Graduação em Ciência Animal/CCA -UEMA); Dr. Alvaro Reyes (Diretor Nacional da Escola de Agronomia da UST); Prof. Oscar Lopez (Chefe da Carreira em Medicina Veterinária da UST); Prof. Paola Ulloa (Diretora Nacional da área técnica de Recursos Naturais da UST)

9h - 11h00 - **Workshop Temático Universidade Estadual do Maranhão e Universidad Santo Tomás, Chile. Área de Excelência: Ciências Biológicas e da Saúde**, ODS: 14 e 15. Profa. Dra. Raimunda N. Fortes C. Neta (Coordenadora do Programa de Pós-graduação em Ecologia e Conservação da Biodiversidade, UEMA); Dr. Fabio Labra (Pesquisador do Centro de Pesquisa em Mudanças Climáticas. Faculdade de Ciências da UST).

11h - 13h00 - **Workshop Temático Universidade Estadual do Maranhão e Universidad Santo Tomás, Chile. Área de Excelência: Inovação Tecnológica e de Materiais**, ODS: 4, 9 e 11. Prof. Dr. Henrique Mariano C. Amaral (Docente Permanente do Programa de Pós-Graduação em Engenharia de Computação e Sistemas PECS/UEMA) e Prof Roberto Carrasco (Diretor Nacional da UST)

11h - 13h00 - **Workshop Temático Universidade Estadual do Maranhão e Universidad Santo Tomás, Chile. Área de Excelência: Ciências da Educação**, ODS: 4, 10 e 16. Profa. Dra. Ana Lucia (Coordenadora do Programa de Mestrado em Ciências da Educação da UEMA) e Dra. Paola Costa (Investigador Centro Interdisciplinar de Inovação Educacional da UST).

14h00 - **Workshop UEMA e UST – Mobilidade Virtual: alunos do Curso de Português e alunos do Curso de Espanhol discutirão tema em ambos os idiomas - Intercâmbio Virtual**. Mediação: Prof.Dr. Walter Canales SantAna (Vice-Reitor da Universidade Estadual do Maranhão).

16h00 - **Cerimônia de Encerramento**: Prof. Dr.Gustavo Pereira Costa (Reitor da UEMA), Prof. Dra. Walter Cannales Sant'Anna (Vice-Reitor da UEMA), Prof. Dr. Thales Passos de Andrade (Superintendente de Relações Internacionais da SRI) e demais convidados.

**16h30 - Workshop com a Universidade Belgrado. Apresentação do Projeto “Public Arts and Public Space”. Profa. Dra. Marluce Wall de Carvalho Venâncio (UEMA).**

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## **INICIAÇÃO CIENTÍFICA**



**20<sup>th</sup> CENTURY MODERN ARCHITECTURE IN SÃO LUÍS: identification, mapping  
and typological analysis of the commercial projects by the architect Carlos Alberto  
Braga Diniz.**

Student's Name: Hilquias de Castro Feitosa da Silva, Architecture and Urbanism,

Research Supervisor: Prof. Dr. Hermes da Fonseca Neto.

## **INTRODUCTION**

The modern movement reached the whole world with its influences, and in Brazil, it started to have more notoriety from 1922, with the event called “Semana de Arte Moderna” (Modern Art Weekend), however it had not yet manifested none modern work, the event brought the ideological bases that would serve as the foundation to the institution of the modern principles in Brazilian architecture, so as the nationalism proposed in the movement.

The origin of the research comes from the desire to comprehend the project methods and methodologies adopted by Braga Diniz, that was capable of develop and apply creative solutions during a period where architecture had stuck methods in construction, this way, it will be possible to understand the real importance of the highlighted architect, such as, his role as a mark to São Luís' modern architecture since 1960, as so the modifications suffered by the projects he made.

## **METHODOLOGY**

The methodology consists in the research of theoretical references, bibliographical research, field research and reunion of the collected data. The elaboration of a theoretical referential based in the authors that do research in modern architecture, such as: Lauro Cavalcanti, Roberto Segre, Yves Bruand, Ruth Verde Zein, Hugo Segawa and David Harvey, that will help in the understanding of the modern architectural language, identified in the works of Braga Diniz.

The descriptive part it's constituted by a illustrated content, by the contextualization of the modern architecture in São Luís, and its more significant examples, giving emphasis to the commercial projects executed by the architect Braga Diniz, in order to register all the architectural collection of the 20<sup>th</sup> century of this architect, allowing to develop the felling of preservation necessity of this patrimony, that has been uncharacterized.

## RESULTS AND DISCUSSION

As previously said, one of the objectives of this work is to search in public agencies the possible original archives that would make reference to the first plans developed by Braga Diniz, due to this desire, it was done a requirement to the Conselho Regional de Engenharia e Agronomia do estado do Maranhão (State of Maranhão Regional Council of Engineering and Agronomy-; CREA – MA), in order to be able to do a Search in the local archives, looking forward to the original plans of Braga Diniz.

After the requirement done and sent, the CREA-MA answered positively, so, in march 30th 2021 was done a technical visit of the researchers together with the research supervisor, guided by a local functionary, complying with all the health protocols proposed by the WHO (World Health Organization), where the researchers went to the CREA archives looking for the original terms and plans.

**Figure 1** – Register of the research in CREA-MA archives.



**Source:** Hermes Fonseca personal archive, 2021.

### **La Ravardiere Hotel (nowaday Green Hotel)**

The Green Hotel, baptized La Ravardiere in the period of the building construction, is a modern hotel situated in São Francisco neighborhood, same region of the Supermercado Bompreço (Bompreço Supermarket) also analyzed in this work. The Green Hotel is implanted in front of the Castelo Branco Avenue, very busy and referenced in the city.

**Figure 2** – Green Hotel facade



**Source:** Author, 2021.

Beginning from the facade it's observable the modern elements characteristics of Braga Diniz, mainly with the use of concrete, not just as a constructive element, but also as a volume and form determinant factor in the building. It's possible to notice a full and empty concept, with the separation of the lobby from the others apartment floors. An element not recognized before, that is recognized here, is the use of curvy shapes in doors and windows frame, also in concrete. It was not noticed the use of any wall coating, only brute concrete, highlighting the different colors in wall paint that complete each other, composing the building facade. At the hotel entrance is notable another element that seems to be a trend in Braga Diniz architecture, a hanging concrete portico, with the hotel logo at it.

As already said, at the beginning, the hotel was called La Ravardiere, and nowadays is called Green Hotel. In a quick interview with one of the hotel functionaries, it was reported that Green Hotel is the third name attributed to the building, having a second name before, nevertheless, in all these periods, the hotel management has been kept the same. It's noticeable some changes, but none of them has big effects, what is possible to observe comparing the old images with the pictures took during the research is that the change of the colors of the building and the identity of the hotel.

## CONCLUSION

It's undeniable the importance of the work of Braga Diniz once his work represents a



remarkable era in world and architecture history. Unfortunately, due to the adverse situations during the research period, mainly because of the pandemic context of corona virus, ad mentioned before, some objectives previously proposed were possible to be developed, such as: interviews, Search in public agency, visits in the buildings, trips, etc. However, what was done in this research, it's just the beginning, not just can, but must be continued, hoping that, in a close future, the better research conditions may contribute to a deeply search of the proposed objectives, and also opening doors to similar researches, that the same way as this one, may find information about other architects that, however in the shadows, helped build the image and history of São Luís.

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**KEYWORDS:** Modern. São Luís. Braga Diniz.



## **ARBUSCULAR MYCORRHIZAL FUNGI ASSOCIATED WITH BRACHIARIA PASTURES AND THE BABASSU PALM**

Natália da Conceição Lima, student of agronomy,  
Christoph Gehring

### **INTRODUCTION**

Large parts of human-transformed Amazonian landscapes are dominated by pastures planted with exotic Brachiaria grass (*Urochloa* spp.) especially with, interspersed with the aggressive native ruderal Babassu palm (*Attalea speciosa* MART). The sustainability of this silvopastoral system (combination of cattle ranching with Babassu nut extractivism) is questionable, due to the very low species diversity. From a scientific viewpoint, this two-species model system allows us to investigate how these two very competitive species interact and if they share microbial symbiotic partners.

This study focuses on arbuscular mycorrhizal fungi (AMF), since both the Babassu palm and Brachiaria grass are strongly associated with AMF. Brachiaria grasses are considered generalist in their mycorrhizal associations and are therefore frequently used as trap plants in mycorrhization studies (COVACEVICH; BERBARA, 2011). The fine roots of the Babassu palm are lignified and with few or absent root hairs, morphological aspects typical for strong mycorrhization (VAN DER HEIJDEN et al., 2015), and confirmed in a study of NOBRE et al. (2018).

### **METHODOLOGY**

Research was conducted in Pirapemas county, central Maranhão State, Brazil. Climate according to the Köppen-classification is wet tropical climate (*Aw*), with an average 1580 mm precipitation concentrated in a 6-month rainy season (INMET, 2021), followed by a distinct dry season. Soils are classified Ultisols, plintic subgroup according to the US soil taxonomy (SANTOS et al., 2018), and are deeply-weathered, acid and nutrient-poor, with likely problems of strong P-fixation and possible Al-toxicity especially in the subsoil.

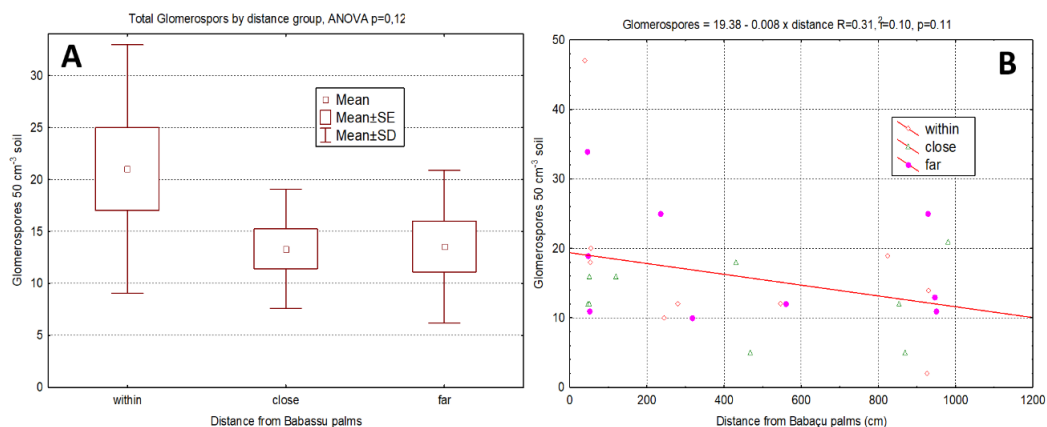
This study investigates Glomerospore abundance and species-composition in 0-10 cm soil of tree monospecific Brachiaria pastures (*U.brizantha* (HOCHST & A.RICH) STAPF cv. ‘marandu’), each with three interspersed ‘islands’ of Babassu palms, and sampling in three distances of these Babassu islands: ‘within-cluster’ (high Babassu dominance) – ‘close’ (at 2,50- 6,0 m distance from the adult palm, the confrontation-zone – ‘far’ (at >8,0-10,00 m

distance from the adult palm, high *Brachiaria* dominance. Glomerospores were extracted from 50 g of soil by the wet sieving method (GERDEMANN; NICOLSON, 1963), centrifuged in water and sucrose solution (JENKINS, 1964). Propagules were counted with the aid of a channel plate and stereoscopic microscope and separated by color and size. Microscope slides were mounted with PVLG (polyvinyl alcohol and lactoglycerol) and PVLG + Melzer's reagent and identified according to Schenck and Pérez (1990) and other pertinent literature. Glomerospore species were functionally classified into r and k strategists. Data were checked for normality of distribution prior to parametric correlations or ANOVAs.

## RESULTS AND DISCUSSION

Figure 1 shows the impact of distance from Babassu clusters / the relative dominance gradient between Babassu and *Brachiaria* on total Glomerospore density. Glomerospore density tended (ANOVA  $p=0.12$ ) to be higher within clusters than at close or far distance (A), and tended ( $p=0.11$ ) to decline with increasing distance from the Babassu palms (B).

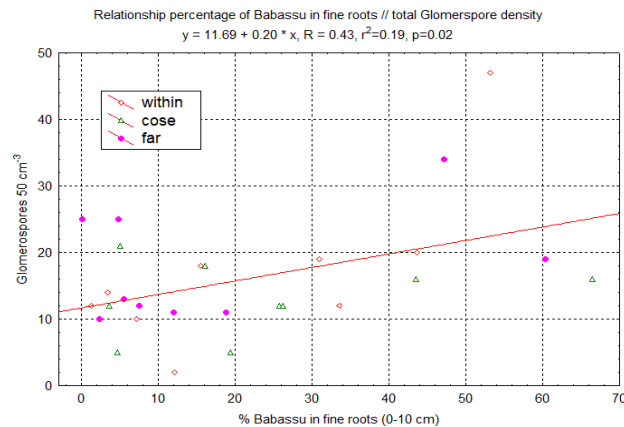
**Figure 1 - Impact of distance from Babassu clusters**



**A** Total Glomerospore density in 50 cm<sup>3</sup> of soil (0-10 cm) in sampled within Babassu clusters, and at distances 'close' (2.5 – 4 m) and far (> 10 m) from these clusters (means, standard error, standard deviation). **B** Impact of the metric distance from Babassu clusters on total Glomerospore density.

Figure 2 depicts a positive relationship between the percentage of Babassu in 0-10 cm fine roots and total Glomerospore density.

**Figure 2** - Percentage of Babassu in 0-10 cm fine roots and total Glomerospore density



Impact of Babassu share in fine roots (obtained in another study on the same sampling points: Pageu et al., in preparation) on total Glomerospore density.

The higher Glomerospore density closer to Babassu clusters and with a higher Babassu dominance in fine roots suggest that the mycorrhizal association of the Babassu palm is even stronger than that of (the C4) *Brachiaria* grass. A likely explanation for this finding is in the larger leaf area and higher carbon-gain of the Babassu palms, providing it with superior carbon-allocation capacity for arbuscular mycorrhizal associations. Our findings are in line with a previous study of Nobre et al (2018), likewise reporting on high Glomerospore density close to Babassu palms.

We identified all 476 Glomerospores to the species or morphospecies-level. Glomerospore species composition in the three study sites. 83.2% of all Glomerospores and ten of the 23 Glomerospore species were of the genus *Glomus*, followed by *Acaulospora* (6.1% of abundance, 7 species), all other 5 Glomerospore genera (six species) together combined the remaining 10.7% of Glomerospore abundance. Glomerospores were strongly dominated by two *Glomus* species: *G. glomeratum* (50.0% of all Glomerospores) and *G. macrocarpum* (27.3% of all Glomerospores, the may be related to the strategy used, since some *Glomus* species have already been indicated as r-strategists (SÝKOROVÁ et al., 2007), also to the larger number of species described for these genera and the dissemination and adaptability of these species (DANIELL et al, 2001).

We furthermore functionally classified Glomerospore species as predominating the k/r strategists: 95.2% of all Glomerospores were classified as r-strategists (3.6% not classified, and only 1.2% as k-strategists: *Orbispora pernambucana*). This strongly reflects the ruderal environment of *Brachiaria* pastures containing many juvenile (stemless) Babassu palms.



Our results partially confirm and partially contradict a previous study of Nobre et al. (2018) in which the density of Glomerospores and root colonization of *Brachiaria* as a 'trap plant' were strongly affected by Babassu dominance, pointing to a high level of mycorrhizal association of this ruderal palm. However, contrary to the findings of Nobre et al (2018) also reporting on a significant increase in Glomerospore species richness and altered taxonomic composition in Babassu-dominated areas, this study failed to detect significant differences with distance from Babassu clusters in specific Glomerospore species or species-groups. This suggests that the Babassu palm and *Brachiaria* grass share common mycorrhizal partners, without significant niche segregation in their mycorrhizal associations. Our results combine interestingly with the results of a second study on the same study sites on a second key aspect of Babassu-*Brachiaria* competition, their vertical root profiles (Pageu et al., 2021 in preparation). That study found very weak vertical niche partitioning between the fine roots of Babassu and *Brachiaria*, and no evidence of niche expansion between the two under competitive pressure of the other. The combination of common vertical fine root profiles and common mycorrhizal networks suggest that both species are direct competitors. Thus, overyielding may not be expected in the silvopastoral system of *Brachiaria* pastures infested with Babassu palms which dominates large parts of deforested Amazonia.

