



In the field of communication

TRACING RICE AND VALORIZING SIDE STREAMS ALONG
MEDITERRANEAN BLOCKCHAIN

17.12.2024



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Instituto Nacional de
Investigação Agrária e
Veterinária, I.P.



101 NEWS

TRACE-RACE WAS FEATURED DURING THE EUROPEAN RESEARCHERS' NIGHT



Published on 30/09/2024

Trace-Race was featured at the Science Museum in Parque das Nações, Lisbon, during the European Researchers' Night, a celebration of science across Europe. The event highlighted t...

TRACE-RICE COORDINATOR DELIVERED AN ORAL SESSION ABOUT THE LATEST RESULTS



Published on 27/07/2024

On July 24th and 25th, the TRACE-RICE project was presented at the "International Conference on Sustainable Foods - Achieving the Sustainable Development Goals" in Bragança, Portug...

TRACE-RICE HONORED WITH "BEST STUDENT POSTER COMMUNICATION AWARD"



Published on 27/07/2024

At the "International Conference on Sustainable Foods - Achieving the Sustainable Development Goals" (<https://icsf.morecolab.pt/>), held in Bragança, Portugal, on July 24th and 25th...





42 POSTERS

UNDERSTANDING THE MARKETED PLANT-BASED BEVERAGES: FROM INGREDIENTS TECHNOLOGICAL FUNCTION TO THEIR NUTRITIONAL VALUE

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INTRODUCTION

The global plant-based beverage (PBB) market is rapidly expanding, projected to grow from US\$8.8 billion in 2017 to an estimated US\$15.7 billion by 2023. This growth is driven by a long history of PBB consumption in Eastern and Western cultures, with notable examples like Horchata, Masaico, Borsó, Shiro, and soy milk. The increasing demand for plant-based beverages is mainly due to the growing number of vegetarians and vegans, as well as the increasing popularity of plant-based diets and environmental concerns is fueling interest in PBBs sourced from various different plants, including cereals, legumes, nuts, seeds, and pseudocereals, all of which sharing processing stages. Consumer preferences prioritize texture, viscosity, and mouthfeel, while nutritional ingredients, microencapsulated fortificants, and bioactive compounds are crucial. However, nutritional compositions exhibit substantial variability.

OBJECTIVE

Identifying trends in PBB composition, using scientifically informed PBB development amid the growing demand for alternative plant sources.

MATERIAL AND METHODS

RESULTS

Figure 3. Principal component analysis (PCA) of PBB that included all the variables analyzed (ingredients in the formulation and nutritional fact). Identified clusters based on their raw materials, appeared circle in different colors.

Figure 4. Analysis of the PCA plant-based beverages (PBB) identified key ingredients as water, plant-based materials, and occasionally oil and gums. Figure 1. Vegetable oils, mainly sunflower (78.3%) or rapeseed (11.46%), were common. Blended PBB often added oil [80% to meet low fat preferences. Lactose played a vital role, with galactin (51.1%) being the primary source of lactose. The nutritional profile of PBB was highly variable, with distinct PBB clusters based on nutrition, raw materials, oil hydrocarbons, and salt, reflecting evolving formulations to meet consumer demands for healthier, diverse options (46.6% of variance explained).

CONCLUSIONS

Plant-based beverages, enriched with diverse plant-based raw materials, adapt to nowadays consumer's demands. Ingredient choice impacts nutritions, with room for improvement. The nutritional profile of PBB is highly variable, and further research is essential for nutritional transparency and to understand the differences among brands.

TO READ THE COMPLETE ARTICLE →

REFERENCE

Grau-Fuentes, E., Rodríguez, G., Gardón, R., & Rosell, C. M. (2018). Understanding the marketed plant-based beverages: From ingredients technological function to their nutritional value. *Food Science and Technology International*, 24(1), 1–12.

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IV Meeting of the Network of Reference Institutes of the National Reference Laboratories

Instituto de Investigação e Inovação em Agronomia e Ambiente (InovAgro)

Instituto Nacional de Investigação Agrária e Veterinária (Instituto de Medicina Veterinária)

LEAF

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ALICE

ENHANCING MOLECULAR SCREENING OF HIDDEN INSECT INFESTATION IN RICE GRAINS BY COI BARCODING: PRIMER PERFORMANCE AND LIMIT OF DETECTION

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GRENNE-IT Bioresource for Sustainable Agri-Food, ITQB NOVA, Oeiras, Portugal

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INTRODUÇÃO

Infestações por *Sitophilus oryzae* e *S. zeamais* zeamais são uma das principais razões para baixa qualidade e durabilidade do arroz? Esta infestação em grãos de arroz posse um significativo desafio para both produtores e consumidores across the globe e has far-reaching implications for food security, economic stability, and public health. These genetically close insect species are particularly adapted to attack rice grains and spend a considerable part of their life cycle, including the entire larval feeding period, inside them [1], representing the hidden infestation that visual methods cannot successfully detect. They do this by creating an entrance hole, covering it after entry, and then, after the pupation process [2,3] an exit hole is made, from which it then emerges the adult insect [4,5].

OBJETIVOS

The main goal of this study is to develop a fast molecular detection method, such as a multiplex real-time polymerase chain reaction (qPCR) to detect specifically and efficiently hidden infestation in stored rice for monitoring purposes and two activities were performed:

1. To verify primer performance, by analyzing its efficiency;
2. Determine the Limit of Detection (LoD) of the qPCR alone.