## CONCLUSIONS

The higher total Glomerospore density associated with Babassu suggests that Babassu can invest stronger in mycorrhizal associations than *Brachiaria*, possibly a decisive trait capable of counter-balancing the superior fine root density of *Brachiaria* grass within a 'dynamic equilibrium' of competition. The lacking differences in Glomerospore taxonomic composition suggests that the Babassu palm and *Brachiaria* grass share common mycorrhizal fungal partners in their efforts to explore sufficient water and nutrients from degraded pastures. This is indicative of an absence of niche partitioning between these two strong competitors and thus low ecological efficiency of Babassu-*Brachiaria* silvopastoral systems predominating throughout wide areas of deforested Amazonia.

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**KEYWORDS:** Amazonia; Symbiosis; Endophytics, Glomerospores.



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## CAZUZA'S MEMORIES: childhood and school<sup>1</sup>

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### INTRODUCTION

Viriato Corrêa was one of the most prolific intellectuals of his time, he was born in Pirapemas - MA, and made it one of the main scenarios in his most exponential novel: *Cazuza* (1938). Corrêa highlighted children in his work and helped children's literature to achieve its space in the Brazilian literary scene, where it was not very accepted (LAJOLO and ZILBERMAN, 2007). In this perspective, this research studied the author's literary production, especially *Cazuza*, analyzing ideas, historical context and literary resources to verify in the memorialistic records of the work how the relationship between the protagonist's childhood and his experiences at school took place, and the possible consequences of this interaction for the formation of the infant. Such analysis made it clear that each experience that *Cazuza* had at school contributed in some way for him to evolve socially and intellectually, expanding the limits of his understanding of the world around him. The research also intended to further publicize the author's literary production.

### METHODOLOGY

The methodology of the work was bibliographical and documentary in nature, divided into some stages, namely: the first consisted of readings about the life and work of the writer from Maranhão, Viriato Corrêa, such as the text *Children's Literature, History and Education: A Study of Work Cazuza, by Viriato Corrêa* (PENTEADO, 2001), in addition to the theoretical support necessary to support the research, related to Children's Literature, childhood, school and memory, such as *The childhood we invented and the schools of yesterday and today* (LAJONQUIÈRE, 2003), *The collective memory* (HALBWACHS, 1990), among others. The next steps consisted, respectively, of research in virtual libraries at UEMA; reading of some works by Viriato Corrêa; reading and analysis of *Cazuza* observing information relevant to the

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<sup>1</sup> (PIBIC/CNPq).



research; production of articles with the theme of this project for publication in journals in the area.

## RESULTS AND DISCUSSION

From the reading and analysis of the work of children's literature entitled *Cazuza*, by the writer from Maranhão Viriato Corrêa, it was possible to identify three essential moments of the main character's childhood related to the school environment, which contributed a lot to his human and institutional formation, although not all of them they can be considered pleasant. These moments relate to the schools that the Infante attended until graduating from primary school, in three different locations: the small village of Pirapemas, the village of Coroatá and the city of São Luís.

Pirapemas, the first place where *Cazuza* lived and, therefore, the place where the boy had his first contact with the school, was only a village and, as such, the school was present there as the only environment with characteristics of civilization. , since there was no church, pharmacy, or any other establishment of the type there (CORRÊA, 2002, p. 16). The school assumed, therefore, a “salvationist” character, as one that would be able to elevate the subject's social position and assert his citizenship through learning to read and write (BARBOSA, 2007). It became, moreover, one of the first places through which children would have contact with society and could carry out their childhood properly and become “civilized” (VEIGA, 2004). This characteristic is evident when *Cazuza* leaves his baby dresses to adopt the “boy panties” and then have the chance to start his school life, starting a more mature phase of life (CORRÊA, 2002, p. 15).

This first experience, however, was not the best, as the boy was faced with the traditional teaching model, which used physical and psychological punishment as a form of discipline (ARIÈS, 1981). These were pedagogical practices adopted by the traditional school, targeted by Corrêa's criticism throughout the work for eliminating any autonomy on the part of children in the course of their own learning, and moving them away from the true objective of teaching, which should be greater social integration.

This scenario changes a lot when *Cazuza* moves to the village of Coroatá and finds a different school there, with teachers from the capital, where they learned “to teach children” (CORRÊA, 2002, p. 76-77). In the boy's children's speeches, it is possible to perceive an



important theme that the work brings to light, namely: the need for teacher education, a current theme at the time. It is understood, therefore, that the new teachers teach better, because they sought and obtained training in the teaching of the Escola Normal (PENTEADO, 2001). Cazuzza compares his present, with the past experience, letting it appear whenever he notices something different in the new school, in a memory exercise, in which the past comes to the fore mixing with immediate perceptions (BOSI, 1994). The boy then finally begins a process of adaptation to the teaching environment, motivated by the preparation of teachers to exercise the profession.

The next phase in the boy's life, therefore, will have to compete with the good memories he built up in his time in the village, a starting point he will use to judge his new experiences at the São Luís boarding school, Colégio Timbira. With new perspectives in front of him, Cazuzza still searches within himself for images of his old life to adapt to the current one, letting his personal memory mix with the collective one at the time he performs this exercise (HALBWACHS, 1990). That's why, in boarding school, the infant experiences first the excitement for the new, and second, the belated homesickness caused by the estrangement that this new thing caused. There, the boy has contact with a more advanced education system, with different teachers for each subject, which leaves him confused at first, but which he eventually gets used to.

He finds a teacher with methods very similar to those of the village teachers, showing once again a differentiated formation. Professor João Cânciao, in addition, taught from the patriotic and nationalist thought spread in Brazil during the Estado Novo period (1930s). It is there that the infant completes Primary Education, and starts to be considered a “little man”, since it was supposed that the school was responsible for the maturation process that the boy went through. Thus, the city school represented the end of a cycle in the life of the boy Cazuzza.

## CONCLUSION

Through the protagonist's memories, the reader is transported to his childhood and invited to delve into his experiences, in addition to following his growth and learning. These experiences allowed the boy to expand his view of the school, as he could compare the practices adopted in one, in parallel with the others, and add to his daily life the lessons he had collected over time. The analysis of the work allowed a closer knowledge of the functioning of education systems between the end of the 19th century and the beginning of the 20th century, in addition



to making it clear that the relationship established between childhood and school is old and, therefore, permeated by several discussions of a historical, social and institutional nature that range from the evolution of childhood notions, through the development of education systems to teacher training, important topics to this day.

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**KEYWORDS:** School. Childhood. Memory.



## CONCRETE PRODUCTION USING STONE DUST REPLACING NATURAL SAND

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### INTRODUCTION

Concrete structures are currently the most used in Civil Construction, with natural sand being the main source of fine aggregates for its production. Knowing that its consumption, as one of the main components of concrete, has generated extreme environmental degradation due to the indiscriminate extraction of this material and that there is indispensability in the reuse of waste from the quarries, one of the alternatives is the partial or total replacement of natural aggregates.

Therefore, there is a need to study the feasibility of replacing sand with gravel dust for making concrete, seeking to reduce the problems associated with the extraction of natural sand and the disposal of waste generated in the crushing process. The main objective of this work is to evaluate the technical and economic feasibility of replacing natural sand with stone dust for the manufacture of simple concrete, in the proportions of 0%, 50%, 75%, and 100% of gravel dust. The specific objectives of this work are:

- Characterize the granulometry of the gravel dust;
- Evaluate the consistency of the mixes through the Slump Test;
- Evaluate the axial compressive resistance of the concrete at 7, 14 and 28 days;
- Analyze the economic feasibility of each concrete mix.

### METHODOLOGY

First, it was defined that 48 cylindrical concrete specimens would be molded with 4 lines in the proportions of 0%, 50%, 75%, and 100% of gravel dust with a design resistance of 20Mpa, as it is the most used resistance for the execution of concrete structures in general. Then, there was a bibliographic review, which is a broad study of publications by renowned authors and institutions of civil construction materials and dissertations on the topic addressed.



Subsequently, the First Testing Program was carried out, which consisted of several tests in accordance with the appropriate ABNT standards, with the aim of characterizing the main materials involved: sand, stone, cement, and gravel dust. The gravel dust and gravel used in this study come from the Bacabeira – MA quarry, supplied by Brasil Mineração, the sand comes from Rosário – MA and the cement used was "BRAVO CP IV-32 RS". In this sense, this test plan included the quartering of materials, Granulometry test of aggregates, and Specific Mass of all materials involved.

The data obtained in the First Test Program were applied to the dosage of concrete mixtures in the appropriate proportions of each mix. Then, the Second Testing Program was carried out with the objective of analyzing concrete qualities, such as consistency, workability, resistance, and water absorption capacity. This plan included the Slump Test, Water Absorption, and Simple Compression Resistance Tests.

## **RESULTS AND DISCUSSION**

Through the analysis and comparison of the granulometric curves of natural sand with that of gravel powder, it was possible to see that these materials had practically equal percentages in the coarse (4.75mm) and fine (0.15mm) portions, differing very sharply in the medium portions (between 1.18 and 0.6mm). In addition, the maximum characteristic diameters obtained for both natural sand and gravel dust were equal (4.75mm), which means that they are well-graded materials and they can be used well in concrete by promoting better workability of the mixture.

Table 01 shows the average axial compressive resistance values achieved by the specimens at 7, 14, and 28 days in Mpa, as well as the replacement content for each mix. As can be seen, all the lines with replacement of natural sand by stone dust had high resistance; however, the most outstanding feature was the one that had replaced 50% of natural sand with gravel dust.



**Table 01.** Average compressive resistances per mix at 7, 14 and 28

COMPRESSION RESISTANCE				
	REPLACEMENT PERCENTAGE	AVERAGE RESISTANCE AT 7 DAYS (Mpa)	AVERAGE RESISTANCE AT 14 DAYS (Mpa)	AVERAGE RESISTANCE AT 21 DAYS (Mpa)
1	0%	19,326	25,505	26,634
2	50%	18,070	19,550	24,315
3	75%	12,985	13,973	18,639
4	100%	12,596	15,409	18,12

days.

Source: Author of the Work, 2021.

In addition, the specimen rupture test revealed that as the percentage of gravel dust as fine aggregate increases, the compressive resistance decreases. This was because a greater amount of water was required to obtain slumps within the pre-determined range, and the greater the water/cement factor, the lower the concrete strength. Although the mixes with 75% and 100% replacement of natural sand by gravel dust have reached average compressive resistance values slightly below the expected design strength, they can still be applied in other different ways in the civil construction such as subfloors and floors where there are no high loads, road channels and sidewalk guides.

From the analysis of the results of the water absorption test, we notice that as the percentage of gravel dust increases in the final amount of fine aggregates in the mixture, the average water absorption in the specimen also increases, since the fact that the stone gravel has a higher content of fines, so there is a need for a greater amount of water.

## CONCLUSION

In general, all the steps performed had satisfactory results, proving that the partial replacement has technical feasibility, so the conclusions presented are as follows:

- The gravel dust studied had good physical characteristics for its use as a fine aggregate in the manufacture of simple concrete;
- The higher the percentage of replacement of sand by gravel dust, the greater the amount of water to obtain the slump in the determined range;
- As the percentage of stone dust increased, there was a reduction in compressive



resistance, as a greater amount of water was required to obtain better workability, as well as an increase in the average water absorption of the concrete;

- The use of gravel dust increases the production cost of concrete, however, the primary advantage of this material in the mixture is associated with the reduction of environmental impacts.

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**KEYWORDS:** Concrete. Gravel. Dust. Resistance. Replacement.



## **EFFECTIVENESS OF CELL BLOCK IN LYMPHONODE ASPIRATES FOR DIAGNOSIS OF CANINE VISCERAL LEISHMANIASIS**

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### **INTRODUCTION**

Canine Visceral Leishmaniasis (CVL) is a multisystemic zoonosis caused by protozoa of the *Leishmania* genus. (SALES, 2017). The effective diagnosis of infected dogs is of paramount importance for the decision of clinical measures to be adopted (BARBOSA, 2010). Animals positive for CVL usually have reactive lymph nodes, this is due to the predominance of macrophages and plasma cells (MOREIRA, 2010).

Cytological exams, in turn, allow direct assessment of the agent in the cellular environment. Among techniques, cytological smears and cell block stand out. This technique has been used for the diagnosis of neoplasms (FERNANDES, 2016). Despite its wide applicability, the cell block technique is little studied for the diagnosis of CVL, which reduces consistent assessments regarding its sensitivity, compared to other existing diagnostic techniques (MENEZES, 2016).

Thus, the objective of the present work is to evaluate the sensitivity of the cell block technique in the diagnosis of CVL in naturally infected animals.

### **METHODOLOGY**

The project was approved by the Ethics and Animal Experimentation Committee (CEEAA) of UEMA, under protocol No. 17/2020. The animals used in the research were from the UEMA Veterinary Hospital. Sample processing and analysis were performed at the Laboratory of Anatomopathology. Fifteen animals naturally infected with *Leishmania* spp., with confirmed serological diagnosis, were selected for the experiment and destined for euthanasia. The tutors of the animals included in the study were informed about the objective of the work and signed a free and informed consent form (FICF), authorizing the participation and donation of the animal's body for the study. The collection of material for testing was performed immediately after euthanasia and necropsy.

Fine needle aspiration puncture (FNAB) of the popliteal lymph nodes was performed, and then the smear was made on glass slides, fixed, and stained in rapid Panopticon



(FURTADO, 2011). The material from the cell block and lymph node fragments were embedded in paraffin and the 5 $\mu$ m histological sections were stained with hematoxylin and eosin (HE) and Giemsa and analyzed under an optical microscope. The cell block sections were submitted to the immunohistochemistry technique, the result was classified as positive or negative, considering the existence of immunoreaction (MENEZES, 2016). The experimental research was qualitative, and the categorical variables are parametric and were compared and analyzed using the Kruskal-Wallis test.

## RESULTS AND DISCUSSION

Of the 15 samples collected, (13/15) were positive in one of the techniques used to diagnose *Leishmania* spp. Immunohistochemistry was the technique with the best results 86.6% (13/15), followed by cytology 66.6% (10/15), cell block with 33.3% (5/15), and histopathological examination with 13.3% (2/15).

Data analysis of the parametric categorical variables through the sensitivity of the techniques ( $p < .001$ ) indicated that there was evidence of a statistically significant difference. Comparing the number of positives in the techniques used and the number of samples used, a higher quality statistical significance was demonstrated in terms of immunohistochemistry associated with cell block than in the lymph node histology group (Kruskal-Wallis test:  $W = 5.58$ ;  $p\text{-value} < .001$ ). The comparison between the predominant groups of lymph node cytology and cell block immunohistochemistry, using the Kruskal-Wallis test, did not show a significant difference ( $p = 0.580$ ), both with corresponding efficacy. The technique under test, cell block of lymph nodes in HE, together with lymph node histology did not demonstrate a statistically significant difference ( $p = 0.580$ ), that is, the two obtained equivalent results.



**Figure 1.** Evaluation of the sensitivity of the techniques using the Kruskal-Wallis test in Jamovi 2.0 software. The results expressed as mean p value less than or equal to the significance level of 0.05 indicate a significant difference.

#### One-Way ANOVA (Non-parametric)

Kruskal-Wallis			
	$\chi^2$	df	p
C	19.1	3	< .001

#### Dwass-Steel-Critchlow-Fligner pairwise comparisons

Pairwise comparisons - C			
		W	p
CITOINCLUSÃO DE LINFONODO (HE)	CITOLOGIA DE LINFONODO	2.54	0.276
CITOINCLUSÃO DE LINFONODO (HE)	HISTOLOGIA DE LINFONODO (HE)	-1.80	0.580
CITOINCLUSÃO DE LINFONODO (HE)	IMUNOHISTOQUÍMICA	-4.15	0.018
CITOLOGIA DE LINFONODO	HISTOLOGIA DE LINFONODO (HE)	-4.15	0.018
CITOLOGIA DE LINFONODO	IMUNOHISTOQUÍMICA	1.80	0.580
HISTOLOGIA DE LINFONODO (HE)	IMUNOHISTOQUÍMICA	5.58	< .001

Source: Author, 2021.

Software Frame Subtitled : Lymphnodes Cell block (Citoinclusão de Linfonodos), Lymphnodes Cytology (Citologia de Linfonodo), Lymphnodes Histological (Histologia de Linfonodos), Immunohistochemistry (Imunohistoquímica)

For CB processing, no investment in specific devices is necessary, since its processing is the same as for IHC, which is routine in pathology laboratories. The sample required for CB processing requires a minimal amount, representing an advantage, another advantage is linked to the possibility of performing retests with the material preserved in paraffin (CAIRES, 2018). Regarding the cell block, observed that only five samples had amastigote forms, however, it is noteworthy that the quality of the samples was not very good when the material was stained with hematoxylin and eosin because it had a lot of formalin pigments, a very common artifact in histological preparations, may hinder the visualization of amastigote forms, as reported by (ANATPAT, 2006) in histological samples. As a result, we proceeded with Giemsa staining, which allowed us to obtain better quality slides and a more accurate diagnosis. That is why we prefer to Standardize the staining technique in Giemsa instead of HE.

Cell block is an accessible, fast, low-cost, and highly sensitive method for cytomorphological diagnosis as described (SILVEIRA et al., 2017) for diagnosing various pathological changes. However, the sensitivity for diagnosing leishmaniasis was not satisfactory. On the other hand, when the immunohistochemistry (IHC) of the cell block samples was performed, the best result was obtained among the other techniques used, being the one with the highest sensitivity. CB-associated immunohistochemistry is a method that has been shown to be sensitive and specific, as proven (MENEZES *et al.*, 2013), so it can increase the accuracy of the diagnosis. The combination of an accurate diagnostic method, such as IHC,



and a technique that allows large-scale field studies is highly desirable to improve the investigation of *Leishmania* spp. infection in dogs, especially in endemic regions such as São Luís. (MENEZES *et al.* , 2016; SALES, *et al.* , 2017). Despite being an invasive procedure, the diagnosis of CVL through the demonstration of the parasite in samples from aspirates or biopsies, is still considered the gold standard due to its high specificity. Visualizing the parasite leaves no doubt about the infection, however, in addition to being a laborious and slow method, it requires routine training and practice of the team in the laboratory (MOREIRA, 2010).

With the growing number of cases of leishmaniasis in Maranhão, as we continue to lack public policies for the endemic control of the disease, and the population is still not concerned with prophylactic measures, a quick diagnosis is needed for this disease, in view of the importance for a better treatment and prognosis of the animal, with this objective is to find better ways for this quick diagnosis, through exams for this effect. As a result of the Covid-19 pandemic, the number of cases and the demand for the Veterinary Hospital of the State University of Maranhão decreased, as the technique used required necropsy animals, we managed to obtain few samples.

## CONCLUSION

The definitive diagnosis of leishmaniasis must be based on the association of several diagnostic techniques. Parasitological diagnosis is a simple, quick and inexpensive method that can be routinely used by veterinarians. However, the animal's immune status and the stage of the disease can interfere with the parasite load, making it difficult to find amastigotes. The use of cell block (CB) associated with immunohistochemistry is a valid technique to aid in the diagnosis, showing high sensitivity and specificity. The CB can be implemented in the diagnostic routine, offering prognostic information, and improving the definitive diagnosis. The cellblock has not been shown to be suitable for rapid identification and parasitological quantification in CVL. Aspiration cytology was the best technique for microscopic detection of the parasite, determining the level of parasite intensity in the tissue studied, with more agility and practicality.

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**KEYWORDS:** Canine Visceral Leishmaniasis. Parasitological examination. CytoBlock.



## INVESTIGATION OF THE EFFICIENCY OF COMPUTATIONAL METHODS USING MULTIVARIATE STATISTICAL TECHNIQUE

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### INTRODUCTION

Molecular optical properties of molecules have been a subject of continuous interest to experimental and theoretical researchers (CASTRO et al, 2017). The importance of the theoretical computation of the molecular properties resulted from the fact that molecular electrical properties are difficult to measure (ANASTASOPOULOU, 2017). Currently, computational implementations for calculating electronic and Raman molecular properties are quite frequent in quantum chemistry packages, where this property is obtained through ab initio methods or Density Functional Theory. Electronic correlation is considered to be very important for the calculation of the Raman property, requiring more sophisticated methods to obtain a quantitative agreement with experimental data (WILKINS et al, 2019).

The present work aimed to apply the Effective core potential (ECP) (pSBKJC and pStuttgart) methodology developed by Vazquez and Vidal (2009), to evaluate its performance in the computation of molecular properties, i.e, electronic excitation energies, for a set of small poly-atomic molecules using the ab initio (LR-CCSD) and DFT methods. The efficiency and accuracy of the computational methodologies were investigated and diagnosed by using multivariate statistical method of principal component analysis (PCA).

### METHODOLOGY

In this work the methodologies for calculating the vertical excitation energies of the gas phase molecules were developed for a series of small polyatomic molecules, using the ab initio method (CCSD) and the Density Functional Theory (DFT) (PBE0, LB94 and CAMB3LYP) with the base set pSBKJC and pStuttgart ECP. The data was transformed into an input matrix to diagnose and investigate the efficiency of the proposed methodology using Principal component Analysis (PCA). The multivariate statistical analysis was performed using the Statistic program version 8.0.

## RESULTS AND DISCUSSION

A set of 6 lowest excitation energies were applied in the explanatory analysis of the data. The eigenvalues and variability in the principal components collected for the complete dataset almost 30 cases using the 12 computational methods.

In a principal component analysis, the grouping of samples defines the data structure through scores and loading graphs, whose axes are the main components where the data is projected. The loading-coefficients analysis of principal components explores the importance of variables and investigates their efficiencies, based on correlations between molecular property of interest (YOUCAI et.al, 2017). When analyzing the data set consisting of the molecular property, all computational methods show positive contributions except for the LB94/Sadlej-pVTZ method which represents a higher diversion characteristic compared to others as can be seen in Figure 1a.

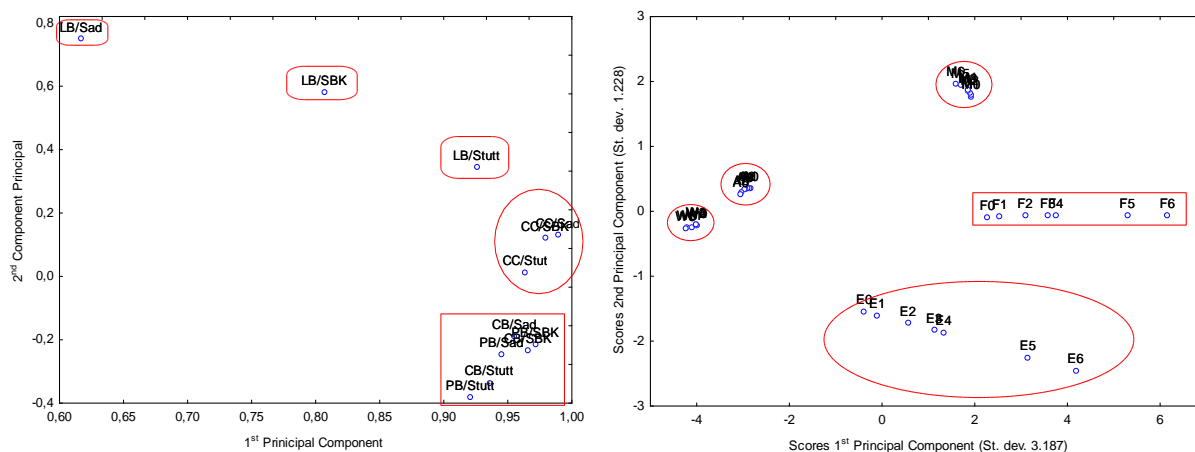


Figure 1- a) Loadings coefficient between Principal Components 1 and 2; b) scores plot between PC1 and PC2 for Electronic excitation energies (Source: The author, 2021)

The scores are the projections of the excitation energies for each computational method along the PC line. Figure 1b of the PC1-PC2 score of the dataset expresses the distribution and classification of the molecular properties, successfully. Where, it managed to explore and segregate the excitation energies in five types of cluster groups, belonging to the molecules of interests (i.e. water (W), methane (M), formaldehyde (F), ethyne (E) and ammonia (A) etc),



based on the orientation of PC2 over PC1, representing a total of 97.23% of the variance, as can be seen in the Table 1.

**Table 1** – Total variance and Eigenvalues details of the main components

Principal Components	Eigenvalues	% Total Variance	Cumulative Eigenvalues	% Total Cumulative Variance
1	10,16	84,66	10,16	84,66
2	1,51	12,57	11,67	97,23
3	0,30	2,51	11,97	99,74
4	0,02	0,18	11,99	99,92
5	0,01	0,07	12,00	99,98

Source: author, 2021.

In general, in principal component analysis, the first two or three PCs that accumulate a relatively high percentage of variation explain the greater variability present among the analyzed variables. Taking in to consideration the concept, in the present work the first three principal components (PCs) were the most significant components, representing 99.74% of the computed electronic excitation energies of total variance (i. e., PC1: 84.66%, PC2: 12.57%, PC3: 2.57%) for the complete data set.

## CONCLUSION

With the proposed PCA analysis, it was possible to identify, and successfully classify the applied computational methods based on their molecular properties During the analysis, LB94 TDDFT computational method was diagnosed with discrepancy in the results which was successfully segregated by our proposed PCA technique. A very consistent and correlated similarities in the excitation energies have been found for the PBE0 and CAMB3LYP TDDFT methods within ab initio accuracy.

Thus, the present study successfully demonstrated the application of the PCA as a robust statistical method to evaluated and diagnosed the efficiencies of the computational methods.



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**KEYWORDS:** Electronic Excitation energies Computation, TDDFT, PCA. Multivariate analysis



## **INTUMESCENT COATING VERSUS PROJECTED MORTAR: PERFORMANCE AND FEASIBILITY ANALYSIS IN STEEL STRUCTURES**

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Clodoaldo Cesar Malheiros Ferreira

### **INTRODUCTION**

When steel is subjected to high temperatures, its physical and chemical properties deteriorate, which causes a reduction in its stiffness and resistance (MARTINS, 2000, p.18), generating a decrease in the yield strength and modulus of elasticity, in addition to the appearance of additional deformations due to the expansion of the material. Therefore, it is important to understand more about passive fire protection and thermal protection materials that can coat steel structures, ensuring that the Required Time of Fire Resistance (TRRF) recommended in the standard is reached, providing adequate safety for the building.

The general objective of the research is to verify the performance of intumescent coating and projected mortar as thermal coatings on steel profiles under compression and fire action, in addition to analyzing the economic feasibility of applying them based on the current fire protection market. Regarding the specific objectives, the research aims to observe the reaction of passive protections in contact with fire, and also to compare the performance of profiles without passive protection under reduced fire action with profiles coated with thermal protection materials under prolonged fire action.

### **METHODOLOGY**

In the tests, 18 steel profiles were used, 6 for each type of classification (Angles, Joists and Channels), all 25 cm long, with welded plates at their ends to ensure more uniform compression. First, the surface treatment and cleaning of the parts was carried out (both manual and mechanized) so that the thermal coating could be applied properly. After that, the measurement of the profiles was carried out in order to calculate their resistance and geometric properties. 12 of the 18 steel specimens were sent to two companies (CKC DO BRASIL and PCF SOLUÇÕES EM ENGENHARIA) in the state of São Paulo, where each was responsible for applying a type of passive fire protection.

The experiments were carried out at the Concrete and Construction Materials Laboratory - UEMA, being divided into 3 stages: First, 6 uncoated profiles were pre-heated for 30 seconds

with a butane-based blowtorch, and soon after they were subjected to compression by the laboratory press, where the temperatures reached (using HIKKARI HT-550 industrial thermometer and type K thermocouple) resistant loads and test time intervals were measured. After that, the 6 profiles with Audax Renitherm PMA 600 HD intumescent coating underwent the same tests and measurements, however, the pre-heating lasted 10 and 15 minutes, each time using the 3 classifications of steel profiles. The last 6 profiles, related to projected mortar from the Cafco 300 brand, had the same paint test method. Finally, the results of the resistant loads of the profiles were compared, in addition to the economic feasibility of applying these products, due to their costs and productivity.

## RESULTS AND DISCUSSION

The tests performed on the profiles without passive protection had the purpose of serving as a comparison parameter for the tests of the specimens with the coatings, since their pre-heating was 30 seconds, in other words, the profiles didn't reach temperatures that would reduce their stiffness and resistance, which are around 400°C for laminated and 200°C for cold formed (PIERIN, 2011, p.124), thus simulating the effects of a fire in its initial stage (ignition), which would still maintain the stability of the building.

In all profiles, the readings taken by the industrial thermometer refer to the face in direct contact with the flames, and those taken by the thermocouple refer to the opposite face to the flame in the profiles, consequently reaching lower values. For all tests in this stage, the rupture of the profile due to the compression applied by the hydraulic press was the final cause of the test.

**Table 1** - Test results on uncoated profiles

Profiles	Angle 1	Angle 2	Joist 1	Joist 2	Channel 1	Channel 2
Maximum temp. by thermometer (°C)	191.38	147.01	233.1	235.6	244.5	135.4
Maximum temp. by thermocouple (°C)	104.42	66.32	68.8	109.88	60.46	107.82
Test duration (seconds)	60	90	120	120	60	50
Test load (tons)	18.99	19.03	49.43	47.79	13.02	14.61
Load average	19.01		48.61		13.82	

Source: Author, 2021

The tests referring to profiles coated with the intumescent coating occurred, as mentioned above, with approximately 20 times longer flame application compared to profiles

without passive protection, which generated the expectation of reaching much higher temperatures, which would greatly alter the strength and rigidity of the material if there was no painting. Different Wet Film Thicknesses (WFT) and Dry Film Thicknesses (DFT) were applied to the profiles, to reach the TRRF of 30 and 60 minutes, where for profiles with 30 minutes of protection, 10 minutes of pre-heating were applied, and for profiles with 60 minutes of protection, 15 minutes of flames were applied before the press was activated.

**Table 2** - Test results on profiles with intumescent coating

Profiles	Angle 1	Angle 2	Joist 1	Joist 2	Channel 1	Channel 2
Wet Film Thickness ( $\mu\text{m}$ )	240	570	250	660	400	800
Dry Film Thickness (mm)	0.173	0.415	0.181	0.477	X	X
TRRF for the thickness (minutes)	30	60	30	60	30	60
Preheating (seconds)	600	900	600	900	600	900
Maximum temp. by thermometer ( $^{\circ}\text{C}$ )	550	550	550	550	550	550
Maximum temp. by thermocouple ( $^{\circ}\text{C}$ )	164.75	135.72	160.22	131.39	149.93	121.82
Test duration (seconds)	660	918	660	940	612	930
Test load (tons)	18.13	15.57	59.3	43.88	14.11	13.93

Source: Author, 2021

It is observed that the maximum temperatures indicated by the thermometer were at  $550^{\circ}\text{C}$ , since this is the highest reading that the equipment reaches. However, most of these values were reached around 420 seconds of the experiment, and it can be concluded that higher temperatures may have been reached, since the profiles were heated for a longer time. Even so, when making the ratio between the resistant load of the painted profile in relation to the average of the resistant loads of the uncoated profiles, it is observed that the lowest value is the test load of the angle 2 (155,7 KN), which is equivalent to 81.90% of the average load of unprotected angles (190,01 KN), which is an acceptable value, depending on the amount of fire applied to the profiles with the paint, where the material guaranteed the protection of the parts.

For the tests of the projected mortar, the same methodology of pre-heating and measurement of the profiles with the intumescent paint was used, with 3 specimens pre-heated for 10 minutes and the other 3 for 15 minutes, after which the hydraulic press was activated. The applied thicknesses followed the recommendations of the manufacturer's manual, in order to guarantee the 240-minute TRRF

**Table 3** - Test results on profiles with projected mortar

Profiles	Angle 1	Angle 2	Joist 1	Joist 2	Channel 1	Channel 2
Preheating (seconds)	600	900	600	900	600	900
Maximum temp. by thermometer (°C)	550	550	550	550	550	550
Maximum temp. by thermocouple (°C)	42.96	40.59	32.77	31.33	52.02	45.02
Test duration (seconds)	622	915	616	972	611	912
Test load (tons)	19.06	18.98	41.36	50.02	14.77	14.65

Source: Author, 2021

It is noticed that the temperatures also reached 550°C, which again would change the properties of the steel if there was no coating, where the projected mortar ensured that the smallest load reduction in relation to parts with and without this material occurred in the Joist 1 (413,6 KN), which is equivalent to 85,09% of the average load of profiles of the same type, but without protection (486,1 KN), being an acceptable value for the temperatures reached.

Finally, the economic feasibility analysis summarized the cost of the main inputs used for the application of the two passive protections, so that an overview of the prices of these materials in the current market could be obtained. For the intumescent coating, the paint used in the experiment was budgeted (25 kg can) and the anti-corrosive Hammerite primer (2,4 l can) was also used, in addition to the average prices found for the main modes of application: Brush, lamb's wool roller and airless spray. For the projected mortar, the material used in the experiment was also budgeted (20 kg bag) and the main application method, which is the mortar projector.

It is observed that the most affordable budget for the paint was the one that used the brush (1745,33 reais), while the budget for the mortar and the projector was 536,33 reais, a much lower value, which was already expected by the market overview. However, this analysis must be done with care, as several factors can change these prices (compressor rental, applied thickness), so the engineer must know how to reconcile the use of both protections.

## CONCLUSION

It can be concluded that even with the interference of some variables (heat source, temperature meters, cure time), the final comparison was successfully verified, since the lowest load ratios in the profiles with and without coating were of 81,90% for paint (angle 2) and



85,09% for mortar (joist 1), which proves how effective thermal protection materials are in preventing fires in steel structures. The financial feasibility analysis was carried out and found that the price of mortar is actually lower compared to paint, however, this study must be in-depth and the other variables, such as thickness used and application method, must be considered in the final budget.

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**KEYWORDS:** Intumescent Coating. Passive Fire Protection. Projected Mortar.



## **SUSTAINABILITY STUDY IN THE PRODUCTION OF BIODIESEL FROM THE USED COOKING OILS**

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### **INTRODUCTION**

With the emergence of numerous environmental challenges, several countries have expressed a great desire to develop technologies and methods that would benefit the sustainability of life on planet earth. The reuse of materials decreases not just waste, but it also reduces the use of raw materials in the manufacturing of new products (BARBOSA et al., 2011). Because of the society's reliance on ready-to-eat foods and, in most cases, quick preparations on a regular basis, increases the amount of waste productions in the environment. Keep in mind that the majority of the components in these recipes are fried foods.

On the other hand, advances in the development of new energy sources, more sophisticated means of production and anthropic actions have negatively affected the environment. This contradicts our understanding of how natural resources are discovered, as well as the severity of the risks to human and animal survival (Silva et. al., 2012).

Waste cooking Oil represents an economic loss in the edible oils. Consequently, it has gotten more attention as a low-cost feedstock for biodiesel and other biofuels, when compared to edible oils' use as a human food source. On the other hand, increasing the recovery (collection/recycling) rate is critical for the development of a cooking-oil-to-biodiesel production system (BIODIESEL, 2017a; BIODIESEL, 2017 b). In this regard, the present work is to perform a sustainability study of the biodiesel produced from the used cooking oils obtained from the local restaurants and vegetable fair.

### **METHODOLOGY**

The used/waste cooking oil samples were collected from three different vegetable fairs points, in the city São Luis and was kept in the bottle under standard conditions.



Preliminarily, the samples were evaluated using the visual identification of impurities of the food particles or other dirt inside them. Which was separated through process of filtration. Considering the sustainability and reuse of waste materials in mind, Pet's bottles were used for filtration. This process took about 20 hours.

After that, the cooking oil samples were weighted through analytical balance and transferred to a flat-bottomed flask. A mixture of sodium hydroxide and methyl alcohol was added and the mixture was heated gently at a temperature of 50 to 60 °C for 50 to 60 minutes. During the heating, the mixture was constantly stirred with the help of glass rod (AMBAT et al., 2018).

At the end of the transesterification of reaction, the mixture was transfer to the separating funnel to separate the biodiesel product for the glycerin by-product. Biodiesel yield was calculated as the mass of biodiesel weighed after the reaction as a function of the mass of oil used in the transesterification reaction.

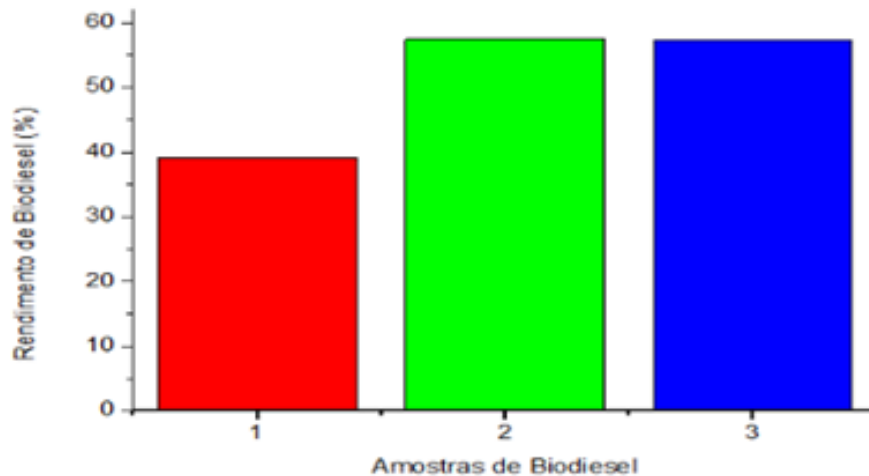
Therefore, the yield (%) = (Mass of biodiesel/ Mass of oil used) × 100 and characterization of the Biodiesel samples were performed to efficiency of the transesterification reaction and the quality standards of the products. The physico-chemical parameters like Density (Kg/dm<sup>3</sup>), Moisture (%), Ash (%) and Viscosity (mm<sup>2</sup>/s) were analyzed at the Laboratory of Chemistry of the State University of Maranhão (UEMA).

## RESULTS AND DISCUSSION

This work was intended to present possible sustainability study for the production of biofuel (biodiesel production) from the used cooking oils, in terms of transesterification transformation reaction at laboratory scale. In addition to the low cost raw material access obtained from the different vegetable fair sellers, the efficiency of the study was analyzed by using the percent yield. It is observed that even with the limited resources at laboratory, we were able to transform a waste cooking oil to valuable biodiesel product.

The reaction showed a partially satisfactory result, as there was a median use (almost 60%) in two of the three samples. The values calculated and obtained from samples 1, 2 and 3 respectively were 39.09%, 57.49% and 57.27%. After analysis of the percent yield, it is found that Sample 1 gave a lowest yield of 39.09%. Where, the vegetable oil/alcohol molar ratio can be considered as the main factor which may influence the extent of the transesterification reaction (GARCIA 2006). Since, an excess of alcohol normally end up in favoring the more

product formation of products, thus giving a positive impact factor on the transesterification process. It is noteworthy that the alcohol was latterly removed from the sample by washing and heating, which also facilitates the separation of biodiesel and liquid glycerin.



*Figure - 1 Percent yield of the Biodiesel Samples from the waste cooking oil samples  
(Source: author 2021)*

The biodiesel product was then characterized, in order to check the quality of the biodiesel samples with the standard of the National Petroleum Agency RANP 07/08. During the preliminary analysis, the biodiesel sample showed absence of the contaminants, i.e., the absence of the suspended materials deposited in the bottom, sediments or even any visual defect, in the samples. Such, analysis classified the biofuel as clear and free of impurities according to the Brazilian standard (LÔBO et al. 2009)

The physical-chemical characterization of the sample was performed at the Laboratory of Chemistry of Campus Paulo VI, State University of Maranhão. The results were compared with the literature values. It is being observed, that the given results shows a very much agreements in the specific mass and ash values compared to the standard values. However, small deviations in the viscosity values have been observed for the sample 2, which may be due to saturated fats contents of the used cooking oils.

However, in case of the moisture percentage content a high values has been registered which may be due to the laboratory technical manual error or environmental humidity effecting the moister content.

Table - 1: Characterization of the Biodiesel Samples

Amostra	Números de Análise	Densidade (kg/dm <sup>3</sup> )	Umidade (%)	Cinza (%)	Viscosidade (mm <sup>2</sup> /s)
1	1	905	1,2	0,025	58
	2	915	1,2	0,028	53
	3	876	1,1	0,028	55
2	1	899	1,5	0,029	48
	2	940	1,7	0,025	49
	3	850	1,6	0,031	52
3	1	910	1,3	0,031	61
	2	830	1,3	0,29	62
	3	920	1,4	0,29	62
PADRÃO RANP 07/08		850 a 900 kg m <sup>-3</sup>	0,05%.	0,020%	3,0 a 6,0

Source: author, 2021

## CONCLUSION

It is concluded that, the traditional transesterification reaction proved to be a very effective technique utilized for the production of biodiesel from the used waste cooking oils. From the present study, we also concluded that the frying oils have the capacity to be an economic and sustainable alternative producer of high potential products like liquid glycerin and the biofuel.

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**KEYWORDS:** Biodiesel; Waste Cooking; Transesterification; Sustainability; Environment.



## **THEORETICAL PERSPECTIVES OF LITERARY JOURNALISM**

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### **INTRODUCTION**

The research around Literary Journalism, at first, may seem an impossible combination, after all Journalism is concerned with what is fact and Literature is, by essence, fiction. Besides, the construction of each of these narratives occurs, so far, in different ways, since newspapers seek objectivity and impersonality, while literary texts present subjectivity and various metaphors.

However, even in view of their oppositions, genres such as the chronicle emerged, which has its greatest manifestation in newspaper publications, dealing with current issues, and at the same time prizes the literary content, since it puts the articulation of language in focus and with a lower periodicity. Therefore, the boundaries that would sharply separate literature from journalism are blurred and give way to reportage-books, which move between the world of fiction and fidelity to facts.

Thus, the work plan concerning the research project "LITERARY JOURNALISM: theoretical contribution and new perspectives" has the general objective of investigating, from an interdisciplinary perspective, the specificities of literary journalism and its contemporary perspectives. In this sense, it was proposed research on the theoretical contributions about literary journalism in order to reflect its constructions, practices and processes and its convergence with the literary field itself.

### **METHODOLOGY**

Having in mind the objectives cited above, we undertook a bibliographical research, based on a review of the existing literature about Literary Journalism and other pertinent themes - having in mind the interdisciplinarity of this work -, enabling the theoretical foundation.

Thus, reading fiches were made, as well as the construction of analytical categories and the systematization of the collected data. In addition, the research was presented, in the format of a minicourse entitled Literary Journalism, at the I Seminar of Language, Fiction and Art and V Seminar of Language and Literature; disseminated through the podcast Pinguid Podcast and



the study profile @profa.ingridpiauilino, in which there is an IGTV about Literary Journalism and Maria Bonita: sex, violence and women in the cangaço.

The partial results of the work plan were also presented in the lecture "Literary Journalism and the humanization of narratives: the voice of the oppressed in 'Maria Bonita: sex, violence and women in the cangaço'", offered by the research group Polifonia of UFMA. Also, in webdebate format, the meeting "Literary journalism, memory and social denunciation in 'Every day the same night: the untold story of Boate Kiss'" took place, organized by G.P. TECER of UEMA.

## **RESULTS AND DISCUSSION**

Both Journalism and Literature converge in their social role of building relationships. In addition to that, Lima (2010, p.37) states that narration is used by Literary Journalism because "it corresponds to a natural demand from people (...) to the old tradition of telling stories". This can be seen in popular sayings with a moralizing character or in the oral transmission of the history of a people, as happens in the Bible. The Bible presents poetic, prophetic and parable genres, demonstrating that literary and fictional devices enable a better understanding on the part of readers, as well as allowing the consolidation of the transference of these stories.

Thus, it is analyzed how Literature and Journalism are united by narration and, therefore, it is necessary to explain what narration would be. Narration is composed not only by the need to report, but also by the organization of social facts, the relations that one event establishes with another. This aspect is what allows learning and the transmission of knowledge.

Moreover, it is through the act of narrating that one can revisit and reorganize the facts that have happened and reflect on today's reality. This action can also be classified in two peculiarities, according to Motta (2005, p.2), which are: factual or fictional. Thus, the media opt for the factual, fictional or hybridism between both, according to the objective to be reached in the receiver of the message.

Journalism, by essence, portrays reality, that which is real and needs to be reported. Thus, the editors of American newspapers fulfilled their social responsibility with the verisimilar, opting for an intrinsically objective language and proposing ideological impartiality in reporting. This standard was treated rigorously, after all, it would not be appropriate to deal with fantasized events. Therefore, the presence of a more literary approach was suppressed, which, precisely, propitiated the emergence of New Journalism.



Journalism in Brazil had, mainly from the 1950s on, a great influence from the United States, which postulated a rigorous standard of impersonality and objectivity, in which news was treated by means of the lead (What? Who? How? Where? When? Why?).

However, even though there was this strong intervention, some Brazilian newspapers and magazines, such as *Realidade* (1966), refused to follow the North American model and, consequently, favored the presence of literary artifacts in their publications. The magazine in question

Attributed importance to anonymous themes and characters, in the same way that it gave greater freedom to reporters in the choice of topics. By not showing a strict concern with the factual, it presented reality through a socio-historical and cultural bearing contextualized with contemporaneity. The magazine also innovates with the story-reportage, a style so new in the Brazilian press that the public-reader at the time took a while to understand if it was a story or an article. (CASTRO, 2010, p.56)

Thus, we have *Realidade* magazine as the initial landmark of literary journalism in Brazil, which is agreed by all the selected theorists in this research. And, in short, the magazine stands out for "producing reports focused on national reality, due to the complex moment in which it emerged" (WEISE, 2013, p.5).

In view of the panorama presented, it is analyzed that there are Brazilian trends to literary journalism and that the borders between the two areas are permeated by hybridisms. Also, one notices a certain difficulty historically in maintaining subjective aspects in the journalistic text, in the 1960s. However, it is noticeable that nowadays the reader opts for these more literary approaches when it comes to news and reports.

Recent publications also demonstrate the character presented in the previous topic, such as *Maria Bonita: sex, violence, and women in the cangaço* (2018), by Adriana Negreiros, *Todo dia a mesma noite* (2018), by Daniela Arbex. These works are framed as book-reportage, which already demonstrates one of the various specificities of the genre treated in this research. Thus, together with Pena (2006;2010) they offer a more humanizing and current perspective of Literary Journalism.

## CONCLUSION

In view of the analyses and expositions placed above, it is possible to observe that Bulhões (2007), Lima (2010) and Pena (2006, 2008) are consensual in considering that



Literary Journalism is a genre and not a mere historical moment in Journalism. However, it can be seen that there is no consensus among theorists regarding the concept of the genre in question. Therefore, a theoretical debate that investigates these various classifications was proposed.

Also, such research proved to be necessary, since there is a vast Brazilian production of journalistic-literary texts and a historical panorama of these publications was built. Moreover, Literary Journalism, as discussed, is of great relevance today, for it allows gaps and voices to be restored and addressed in subgenres, such as the book-reportage.

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**KEYWORDS:** Journalism. Literary. Fiction.



## **URBAN HEALTH AND RESILIENCE ON A COMMUNITY SCALE. POST-PANDEMIC APPROACH.**

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Prof Ingrid Gomes Braga, PhD

### **INTRODUCTION**

The concept of health has been historically linked to the absence of diseases. However, the contemporary concepts evolved to be seen as a social product from the combination of various biological, environmental, ethnic and racial, cultural, and socio-economic factors. These aspects take place in society and are considered Social Determinants of Health (SDH) being directly related to the population quality of life (ADRIANO, J. R. et. al. 2000). Major urban areas, endowed of the complexity of a high population density, are focus points. Especially in a crisis context, such as the COVID-19 pandemic and the immediacy of climate change, that tends to enhance the social inequality e spacial segregation present in cities. The Healthy Cities and Resilient Cities movements arise as operational global initiatives that target to build a network of actions to promote health in the local cities contexts. This paper aims to analyse these actions that promote urban health improvement around the world, emphasizing the urban resilience shown by the communities, as a source of possibilities and alternatives to the social challenges experienced at local levels.

### **METHODOLOGY**

Through an exploratory research, was considered relevant to this work taking a descriptive approach, with the following procedures: analysis of both academic articles from scientific journals, such as D’Onofrio e Trusiani (2017), Caiaffa et al (2008), Buss e Filho (2007); explore digital platforms, for instance the CAPES Periodic Portal and the Scientific Electronic Library Online SCIELO for relevant material; systematic review and discussion of the articles found in theses platforms, that were used to support and comprehend the intersectional actions and approaches included in health promotion actions.

City projects and plans were also studied, in a global scale range of urban health initiatives, going through the most relevant experiences in the continents, including Europe, North America and Latin America. Other significant data was collected from international



agendas of urban health and resilience, for example the World Health Organization (WHO) congresses and reports, the 100 Resilient Cities initiative, analysis of municipal reports and websites, among others relevant non-governmental organizations. The research process mainly occurred through weekly online meetings of the TESCER Research Lab, by the Microsoft Teams platform made available by the University.

## **RESULTS AND DISCUSSION**

The well-being and life conditions of the individual and communities, whether they are physical, mental or environmental, directly compose health indicators of the population (BUSS e FILHO, 2007), that is considered in this work as not only individuals that inhabit the city spaces but also produce it by their daily social interactions and spontaneous interventions in the urbanity. To address the issues and necessities of the population, debates towards the negative influence that the urban conditions have on the health of their inhabitants are increasing (SALDIVA, 2018). Especially for the prospect of how to improve them, for the possibility to reverse this troublesome scenario and turn the cities into healthier and resilient environments. Given the part that the physical and social environment of cities have on the health of their inhabitants, and the goal of building cities where those environments can better function in a holistic manner, is clear that architects and urbanists have a huge responsibility in the development of plans and public policies that are aligned with those priorities.

The Healthy Cities Movement began in Europe and was disseminated around the world in many forms, maintaining the goal to promote actions that highlight health as a major issue in social agendas and policies of cities. It is in favor of a sustainable development, at a local level, through an intersectoral and participatory governance and an integration of health strategies in urban planning, promoting solidarity and global cooperation (WHO, 2013, p.7). The 100 Resilient Cities is also a valuable initiative of the Rockefeller Foundation. It is a network of cities administrations and directors that share a common view of holistic urban resilience, with thousands of projects in action. According to the Resilient Cities Network (2021), urban resilience is “the capacity of a city’s systems, businesses, institutions, communities, and individuals to survive, adapt, and grow, no matter what chronic stresses and acute shocks they experience”.



As a way to better comprehend the dynamics of urban planning and public policies facing the promotion of urban health and resilience, some pioneer cities in the global picture of resilience are analysed and explored as reference sources. In Europe, the cities that stood out were: Bologna in Italy, with the Urban Plan of Innovation that brought the intersectionality and community participation into urban interventions (COMUNE DI BOLOGNA, 2016); Copenhagen in Norway, not only for the cycling tradition in urban mobility, but also for urban resilience strategies, with the creation of green areas and water management in climate adaptation (KLIMAKVARTER, 2012); and Paris in France, mainly for their Open Governance model (OPG, 2021) and the Parisian Urban Planning Workshop.

In North America, the city of Victoria in Canada was also important to analyse, focusing on the numerous city's green areas management and the elaboration and application of a Community Action Plan (CITY OF VICTORIA, 2012). The studies of New York City, EUA could also illustrate how the climate circumstances in urban density and the infrastructure in the districts dictate the demands for resilience policies, converging to be a reference with the current resilience plan "OneNYC" (OneNYC 2050, 2021). In Latin America the analysis was reached through a series of promise initiatives that were well conducted in considerably similar contexts to Brazil. For instance, in Santiago, Chile, the point brought as a reference is also the resilience strategy (GOBIERNO REGIONAL METROPOLITANO DE SANTIAGO, 2017), particularly how the methodology was performed and the goals produced; and finally Medellín in Colombia, considered as a strong example of social and urban transformation, by the analysis of punctual projects, such as the UVA's (VALENCIA, 2016), in addition to review of the City's Development Plan, with the inclusion and community engagement in decision-making processes as a central point.

From this research it was possible to identify patterns in the practices taken in pretty much every city analysed. This is evident in the integration between the actions, sectors and agents involved, as well as in the interdisciplinarity noticed in numerous initiatives, either with the organizational aspect or as the ample coverage of issues and segments. Furthermore, it is observed the convergence of similar topics. This can be seen for example with the repetition of approaches to address subjects such as urban green areas, urban mobility, active



aging, public spaces and requalification projects of neighborhoods. These matters are all aligned with WHO principles and the Sustainable Development Goals (SDG), elements that allow meeting complex analysis and comparisons. The use of digital technology, internet based media and Geographic Information Systems (GIS) towards planning purposes was also a pattern found, which gained more relevance with the crisis of the virus of COVID-19.

The impacts of the pandemic are still being measured and evaluated, although it is already evident the influence that the social determinants of health present in the urban environment had on the unequal damage of the virus in different society groups. This reaffirms the emphasis of paying attention into a holistic approach towards health, especially on what concerns socially vulnerable neighborhoods. There is no consensus yet about the directions that the cities will take to adapt to such crisis situations, but it is possible to affirm, by the observation of experiences, that the urgency for urban resilience is eminent in current times of climate, social and economic uncertainties. Also, the stimulus to building healthier cities and resilient communities is crucial to what regard the population quality of life and the maintenance of society as we know it today.

## **CONCLUSION**

The health concepts highly evolved throughout the past decades, leaving behind a outdated limited view. Urban health and resilience are themes of extreme relevance nowadays, even more with the current perspectives for post-pandemic times. There is urgency for public policies that implants this broad view of health into the city planning, particularly in the brazilian context, since social inequality and infrastructure precariousness are massively present in the country. The research was able to deepen in this field, with comprehending the role of intersectoral actions into promoting urban health and engagement of communities in the decision-making processes, emphasizing their autonomy and preparedness for adaptation and mutual support. Moreover, it was achievable to understand more of the urban dynamics and its impacts on the urban space, and in addition, the good urban practices implicated in the increase of population quality of life.



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**KEYWORDS:** Healthy cities. Resilient communities. Urban health. Urban resilience.



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## CATEGORIA LIVRE



## **EDUCATIONAL PRIMER ON THE ECOLOGY OF MARANHÃO'S BIRDS**

Thalia Matos Aguiar Viana, Biological Sciences,

Andréa Araújo do Carmo

### **INTRODUCTION**

Brazil ranks third position in bird's diversity, especially in northeastern Brazil there are three of the six biomes found throughout the country, thus possessing a great diversity of birds (CAVALCANTE; DOS SANTOS NUNES, 2019). Working on the knowledge about birds with students in schools makes it possible to raise awareness about environmental issues and some didactic tools provide the student with a stimulus, such as observing and recognizing their surroundings (DE SOUSA; SEVERIANO, 2019).

Currently all educational processes have been challenged to use Information and Communication Technologies (ICT's), and these technologies are increasingly present in the classroom (PINHEIRO; VIANA; BEZERRA, 2020). The use of teaching resources with ICT's has become one of the main strategies in the educational field, because it has become an important tool in the teaching-learning process, resulting in a more dynamic and meaningful methodology (SILVA; SILVA, 2020).

The objective of this study was to create a digital educational booklet to be used in the birds ecology teaching of Maranhão in face-to-face classes and remote education.

### **METHODOLOGY**

Initially, a literature review was carried out on the main families present in the Maranhão State in bases as Scielo, Academic Google, Wikiaves and Taxeus. The primer was developed on the Canva platform (<https://www.canva.com/>), using its free resources available. This material aims to present in a didactic and systematic way about the birds ecology present in the Maranhão's biomes. For these reasons that high school and university students, as well as ornithology lovers, would be able to learn through it.

We described the following for each of the ten bird families: family name; order; who they are; distribution; morphology; food; lifestyle; reproduction, curiosities and species examples. The bird families worked on in the booklets were Accipitridae, Columbidae,



Dendrocolaptidae, Thamnophilidae, Tyrannidae, Picidae, Psittacidae, Trochilidae, Ardeidae and Threskiornithidae.

## RESULTS AND DISCUSSION

We obtained as a product the didactic material entitled “CARTILHA EDUCATIVA ECOLOGIA DAS AVES NO MARANHÃO” written in Portuguese and available for free on: [https://drive.google.com/drive/folders/1bFz2e\\_CtAod9R5wSZTQxHQZRCNWGP8g6?usp=sharing](https://drive.google.com/drive/folders/1bFz2e_CtAod9R5wSZTQxHQZRCNWGP8g6?usp=sharing).

**Figure 1.** Primer cover screenshot.



Source: Own authors, 2021.

The material produced can be used by teachers and students from basic education to higher education level, both as an online support material and in face-to-face or hybrid teaching. This production and its use stimulates the students' creativity who participate in the learning process, also in the teachers it contributes as a tool to meet the needs imposed by education (DE



MENESES et al., 2020). Its use as a resource to facilitate learning in the classroom helps in the process of structuring knowledge.

The digital educational booklet is a creative and playful tool to be used in remote teaching, because it brings important information from a more creative approach. This material can be used by teachers in their zoology, biology, or related areas, where teachers will encourage their students to explore more information through this playful material.

The booklet is a catalyst in the learning of several subjects, because it collaborates in the students' knowledge formulation path, presenting a visual approach that is attractive to the students (GALINDO-NETO et al., 2017; RAMOS; ARAÚJO, 2018).

## CONCLUSION

The use of the educational booklet on the ecology of birds of Maranhão in the teaching of Biology, Zoology and related areas acts as an important didactic tool to complement the theoretical lessons. In addition, the use of playful methodologies are essential in the teaching-learning process, since they stimulate and develop the students' logical reasoning, arousing their interest in the search for knowledge.

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**KEYWORDS:** Biology. Digital tool. Teaching-learning. Zoology.



## EVALUATION OF COMBUSTION REACTION: AN ISODESMIC REACTION

### APPROACH

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### INTRODUCTION

High performance or high specific impulse, and Predictable Burn Rate is one of the important characteristics that is always desired for fuel. Since these characteristics are the result of the chemical energies of a molecule and to understand it, we will need to study their thermodynamic parameters [1-3]. Computational quantum chemistry has become a powerful tool for obtaining precise thermochemical parameters of interests. The direct approach to accurate quantum calculations of thermochemical properties, however, requires the use of high-level methods that are still limited to relatively small molecules [3-5].

The use of "isodesmic type" reactions provides an indirect means of obtaining suitably accurate thermochemical values. In essence, these reactions are built in an attempt to preserve the chemical characteristics between reactants and products. In this way, errors incurred on the reagent side ideally would be similar to the product side, regardless of the method used to obtain the reaction energy. This would lead to superior error cancellation and therefore accurate reaction energies even when a moderate method is employed in the calculations [[5-8]. This study is an attempt to evaluate the thermodynamic characteristics of methane combustion reactions through different types of possible isodesmic reactions .

### METHODOLOGY

Preliminary, a list of possible isodesmic reactions were drawn as following:

**Table 1:** Isodesmic reactions involved in the combustion of methane molecule

Reaction -1	$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
Reaction -2	$\text{CH}_4 + 3/2\text{O}_2 \rightarrow \text{CO} + 2\text{H}_2\text{O}$
Reaction -3	$\text{CH}_4 + \text{O}_2 \rightarrow \text{C} + 2\text{H}_2\text{O}$



Reaction - 4	$\text{CH}_4 + 1/2\text{O}_2 \rightarrow \text{CO} + 2\text{H}_2$
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Initially, The molecular species involved in the reactions ( $\text{CH}_4$ ,  $\text{O}_2$ ,  $\text{CO}_2$ ,  $\text{H}_2$  and  $\text{CO}$ ) were modeled using gauss view 5 program using experimental values of bond length for  $\text{O}=\text{O}$ , C-H, C-O, and O-H for each of the molecules. The ground-state geometrys optimization were performed at B3LYP density functional method using the cc-pVTZ base set. The harmonic frequencies and hessian matrix of the interested structures were determined using the Semi-empirical method (PM6), DFT method (B3LYP and PBE0) and PBEPBE method with cc-pVDZ basis function at temperatures of 100, 200, 300, 400, 500 and 600K, following the geometric optimization calculations.

The thermodynamic properties of the structures like Enthalpy, Entropy, and Gibbs free energy of formation at the given temperatures were extracted from the Gaussian9 output files. The enthalpy change ( $\Delta H$ ), is calculated by taking a difference in between the enthalpies of the products and reactants represented by the formula below:

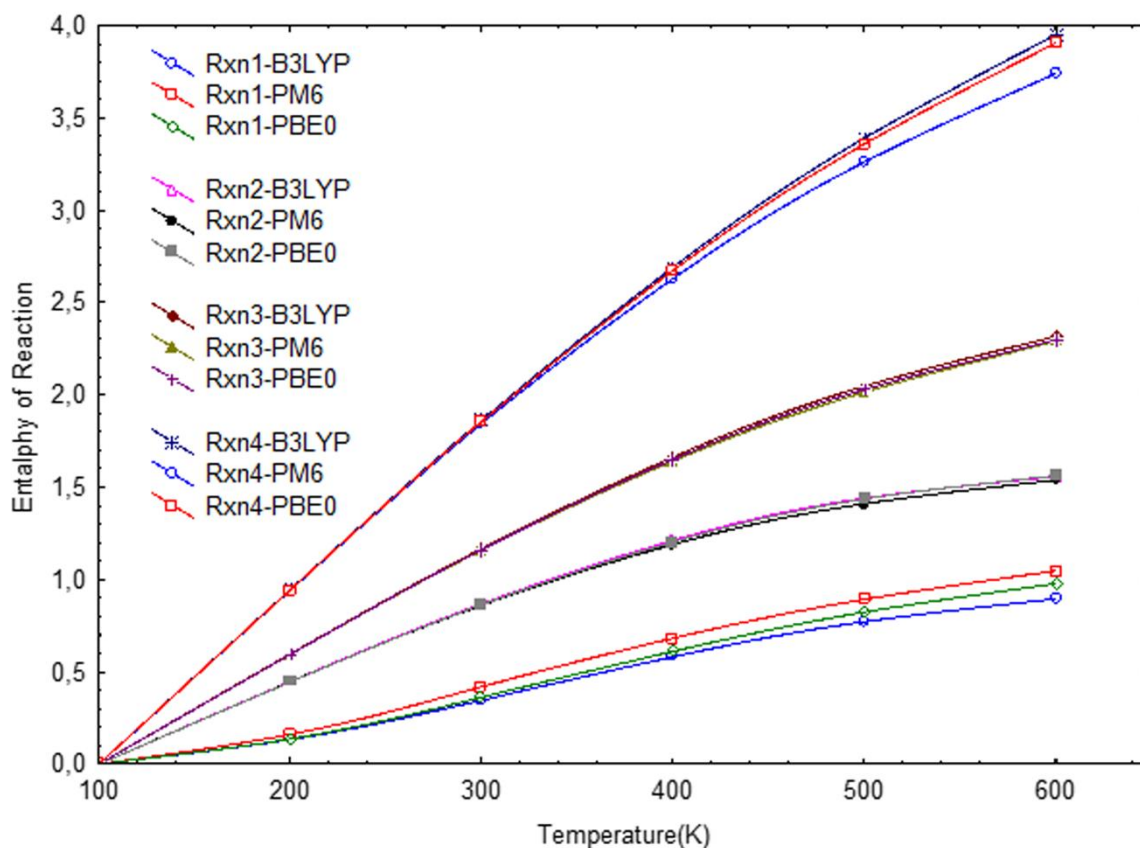
$$\Delta H_{\text{reaction}} = [ \sum \Delta H_{\text{fo products}} ] - [ \sum \Delta H_{\text{fo reagents}} ]$$

The computed data were compared with the literature values using the Root Mean-square Error (RMSE) values and Correlation coefficient (R) values.

## RESULTS AND DISCUSSION

The comparison in between the different methods and isodesmic reactions for the methane molecule at 100K, 200K, 300K, 400K, 500K, and 600K temperature using the theoretical method of interests are depicted in Figure -1. The results presented served to demonstrate that the enthalpy of combustion increase with the increasing temperatures.

**Figure 1:** Comparison for the enthalpy of reaction for the isodesmic reactions computed using semiempirical (PM6) and DFT (PBE0 and B3LYP) methods.



According to the figure -1, the fourth isodesmic reaction (RXn4) had shown the highest variation in enthalpy of reaction when we varied the temperature from 100K to 600 K. The third reaction (RXn3) has shown some relatively lower values when compared to the reaction (RXn4). Reactions 2 (RXn2) and 1 (RXn1), however at all temperature points the reaction (RXn2) has shown a higher enthalpy values than the reaction (RXn1).

It has been observed that, Reactions 1,2 and 4 showed some negative enthalpy changes ( $\Delta H < 0$ ), and are classified as exothermic. On the other hand, the reaction 3 has been observed to show some positive values of heat of reactions, at all temperatures using the theoretical methods. thus it means that, the understudy reaction was endothermic ( $\Delta H > 0$ ) and thus, involving absorption of heat.

Upon, comparing the different methods i.e, Semiempirical (PM6), PBE/PBE/cc-pVDZ and B3LYP/cc-pVDZ (DFT), it is being observed that B3LYP/cc-pVDZ has performed very qualitatively compared to other methods. while, comparing with literature values, all the



methods shows a deviation in results except for B3LYP/cc-pVDZ method, which presented very good approximation in its computation.

## CONCLUSION

It is concluded that, isodesmic reaction technique is very successful in determining the types of reactions in combustion chamber, and it helps us to clarify which of the reaction are involved in the absorbing the heat produced during the process. The exothermic and endothermic types of reactions were detected by studying their changes in enthalpy of reactions, where the reaction 1, 2 and 4 was considered as exothermic ( $\Delta H < 0$ ) and reaction 3 was considered to endothermic ( $\Delta H > 0$ ).

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**KEYWORDS:** Isodesmic Reactions, Thermochemistry, Computations, DFT.



## **GUPEVA: THE HISTORICAL RELEVANCE OF THE INDIANIST VOICE OF MARIA FIRMINA DOS REIS<sup>1</sup>**

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### **INTRODUCTION**

The work considers the existing connections between the work *Gupeva* by Maria Firmina dos Reis and the bond fostered through the existing relationship with the context available to it. The general objective is to analyze the author's conceptions contained in her Indianist tale from 1861-2, while observing the historical relevance of this work and the treatment with which the author proposed to think about the formation of Brazil in this 19th century tale.

In the light of this work, it is also sought, within the specific objectives, to emphasize the relevance of Maria Firmina's voice in the intellectuality of Maranhão and to draw a parallel with the pertinence of reading her work and giving the rightful recognition by presenting the panorama in which this work of the period of imperial Brazil was stated. Another specific objective is to emphasize the invisibility of her voice as a black woman and also, highlight points that build *Gupeva's* historical relevance, establishing him as a classic of Maranhão literature, even though it is not recognized as such.

### **METHODOLOGY**

The study lineation was formed from the study of the Indianist work of Maria Firmina dos Reis, entitled *Gupeva*. From this analysis, a bibliographic review of relevant works on the theme on which the work was based was carried out: the process of formation and miscegenation of the Brazilian people. Previous works dealing with the European and Catholic perspective that permeated the first visits to the Brazilian territory were used, and the opinion of renowned authors such as Laura de Melo e Souza was verified to identify the relevant historical approaches that are present in the story.

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<sup>1</sup> *Gupeva* is a tale from the 1861-2 that belongs to Indian literature. In the work, the author, Maria Firmina dos Reis is dedicated to proposing that the place destined to native peoples in nineteenth-century society be rethought.



The research was also based on the author's life, all the obstacles and the difficulty that Maria Firmina dos Reis had for her works to be exhibited and actually contemplated. The historical context in which the work, specified here, was involved was analyzed, and how this influenced the author's writing. After this first stage of survey and bibliography consultation, information was organized not only about the work but also about other views relevant to the context and assembly of the work.

## RESULTS AND DISCUSSION

Maria Firmina dos Reis was born on March 11, 1822, in São Luís (MA), and died on November 11, 1917, in the city of Guimarães (MA). Her publications made her known in her own city while still alive, by proposing themes that were not common to the writings of a woman, or even a black woman who lived far from the world of the elite and the imperial Court, in the interior of the Maranhão province, given the context in which was inserted. Maria Firmina dos Reis played a significant role, even though she lived in a state of Maranhão that did not favor her socially, politically and economically, where the slavery logic prevailed (FRANCO, 1969). According to Rafael Balseiro Zin (2017, p. 34) Maria Firmina would have been considered by her peers an example of erudition and gained popularity in Guimarães, where she moved at the age of 5 and where, until today, “to an intelligent woman and educated they call her Maria Firmina” (MOTT, 1988, p. 62).

The author, however, did not gain the same prestige of other authors of her time, and found herself rooted in the social structures that anchored her. Being belatedly rediscovered and valued, the scarcity of critical reception devoted to it draws attention; among the most prestigious editions that were responsible for raising works like *Gupeva* to another level have somewhat recent dates. After the organization of a facsimile edition of *Úrsula*, in 1975, by the historian and bibliophile Horácio de Almeida, after having found and analyzed it in a used bookstore in 1962, the two editions of the novel *Úrsula* come from 1988 and 2004, respectively, the first conceived by Editora Presença and the second as a result of a project for reprinting nineteenth-century writers. Firmina, was still somewhat forgotten within names of Brazilian literature that came from the same time as Maria Firmina - such as José de Alencar himself, with his masterpieces of Indianism, released in periods not so distant from *Gupeva*'s, *O Guarani* (1857) and *Iracema* (1860), or even another man from Maranhão, Gonçalves Dias, who also produced this type of literature, in his poem *I-Juca Pirama* (1851) - had his works made



invisible. This character from Maranhão literature, however, did not obtain similar awards nationwide as male companions. Despite her relevance in the nineteenth-century Maranhão scenario, Maria Firmina was forgotten, most likely “because of a possible ideological silencing coming from the leading elites of Brazilian intellectual life” (ZIN, 2017, p. 34).

The writer draws attention for working on the theme of Indianness, which for nineteenth-century works was not common. In Gupeva, Maria Firmina narrates, through fiction, the meeting point between European and indigenous indigenous culture. This tale is centered on the “Baía de Todos os Santos”, where the first encounter between Europeans and Brazilian native peoples would have taken place.

The author also induces elements that enrich her narrative and converge with the proposal, discusses expressions referring to Catholicism in parts of the work such as the insertion of the religious imagination, instigating that the reflection on the look at the indigenous person is complete, with a view to mentality of Europe in the historical time in question. It is also visible, elements that allow the tale to be connected to an entire trajectory that is not only literary, but also historical, from the place where it takes place - which is the same as the original story of Caramuru (1781) - to the insertion of historical personalities.

In the construction of the characters, the writer builds two lines of thought, and the work is constituted as a clash before the contact of the peoples presented. It presents the vision of the indigenous against the white European in a two-way street; at first, it shows it through the friend of Gastão, and his ethnocentric speeches towards the native peoples, that is, it shows it through the vision of the European and in a second moment, the indigenous vision is present in relation to the European, evidencing a reflection on the issue of alterity within the colonization process of the Americas. The tale proposes a narrative with interpretations about the formation process of Brazil and its identity and, furthermore, it presents a historical concept that is very present in studies on the “discovery of the New World”: the edenization - very clear at the beginning, when the author introduces the space where the story is set, which, no wonder, would be the place where the Brazilian nation would have had its origin. It is still observed, more of this successful attempt to refer the reader to the place of the story, while imprinting the “discoverer” thought of the European.

## CONCLUSION

Firmina's work has shaped itself as a classic, it is relevant to be worked on and made



available in a wide way, mainly for students from Maranhão, and also, used to understand themes of local history in the same way as men's works, by the way, mostly white, and often linked to sectors of the elite are considered.

The writer re-discusses not only the role of indigenous peoples operating the colonizing European, but also the aesthetic vision of native peoples and goes beyond: it is possible to rethink and reflect - if reading nowadays - how this historical past involving societies Indigenous peoples shaped the present and their relationship with the white man, as well as the space reserved for them to this day in the current society.

According to the outcome of the thesis, the dissimilarity in the invisibility factor of her voice is noticeable, as a black woman from Maranhão and, in a similar way, the distinction of Gupeva as a local production was evident, as well as the intrinsic pattern in her writing, pertinent to draw a parallel from the encounter and clash of the European and the indigenous role in society, the reality and the place destined for the Indian in nineteenth-century society, building itself as a classic of Maranhão literature, although it is not recognized as such.

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**KEYWORDS:** Maria Firmina dos Reis. Indianist literature. Gupeva. Maranhão.



## **THE DIPLOMATIC SOLUTION TO THE INTERNATIONAL RESPONSIBILITY CONTROVERSY: a necessary shift of focus**

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### **INTRODUCTION**

An open controversy in current international humanitarian law practice is the possibility of pursuing reparations for serious violations of human rights in judicial proceedings in the national courts of the place of the violation. The accountability of a sovereign state for acts against the citizens of any state has been built overtime since the Westphalia Peace in 1648, which established the principle of sovereign immunity in international law, a principle which is today considered of relative application. The contemporary context of a sovereign state's responsibility for acts of aggression provides for a difference between *acta jure imperii*, which are public in nature, and *acta jure gestionis*, in which the state acts on behalf of private interests. Through this distinction, it is recognised that states should be responsible for violations of international law if they are private in essence.

The Hague Convention of 1907 respecting the Laws and Customs of War on Land (henceforth known as the "Hague Convention (IV)") became a turning point in the history of international relations regarding the accountability of a nation for breaches of the rights of non-combatants during time of war, calling for states to provide reparations to victims of human rights abused during wartime. This, however, did not on its own cause the doctrine of state responsibility to accept universal claims of reparations from civilians on the basis that the principle of sovereign immunity was still in place.

In several sovereign jurisdictions around the world, however, there is increasing jurisprudence affirming the rights of victims of breaches of peremptory human rights norms to seek reparation for acts committed during time of war protected in theory by the sovereign immunity principle. Examples of this can be seen in Greece, through the *Distomo* case, from Greece's Supreme Court (2014), and in South Korea, with the claims of reparations for sexual workers ("comfort women") still awaiting final decisions. For its part, the Federal Supreme Court of Brazil ruled, in ARE nº 954858, also in 2021, that Germany had the responsibility to pay damages to Brazilian nationals who are the descendants of victims of a submarine attack in World War II which, in the judgement of the court, was not protected by the classification of a sovereign act committed during warfare on the principle that access to justice and human rights



must prevail over the principle of sovereign immunity. This series of rulings, especially the latest Brazilian one, are problematic in the sense that the compensations are unenforceable under current international law and risk to deteriorate international relations between the parties involved.

The present research proposes, therefore, to analyse the *jus cogens* norms of international law that require that a state be responsible for its acts, rendering the principle of sovereign immunity inapplicable. The current context in which national jurisdictions tend to affirm the responsibility of a foreign state for violations of human rights is presented in a critical light. As a result, the role of diplomacy in the negotiations between countries is as a possible solution to the problem, considering the quicker and more enforceable approach it presents to victims of legitimate damages. The main objective of the work presently conducted is to seek a better solution to the issue of international responsibility of states when certain violations of international law occur, affirming both the inefficiency of the judicial responsibility route and the existence of obligations between states for crimes committed in time of war.

## **METHODOLOGY**

The position of *jus cogens* norms is presented through the lens of authoritative scholarly writing on international humanitarian law, which aims to present the relevance of international responsibility when such norms are breached. State accountability is then analysed through the incidence of relevant international treaties, especially the Hague Convention (IV) of 1907, and the various attempts led by countries of the United Nations to systematize the international reparations for war crimes and other offences deemed to be serious violations of humanitarian law.

The article then focuses on the refusal of sovereign immunity by the jurisdictions of certain states motivated by the protection of norms considered indispensable, commonly known as *jus cogens*. With the aid of previous scholarly writing on the topic of international reparations, the research criticizes the validity of using judicial proceedings in a given state to determine the responsibility of another state, within the framework of international law. The recent ruling from the Federal Supreme Court of Brazil, is singled out as a case study of the problems arising out of the possibility of seeking international reparations through the courts, given the explicit and broad dismissal of sovereign immunity.



Afterwards, the article criticizes the problems faced by nations worldwide in the enforcement of their judicial rulings against other states with the diplomatic solution to responsibility claims. As an example of the diplomatic attempt to solve such issues, the Japan-South Korea agreement of 1965 in which Japan agreed to pay 300 million USD to South Korea to end claims of violations of human rights from South Korean nationals is used as a landmark case, whose validity and preferential position over the judicial disputes should be observed.

At last, the benefits of the diplomatic approach are examined with the goal of determining how both the sovereign immunity principle, which is absolute in the case of sovereign acts, and the interests of private individuals to whom illegal acts have been committed under international law, are satisfied.

## **RESULTS AND DISCUSSION**

The peremptory norms of international law are a concept still in evolution, much like human rights themselves are not a closed concept. Therefore, it is a delicate issue to follow a sure way to make countries responsible under the jurisdictions of other countries for violations of norms which even the most recent doctrine cannot define as being deserving of exclusion from the sovereign immunity principle. However, it is undeniable that international humanitarian law demands states become accountable for violations of human rights, as provided for in the human rights treaties in effect and on the attempt by the United Nations since 2005 to implement a system of international responsibility that allows for compensations in given cases from sovereign states to individuals.

Such system of international responsibility, however, currently does not exist. In this absence, the practice of international negotiations should be the preferential route to solve disputes in which a claim of breach of international humanitarian law is brought by either individuals or states against a foreign state. As the Federal Supreme Court case of the “Changri-lá” sinking by Germany shows, the access to justice and the prevalence of human rights are, albeit important at the national level, incompatible with the interests of the sovereign state in the international order to be safe from an infinite number of human rights violations that can be alleged, especially when the violations are not from the immediate past and occurred in the context of wartime. The many cases already tried in the national jurisdictions of individuals seeking reparations against sovereign states have not satisfactorily led to compensations



precisely because there is a grey area in international law on the legality of the dismissal at the national level of the sovereign immunity which is afforded to countries.

A better route must be taken to afford quick and solid reparations in bilateral agreements between countries, such as the Japan-South Korea deal announced in 2015, after the one these countries had already signed in 1965, on the issue of Japanese compensations for South Korea and its nationals. The possibility of diplomatic resolution of international responsibility claims must be accompanied with the necessary respect between nations that is paramount to diplomacy, otherwise like in the South Korean jurisprudence on the issue of reparations for violations of human rights by Japan, individual plaintiffs may continue to bring cases in spite of the settlement in effect between countries. The article defends ultimately that a robust understanding of state responsibility in the diplomatic institutions of a sovereign country is a quicker and more effective way for the provision of reparations, in respect of the guidelines of international law governing relations between states, notwithstanding the affirmation of the prevalence of human rights.

## CONCLUSION

A proper assessment of how international responsibility for *jus cogens* norms violations can play out at the national level is still lacking. Despite the best efforts of certain countries sought out as offenders to settle claims through negotiations, which should be carried out by the negotiating states in complete obedience to the interests of the individual victims, a consistent effort to make reparations more prevalent in international law is still far from being a solid solution to the issue of responsibility for serious breaches of human rights. Therefore, instead of focusing on the traditional and limited view of responsibility for sovereign acts at the national courts of the offended countries, the focus must shift to diplomacy between states, which is an unlimited and rich field in which the international responsibility can and should be assumed.

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**KEYWORDS:** Sovereign immunity. International humanitarian law. State responsibility for human rights violations. Diplomacy.



## **THE IMPORTANCE OF THE COUNTER MAJORITARIAN EFFORT CONSIDERING THE INFLUENCE OF COLLECTIVE CONSCIOUSNESS IN THE DEMOCRATIC STATE OF LAW**

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### **INTRODUCTION**

The objective of this work is to present that, despite the evolution of States towards the protection of rights, it is still necessary to discuss the pressures that majorities impose on minority groups. Given the plurality of conceptions and needs of the individuals that are part of the social body, the Democratic State of Law presents itself as the model that best matches these factors, enabling the effective expression of the majority's will. In this context, the work of Émile Durkheim is relevant, presenting the idea of collective consciousness, comprehended as the set of feelings and beliefs common to members of the same society.

Considering this concept, it is understood that the State had to seek mechanisms to safeguard the individual rights of minority groups. It is in this scenario that the counter-majority force emerges, aiming to balance the wishes of the majority and the needs of the minority. As the main purpose of the investigation, the intention is to analyze how the issue of broad realization of rights is still open to debate, even in the face of the evolution of democracy through history.

### **METHODOLOGY**

The methodology used here was a careful and interdisciplinary bibliographic research in history, sociology and law studies. One of the key points of the proposed analysis was the concept of collective consciousness, elaborated and investigated by Émile Durkheim in his book "On the division of social work". This book was launched by the French sociologist in 1893, focusing on the construction of a modern world, linked to values that were, up until that point, very little explored by scholars. In his research, the degree of social cohesion presented by society at the time drew attention, and it was possible to affirm the existence of a set of preconceptions and beliefs that were created by it and, at the same time, were able to influence and control its functioning.

Through this pioneer work, it was possible to conduct the discussion to a contemporary



literature, that searched for explanations and investigated the situation of those on the margins of social life and the exercise of citizenship, mainly focusing on Howard Becker's considerations about “outsiders”.

Another primordial source of this work is the Federal Constitution of Brazil itself, which honoring its nickname of “citizen constitution”, allows us to realize the value given to the counter- majority force. The design of the legislative houses, with an emphasis on the Senate, and the Federal Supreme Court's duty to legality were a determining factor in the development of the discussion.

## **RESULTS AND DISCUSSION**

The research resulted in a broad reflection on the existing contradictions in the Democratic Rule of Law, such as the social gaps between certain groups, and the relevance of counter- majoritarianism as a mechanism capable of minimizing inequalities and protecting fundamental rights of minority groups.

For this, a perspective was built taking into account the concept of State, Democracy and the historical development of the Democratic State of Law, pointing out that democracy is not limited to greater political participation or the “government of the people”, since, according to Daniel Sarmento, if that was the case, “[...] it could be considered democratic, for example, the Nazi government that rose to power via elections, and governed most of the time with the support of the majority of the German population”. In essence, it presents itself as a political ideal that aims to respect fundamental rights and democratic values, recognizing the individual as a depository of subjective rights and individual guarantees, which must be safeguarded by the State.

However, it is reinforced that the Democratic Rule of Law has challenges to be overcome, mainly related to the realization of minority rights, sometimes encountering a barrier in the strength of collective conscience exercised by the majority groups in society. In this sense, this research discusses the relationship of conflicts between these social groups and the concept of collective conscience proposed by Émile Durkheim, in order to broaden the understanding of the important role played by the counter-majority force, both through legislation and judicial paths, and the perception of how the State should intervene when the pressures of collective conscience restricts legitimate rights.

It seems that individual freedoms are suffocated by this greater common force, however,



what tries to establish here is that, if the State has the duty to safeguard rights, this is also a notion present in the collective conscience. So, the problem presents itself as extremely complex, because, just as in the collective conscience of the people of Athens in Greece, freedom corresponded exactly to political power for a restricted group, majority decisions are now also seen as the best solution for the country's political debates, even if they suffocate minority needs, which are not clearly presented because they have not yet found their basis in the collective conscience.

In addition, the perception of the role of the Senate in the face of the issues presented is essential for understanding counter-majoritarianism, since this house was designed with the intention of suffering less popular pressure, which manifests itself mainly through the votes system in correlation to the their debates, expressing more freedom to address issues that do not interest or please the majority and legislate about them. In this sense, the Senate presents itself as a counterpoint mechanism to the majority will, contributing to the confrontation of the existing tension between the collective conscience and the minorities, through the counter-majoritarian exercise.

Therefore, when discussing the problems of collective conscience, deviant behavior and the promise of the Democratic State of Law to safeguard legitimate rights, we arrive at the investigation of the counter-majoritarian force itself. This instrument is used, within the proposed scenario, aiming to contain the will of the majority, since, by giving in totally to the dictates of collective conscience, the State would promote the violation of the rights of social minorities, putting democratic values at risk. In other words, we call upon counter-majoritarianism because of the need to seek balance in contemplating the interests of different groups in society, always striving for the exercise of equity and the realization of rights. For it is understood, according to Adolf Von Ihering, that when fighting for the right, one must fight for it as a whole.

Furthermore, the manifestation of counter majoritarian force is perceived in the representativeness of the Legislative Power in the process of drafting laws, guided by democratic principles and based on a structure that aims to promote the balance of interests, we realize that, at first, it is the great constitutional representative of counter-majoritarianism. However, it is important to emphasize that, when this legislative process fails to promote individual rights and guarantees, sometimes the Judiciary is responsible for ensuring the effectiveness of these guarantees to minority groups.

The need for greater effectiveness in the legal custody of minority groups and their



expressions of will is justified by the frequent discrimination they suffer within society. Consequently, as they are in a state of social vulnerability, they look for a space to reaffirm their categorical identities, with the aim of overcoming the barriers imposed by dominant groups and fully exercising their individual freedoms. Thus, it is observed that the counter-majority force is a fundamental instrument for the confrontation, imposing limits on the discretion of the majority groups, animated by an understanding that the obligation of this community, in a State that values the realization of rights, is not to impose their own moral codes and conduct, but to respect the individual freedom of the other and their right to think, act and live according to their own conceptions.

Faced with an understanding similar to that of Roberto Lyra Filho, who states that "the law is, being", we understand that it is the role of this law system to turn itself to the needs that pulse in society, regardless of whether they are in line with the dictates of collective conscience, promoting social justice and the evolution of the concepts that are rooted in it. With that, therefore, the Democratic Rule of Law, starts to put into effect the ideals that served as base for its construction, thus guaranteeing the rights of constitutionally protected minorities and with that, the freedom in its most complete sense.

## CONCLUSION

The importance of counter-majority force in the scenario of realization of rights was clarified and reaffirmed. From a perspective that was not able to find democratic solutions to the resolution of impasses and preferred the suppression of minority issues, it was concluded, in presenting this counterpoint, that there is still space in the Democratic Rule of Law for the expansion of access to justice and exercise of freedoms. It is in this sense, therefore, that it is necessary to always remain alert, in the path of making real efforts to put this force into effect and, thus, being able to achieve the realization of legitimate freedoms that would previously have been suppressed and marginalized by the homogenizing discourse.

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**KEYWORDS:** Democratic State of Law. Collective consciousness. Individual freedom. Minority. Couter majoritarian effort.



## **THEORETICAL STUDY OF THE THERMOCHEMICAL PROPERTIES OF THE AVIATION GASOLINE BENIGN FUEL ADDITIVES**

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### **INTRODUCTION**

Throughout the nineteenth century and until the present, society has been reliant on the continuous use of fossil fuels and their derivatives, primarily from petroleum. Some petroleum derivatives, such as diesel, kerosene, gasoline, and GLP, are produced during the petroleum refining process. All of these products are obtained through distillation, and they differ in their respective boiling points (MARQUES & SILVANA, 2006). Since, the fossil fuels burning are production a lot of green house gases. That is why, the use of bio-fuels can help to reduce the emissions of greenhouse gases. Currently, bio-ethanol and bio-diesel are used as alternative fuels in a number of countries. In recent years, tests using mixtures of bio-combustibles fuel and traditional fuels have become more common (DOGAN, 2011). Butanol has sparked interest as an alternative fuel in the transportation sector (NOUREDINE, 2001). In addition, the use of software to simulate molecular properties and traced-out the reaction mechanism is growing day by day. In the realm of molecular modeling, we find that a number of computational methods is being found to investigate effect of molecular structures on the molecular properties (Robing et. al., 2019). In this regard, the present study focused on the theoretical computation of the thermodynamic properties for a series of isomeric structures of propanol and butanol. In addition, the temperature effect on the thermochemical characteristics is also being reported at the Density functional theory (DFT) using cc-pVTZ basis set.

### **COMPUTACIONAL METHOD**

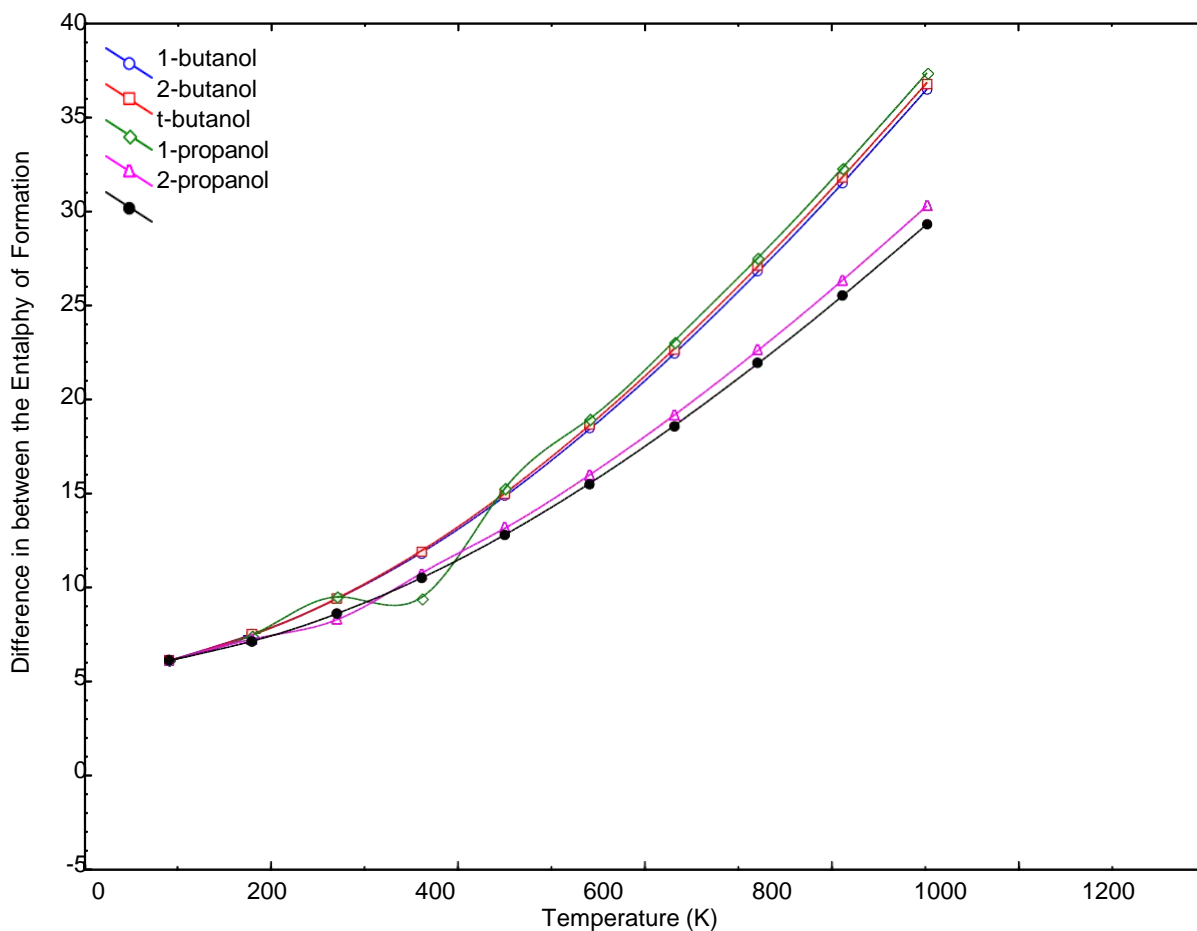
Initially, the molecules were modeled using the Gauss view 5.0 program, taking into account experimental data for C-C, C-H, C-O, and O-H bond length for each of the molecules of 1-propanol, 2-propanol, 1-butanol, 2-butanol, iso-butanol and ter-butanol. The B3LYP density functional using the cc-pVTZ base set were used optimize the ground-state geometries of the gaseous state molecules of interest using Gaussian9. The harmonic frequencies and hessian matrix of the interest structures were determined using the B3LYP/cc-pVTZ method at

temperatures of 100, 200, 300, 400, 500, 600, 700, 800, 900, and 1000K, following the geometric optimization calculations. The thermodynamic properties of the structures like Enthalpy, Entropy, and Gibbs free energy of formation at the given temperatures were extracted from the Gaussian9 output files. The computed data were compared with the literature values using the Root Mean-square Error (RMSE) values and Correlation coefficient (R) values

## RESULTS AND DISCUSSION

The computational results of the thermochemical molecular property of Enthalpy using the DFT/cc-pVTZ method for the 1-propanol, 2-propanol, 1-butanol, 2-butanol and ter-butanol are depicted in Figure-1. A strong resemblance in between the results for the different structures have been observed, as can be seen in following figure.

Figure - 1: Comparison in between the enthalpy of formation in between the different isomeric structures of interests using B3LYP/cc-pVDZ method



A continuous rise in the Enthalpy value with temperature rise have been observed, which shows that our methodology successfully and quantitatively computed the molecular property of interest. The correlation coefficient (R) and Root Mean-Square Error (RMSE) statistical analysis in between the computed and literature data has been performed. The results of analysis are illustrated in Table-1. A strong linear correlation coefficient values of approximately of 0,99 have been observed for the data. This shows, a strong resemblance of the computed data with the literature values. The Root Mean-Square error (RMSE) for the computed data with the experimental literature values have been computed to find out the deviation of the computed data. A deviation of the 1.053, 0.169, 0.158, 0.335, 0.841 Kcal/mol for the molecules of ter-butanol, 1-propanol, 1-butanol, 2-butanol and 2-propanol have been observed, respectively.

Tabela 1: Root Mean-Square Error and Correlation Coefficient calculated in between the experimental and computed values of Enthalpy of formation

<b>Molecular Structure</b>	<b>Correlation Coefficient (R)</b>	<b>RMSE</b>
ter-butanol	0.9973	1.053
1-pronaol	0.9999	0.169
1-butanol	0,9999	0.158
2-butanol	0.9998	0.335
2-propanol	0.9998	0.841

Which means a very small deviation error have been recorded for each structure, with an exception for ter-butanol where a highest deviation of 1.053 kcal/mol have been observed. This proofs that our methodology successfully computed the energetic characteristic of Entalphy of formation of molecules of interest.

## CONCLUSION

In the light of the work presented and discussed in the present study, it can be concluded that the thermodynamic characteristic of enthalpy changes very lightly with the structure. However, on the increase in temperature the difference in between the thermodynamic molecular property has shown a strong change with the molecular structural change. Which means, that the molecular isomeric structures can effects the combustion reactions at higher temperature. Thus, we concluded that the propanol and butanol structures contain sufficient amount of heat-content



and due to its hydrocarbon long chain property compared to the ethanol are considered to be a better alternative as use as fuel or fuel-additive in the aviation gasoline to enhance its octane number efficiency.

## ACKNOWLEDGMENT

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**KEYWORDS:** Thermochemistry. Fuel, Aviation Gasoline, Computation.



**CATEGORIA ODS**



## **THE NEED OF A UNIVERSAL ENVIRONMENTAL DECLARATION FOR A 2030 AGENDA FULFILLMENT**

Maria Beatriz de Andrade Azambuja, Law,  
Vitoria Colvara Gomes de Sousa

### **INTRODUCTION**

Between the centuries, the Society used natural resources as they were endless, inexhaustible. That became evident all the damage caused by Industrial Revolutions. Facing the imminence of an environmental collapse, the human being took responsibility of try to repair the disastrous past that triggered actual problems that involve the environmental area, just like outline solutions for a viable future for the species.

Back then, were signed countless agreements, lot of them with international scope, for the purpose of reverse that catastrophic situation. However, it is in the public knowledge and it is notorious that a lot of these agreements are constantly broken. So, seeks to demonstrate that the creation of a Universal Environmental Declaration would consist of an important topic for the legitimism and effectiveness of an international norm about that subject.

### **METHODOLOGY**

The research realized is explicative, because seeks to accomplish an explanation about the reality (GIL, 2008). In this sense, the problematic addressed is the necessity of an Universal Environmental Declaration for the purpose of comply of 2030 Agenda and possible impacts of it absence. Besides that, it is also in bibliographic nature, were searched: scientific Articles, books, monograph and international documents, with time cut between 1939 to 2020

### **RESULTS AND DISCUSSION**

The interest on environmental came on international area as a search of a raw material to earn profit. From the beginning of civilization, the human being showed the necessity of “tame” nature, it was effective with the discovery of agriculture. Then people can manage to control an unpredictable being, the nature. The first philosophers undertook about the man’s superiority over the nature, René Descartes, for example, reduced nature to a mere resource, while Platão e Aristoteles claimed that it would be just a man’s domination (OLIVEIRA, 2002).

However, the struggle for a sustainable society is not linked just with this moment of



history. Past the period of the Agricultural Revolution, industrial revolutions arise, marked by mechanization and massification of production and by the increase in attacks on the environment, the destruction of forests and the emission of polluting gases. It all seeking a supposed progress, that confirms the maxim of the historian Walter Benjamin (2019), that there is a legitimation of violence when it comes to the idea of progress.

Just in 1972 happened the first international conference for treat the environmental question without the economic bias evolved. The World Conference on Man and the Environment or also the Stockholm Conference, was elaborated by the United Nations (UN) and opened the doors to the debate on the subject in the scientific sector. In that sense, according to Le Pestre (2005), there is four reasons for a realization of these event: the dissemination of environmental problems, the increase of scientific cooperation on decade of 60, the growth of the economy, that led the rural exodus, and specific problems, like the pollution of Baltic Sea; the author states as well that it was from this meeting that the States recognized the need to act due to the problems exposed.

It is of the utmost importance to stress the concept to international agreements and how happens, at real, its legitimation. In the light of ideas of Beviláqua (1939) “Tratado internacional é um ato jurídico, em que dois ou mais Estados concordam sobre a criação, modificação ou extinção de algum direito”; during the conference cited above was raised the agenda of environmental education and of sustainability with clearly, agreeing with Beviláqua’s affirmations.

That debate remained on state with others big conferences, like ECO-92, RIO+20 and COPs (Conferences of the Parts) which have always resulted in the preparation of documents with relative binding and validity in the signatory countries. In 2015, 195 countries met and signed the Paris Agreement, that reaffirm the necessity of reduction of emission of pollution gases and limit the average global temperature increase to 2° C.

Meanwhile, the signing of these agreements has not produced the expected effects in terms of effective compliance. A clear example of disregard for the environmental issue and non-compliance with the Paris Agreement was the declaration made by the United States that it would no longer be a signatory to the agreement, three years after it entered the agreement, thus prioritizing the country's economic interests over the environmental issue.

It is emphasized that respective country is consequently on the list of the most polluting, so its exit from a protectionist agreement represents a big danger for the future generations. But that fact did not caused amazement on academic area, because since the presidential elections



on United States, on 2016, the one that Donald Trump won the presidency of the country cited above, he showed the ignorance and total disregard with the environmental area (SESSA; OBREGÓN, 2020).

Rei, Gonçalves e Souza (2017) affirmed that, at the same time that Brail agreed to zero the illegal deforestation and reduce in 43% the emission of GHGs (greenhouse gases) by 2030, it refuses to sign the New York Declaration about the forests, that had as an objective over the deforestation up to the same year.

However, it is fully apparent that is no real compliance of the accord that was signed in France, taking as an example, in addition to previous agreements that were also not fully adhered to, making it necessary, therefore, the elaboration of a single document that covers the Environmental Law in all its complexity, importance and magnitude.

Like plenty of countries that do not compliance the determinations of these accords about the environmental area, the city of Medellín, in Colombia, shows that the sustainable economy, in addition to being socio-environmental viable, it could be cost effective. The city was tagged by the narcotraffic and violence, its public spaces was taken to criminal organization and became a secure and enjoyable place just after street cleaning and environmental structure public policies (MAZO, 2017).

Thus, the 2030 Agenda stands out as an engine for the evolution of studies and the legitimation of sustainability in the world legislative system. According to Pretel and Vasconcelos (2020):

a agenda 2030 foi um compromisso firmado pelos representantes de 193 países, incluindo o Brasil, conforme a Resolução A/RES/72/279. OP32, de 2018, da Assembleia Geral da ONU, sendo composta por 17 Objetivos de Desenvolvimento Sustentável e 169 metas que deverão ser atingidas no período de 2016 a 2030. Respectivos objetivos e metas encontram-se relacionados com efetivação dos direitos humanos, bem como a promoção do desenvolvimento, dando continuidade aos Objetivos de Desenvolvimento do Milênio

Even with many incentives of international institutions about environmental protection, many world leaders are still rigid in relation to sustainable measures application. Just like any other international agreement, 2030 Agenda faces obstacles to its application, as the non-compliance or acceptance or the slowness shown by the countries for its enforcement.

In this context, a great success of the 2030 Agenda, if fulfilled, would be to achieve sustainable development, that is, the economy would not be affected by caring for the environment. This is confirmed on sustainable development goals 2 which aims to achieve



sustainable agriculture, in addition to eliminating hunger in the world.

So, the Universal Declaration of Human Rights of 1948 replaced the Declaration of Human and Citizen's Rights of 1789, bringing with it an actual way permeating the fundamentals guarantees; because of that, was legitimated important principles, like woman's rights.

In this sense, the Universal Declaration of Environment would be a legitimizing the need to apply sustainability, not as an ordinary law, like the international treaties are applied in Brazil, but as guiding principles for the maintenance of order in the social fabric.

Just like the Universal Declaration of Human Rights bring the legal validation to fundamental law, as the non-obligation to participate in rituals in which the clitoris is removed in Nigeria; The Universal Declaration of Environmental would corroborate with assent politics with international treaties that already created, confirming their importance and necessity of the maintenance of life.

## CONCLUSION

In line with what was exposed, there is an urgency on environmental care, for the future generation to have access to a habitable planet. In order to damage done by the big businessman and industrialization all the goal plans created, like the 2030 Agenda, would be very efficient; but there is no fulfillment of them which legitimizes the need for a stricter rule to deal with this issue.

That would be the Universal Declaration of the Environment, which would bring important topics to maintenance of environmental order. As the the Universal

Declaration of Human Rights bring the ratification for matters that are indispensable today, but before that were not put on the agenda; the environment must be treated with the emergency it needs and the application of a universal declaration that talk about it would boost this cause debate.

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**KEYWORDS:** 2030 Agenda, environmental development, Universal Declaration of the environment



## **THE SMALL PRODUCERS' FREE FAIRS: An analysis of its limits and possibilities in the metropolitan region of São Luís/MA**

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**Time Course:** 2021/2022

**Research Supervisor:** Greilson Lima

### **INTRODUCTION**

This article presents the functioning of agro-ecological and family-based open fairs in the city of São Luiz from an anthropological perspective. The migration process of populations that integrate this branch of activity and find a more dynamic market for their products in the state capital will be analyzed. The open market, as an object of study, is analyzed through two aspects: production and circulation. The justification for this work is based on our teaching experience in the rural area and our family ties belong to family farming. Added to this, the interest in seeking knowledge about how public policies reach the aforementioned social group. The aforementioned theme corresponds to a very vast and current field of knowledge that is always at the center of political and academic debates, since the exploitation of agriculture collides with the problems of the struggle for land ownership. This study is interested in deepening knowledge about public policies to encourage family farming, with special attention to the municipality of São Luiz.

### **METHODOLOGY**

In the methodology, we will use several sources produced by the State and society within the time frame that delimits the study. The official documents produced by the State will serve as a starting point, but they will be confronted with other readings. We will also use oral sources to understand, in part, the relationship established between the State and small producers.

The analysis of the relationship established between the State and small producers, based on the use of oral sources, will be essential to understand how they assess the actions of public bodies to encourage agroecological production, as well as to analyze their concerns about the functioning of the Feira Program Free. Direct observations will also be used for offering the possibility of knowing the daily life of small agricultural producers in the performance of production and marketing activities.

The media, such as printed newspapers and magazines, reports in television newspapers



and the information published on the world wide web will represent another body of documents to be researched, as they constitute vehicles for the dissemination and promotion of the Small Producer Free Fair Program, in addition to represent a space for the dissemination of ideologies that influence the actions of public authorities.

## RESULTS AND DISCUSSIONS

As importance will be given to the voices of people who experience this activity, it is expected that there will be discussions around the concept of open market, as well as urban and peri-urban agriculture. As a problematization, we will analyze the use of the open market as a space for agribusiness products, which is not its function. The open market has reason to exist due to the local production in an agroecological way. Another issue to be researched is the relationship of open markets with competition from supermarkets, fruit shops and other commercial establishments with better service conditions.

Another problem to be discussed and which we will seek results is the contradiction in the speeches of the subjects involved with the incentive policy for this sector. As public resources are always scarce, how does the public agent justify meeting all demands? The chosen time frame is directly related to the left and center left governments that took power in the country and enacted new laws to encourage the sector.

## CONCLUSION

I intend, through the association of documentary and bibliographic sources, to develop a dissertation in this graduate program and offer an understanding of the meaning of the role played by the Feira Livre o Small Producer Program, seeking, therefore, its specificity as a State action aimed at development family farming on the island of São Luís.

Despite these choices, in the course of the research, the methodology and sources may change or be incorporated according to the needs presented in the development of the study. Other concepts, in addition to those already mentioned, may be incorporated, if necessary, in view of the interdisciplinary perspective that is the purpose of this study.

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## CATEGORIA EXTENSÃO



## **LITERATURE REVIEW: Christopher Alexander's theories.**

Laryssa Mendes de Oliveira, Raquel Miranda dos Santos, Luanna Nogueira Berthier da Silva, Daniela Bispo Ribeiro, Aquiles Miguel Alves Lima, Gustavo Santana Vasconcelos, Isabella Vitória Costa Gomes, Luciano Costa Conceição Junior, Anna Giovanna Pestana Silva, Clauber Lobão Braga Júnior; Architecture and Urbanism, UEMA; Marluce Wall

### **INTRODUCTION**

This paper presents the result of the first round of activities of the PIBEX City Readings Project which was a literature review in English language.

City Readings is a project that aims to create spaces for debating urban planning and architecture papers in English as a way to improve the student's ability to read, speak and, write in that language. The aim is to prepare them to be able to fully participate and present papers at international academic events.

### **METHODOLOGY**

The first initiative of "City Readings" PIBEX project was to contribute with the team of research project "Dialogue with Alexander and Lefebvre, identifying patterns in the socio-spatial trajectory of residential spaces in São Luís, Maranhão". The research in question is funded by Fapema and was granted 5 scholarships in the Institutional Scientific Initiation Scholarship Program (1 CNPq, 3 FAPEMA and 1 PIVIC).

It was decided that the group should perform a literature review, reading books written by Christopher Alexander: *The Timeless Way of Building* (1979) and *A Pattern Language: Towns, Buildings, Construction* (1977).

In the second moment, online meetings were held through the Microsoft Teams platform with all the members of both PIBEX and Pibic Project and the research supervisor to discuss the ideas and all data collected with the readings.



At that moment, the research team brought into the debate Raquel Barros': "Collective housing: the inclusion of humanizing concepts in the design process", that is written in Portuguese and constitute an important contribution to understand Alexander's theories.

Together both teams wrote the responses presented in this article. The methods mentioned have, in addition to the scientific purpose of the research, the objective of exercising, while planning living spaces, the act of knowing how to listen, see and ask, in order to build bridges that will serve to solve future problems in the field of architecture and urban planning.

## RESULTS AND DISCUSSION

Alexander points that there is a central quality in every place that makes it a good place, a comfortable place, a cozy place, a place where everybody can be happy and well. This quality is made of patterns of events that keep happening there.

Therefore, when you design a building, it is important to worry not only about the structure but also about its human parts.

In the process of socio-spatial development people manifest social practices as an answer to their problems and needs. The solutions to this context of needs are characterized as "patterns" by Christopher Alexander in his work "A Pattern Language".

In his book "The timeless way of building, Alexander et al. (1979, p. 75), gives the concept of patterns:

These patterns of events are always interlocked with certain geometric patterns in the space. Indeed, as we shall see, each building and each town is ultimately made out of these patterns in the space, and out of nothing else: they are the atoms and the molecules from which a building or a town is made.

These patterns are not really the elements, but the relationships they maintain with each other, that may, depending on how those relationships occur, create The Quality without a name. that quality that makes a place a great place.

Another great point on Alexander's theories is that the quality is precise and objective (the most fundamental quality there is in anything), but still it cannot be named. There's an attempt to explain it through other concepts - comfortable, free, exact, egoless, eternal, whole, alive - although they are not enough to describe it entirely: "Imagine the quality without a name as a point, and each of the words which we have tried as an ellipse. But each ellipse also covers



many other meanings, which are distant from this point” (ALEXANDER, 1977, p. 39).

The quality without a name in us, our liveness, our thirst for life, depends directly on the patterns in the world, and the extent to which they have this quality themselves. patterns which live, release this quality in us, but they release this quality in us, essentially because they have it in themselves. (ALEXANDER, 1977, p. 122).

In this sense, The Quality depends directly on the patterns that exist in the world, especially the ones which are alive. As a requirement to the appearance of The Quality without a name those patterns cannot function properly in an isolated way, but integrated in an interdependent and stable system of patterns.

Acknowledging the patterns as the core of any creation of spaces, observing that those patterns change from people to people, from culture to culture it is possible to focus in studying them seeking to measure constructed spaces’ qualities and answer the question: How could architects and urbanists define and achieve The Quality in spaces, in order to design better environments?

## CONCLUSION

It’s necessary to increase the knowledge about Christopher Alexander’s theories, to comprehend the socio-spatial production of São Luís housing areas, since understanding the author’s discoveries about human behavior on living spaces can lead to discovering it’s patterns and to establish new paradigm of urban habitat production.

Patterns represent the ways of solving a problem, a way used over and over again in buildings and towns to make these spaces alive. In the city of São Luis, there are patterns in the neighborhoods that can be studied to understand the dynamics of urban space. As said before, these patterns maintain relationships to each other to generate in a certain space The Quality without a name, which is the core of all great design processes.

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**KEYWORDS:** Patterns. Housing areas. Quality. Urban Space



## ORIENTAÇÕES PARA INSCRIÇÃO NA SESSÃO INTERNACIONAL

A Sessão é voltada para estudantes de graduação que irão apresentar trabalhos de Iniciação Científica no XXXII Seminário de Iniciação Científica – SEMIC 2021 e na Jornada de Extensão - JOEX 2021 e que têm interesse em apresentar o trabalho em uma segunda língua. Também podem participar estudantes com trabalhos científicos alinhados com os Objetivos de Desenvolvimento Sustentável e com categoria livre. Estudantes de pós-graduação também podem participar.

As apresentações serão distribuídas em sessões matutinas e vespertinas e avaliadas por uma banca indicada pela Superintendência, que dará o feedback ao aluno dentro do tempo de 5 minutos. Os estudantes que se apresentarem na Sessão Internacional receberão certificado de participação.

Os estudantes podem submeter trabalhos em 4 categorias:

Iniciação Científica;

Projeto de Extensão;

Trabalhos alinhados aos Objetivos de Desenvolvimento Sustentável, e

Categoria Livre, em que serão aceitos trabalhos produzidos em disciplinas e similares.

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a) Enviar e-mail para a Superintendência de Relações Internacionais no endereço [arin\\_seletivo@uema.br](mailto:arin_seletivo@uema.br), com as seguintes informações: Nome, Curso, Campus, Período, Categoria, Nome do Orientador e Resumo Expandido do Trabalho (em inglês). No assunto do e-mail deve constar “Inscrição – Sessão Internacional”.

b) O Resumo Expandido do Trabalho deve, obrigatoriamente, seguir o modelo disponibilizado pela Superintendência e conter no mínimo três (3) e no máximo cinco (5) páginas.

c) Os alunos selecionados para a Sessão deverão enviar as apresentações (slides) por e-mail.

d) Os slides devem seguir o modelo fornecido pela Superintendência.



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A Superintendência de Relações Internacionais, anteriormente conhecida como Assessoria para Relações Internacionais, foi criada em 2015 para desenvolver, orientar e promover a internacionalização da Universidade Estadual do Maranhão. Esses objetivos são feitos por meio de atividades internas e externas nas áreas de cooperação, mobilidade, inteligência internacional, programas especiais, eventos e conta com apoio linguístico e de comunicação e marketing.

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- Realizar e acompanhar ações processuais que visem à celebração de Protocolos de Intenções Internacionais;
- Apoiar a realização de estudos presenciais de idiomas no exterior ou na própria UEMA;
- Estabelecer e manter a comissão de tradutores consultores nativos vinculados a SRI;
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- Manter a comunicação com instituições de ensino no exterior para celebração, manutenção e renovação de convênios institucionais;
- Manter divulgada uma lista atualizada dos Protocolos celebrados e em tramitação;
- Nos contatos, contratos ou suporte a licitação para aquisição de prestação de serviços de tradutor juramentado;
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- Estabelecer e manter cadastro de docentes e discentes voluntários em hospedar docentes e discentes estrangeiros (Intercâmbio em Casa “UEMA-Friends”);
- Na articulação da prática de inglês técnico por área de especialidade de centro (“*paper* na sala de aula”);
- Acompanhar e divulgar novas oportunidades de bolsas de estudo e financiamento a pesquisas no sítio eletrônico da SRI;
- Em quaisquer novas ações necessárias ao bom desempenho do setor.

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