MÉTODOS

PRIMER AND PROBES DESIGN

S. oryzae and *S. zeamais* mtDNA
→ COI Barcode region
(compilation of DNA sequences from GenBank®)
Sequences alignment and design of primers and probes using Geenics Prime

MORPHOLOGICAL IDENTIFICATION OF ADULT INSECT SPECIES BY GENITALIA OBSERVATION

S. oryzae and *S. zeamais*

DNA EXTRACTION

S. oryzae and *S. zeamais*
→ Grinding in a mortar
→ Purified DNA

RT-PCR – PRIMER EFFICIENCY AND LOD ASSAYS

DNA quantification (NaDrop) → DNA amplification and analysis of results

RESULTS AND DISCUSSION

***Sitophilus oryzae* primer efficiency plot**

$y = 3.438x + 25.037$
 $R^2 = 0.979$
≈ 95% Efficiency

Log DNA copy number	Ct value
-5	45
-4	40
-3	35
-2	30
-1	25
0	20

***Sitophilus zeamais* primer LoD plot**

$y = 3.547x + 37.652$
 $R^2 = 0.991$
≈ 92% Efficiency

Log DNA copy number	LoD
-5	30
-4	25
-3	20
-2	15
-1	10
0	5

***Sitophilus oryzae* LoD plot**

$y = 3.005x + 40.005$
 $R^2 = 0.999$
≈ 99% Efficiency

Log DNA copy number	LoD
-5	25
-4	20
-3	15
-2	10
-1	5
0	2

ACKNOWLEDGMENTS

Grateful thanks to INRAE, for helping in insect species identification. Funding was provided by the Portuguese Ministry of Science, Innovation and Higher Education, through the National Research and Development Programmes. C. Braga was funded through the INOVAGRO Project (PTDC/AGR-AGRO/30810/2017) and ultrasound technology (C. Braga) was funded through the INOVAGRO Project (PTDC/AGR-AGRO/30810/2017).

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[1] E. Zeck, *Entomol. exp. appl.*, 1990, 54, 111-120.

[2] E. Zeck, *Entomol. exp. appl.*, 1990, 54, 121-130.

[3] E. Zeck, *Entomol. exp. appl.*, 1990, 54, 131-140.

[4] E. Zeck, *Entomol. exp. appl.*, 1990, 54, 141-150.

[5] E. Zeck, *Entomol. exp. appl.*, 1990, 54, 151-160.

ILLUSTRATION

Illustration of the stages of infestation of rice grains by *Sitophilus* spp. By EH Zeck



23 ARTICLES



Design thinking for food: Remote association as a creative tool in the context of the ideation of new rice-based meals

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ARTICLE INFO

Keywords:

Design thinking; Remote association; rice; food; innovation; meal; creativity; design methodology; design thinking; remote association; rice-based products

1. Introduction

Rice (*Oryza sativa L.*) is the staple food of most of mankind, with a world per capita consumption of about 80.5 kg/year. The European consumption of rice is about 10 kg/year, with a growth rate between registered between 2015 and 2019. Within this region, Portugal has the highest consumption, with a per capita average of about 16.3 kg/year [1]. In 2019, the European consumption of rice was about 10.5 kg/year perceived not only by the consumers data, but also by analyzing the preparation of rice in different countries [2]. In 2019, the European consumption of rice was about 10.5 kg/year, with a growth rate between 2015 and 2019. Such dishes span from plain white rice to more elaborate rice dishes, presented as a side dish or even as a main course and rice porridge, rice with meat, fish or vegetables, rice with beans, rice with lamb, pork or beef [2].

Design Thinking (DT) is a methodology that can be used to develop rice preparations made with milled rice kernels, with the remaining rice bran being incorporated into animal feeds [3–10]. However, there is a lack of studies on the use of DT methodology to create rice products [11–13]. In 2019, the DT methodology was first proposed by Oliveira [14], who described it as a team exercise performed in two phases: DT and DT+ [14]. The DT methodology is a creative technique that describes the DT design methodology. The DT+ emphasizes the brainsteaming technique as the key to idea generation and creating a list of rules to get the “perfect brainsteaming”.

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QUALIDADE E SEGURANÇA ALIMENTAR



A GERMINAÇÃO E A FERMENTAÇÃO DO ARROZ PARA AUMENTAR O SEU VALOR NUTRICIONAL

Os processos de germinação e fermentação estão a ser estudados para aumentar o concentração de compostos bioativos (γ-orzanol e ácido γ-aminobutílico) e potenciar o valor nutricional e a utilização do arroz.

18
VERA RICE, Jornal Agrícola (2023)



Article

Relationship between Physicochemical and Cooking Quality Parameters with Estimated Glycaemic Index of Rice Varieties

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Abstract: Rice is a staple staple food in the basic diet of the global population that is considered to have a high glycaemic index. The study of the physical and chemical parameters in rice that are related to the starch digestion process, which allows us to quickly predict the glycaemic index of varieties, is a major challenge, particularly in the classification and selection process. In this context, and with the goal of establishing a relationship between physicochemical properties and starch digestibility rates, thus shedding light on the correlations between quality indicators and their glycaemic index, we analyzed the physicochemical properties based on their chemical composition, physicochemical properties, cooking parameters, and the correlations with digestibility rates. The resistant starch, the gelatinization temperature and the retrogradation (seback) emerge as primary predictors of rice starch digestibility and its estimated glycaemic index, exhibiting robust correlations ($r = -0.84$ and $r = -0.78$, respectively). Among rice varieties, Long B and Basmati stand out with the lowest estimated glycaemic index values (68.44 and 68.10), elevated levels of resistant starch, gelatinization temperature, and seback values. Furthermore, the Long B showcases the highest amylose, while the Basmati with intermediate, revealing intriguingly strong grain integrity during cooking, setting it apart from other rice varieties.

Keywords: rice; commercial types; physicochemical parameters; cooking parameters; glycaemic index

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Foods 2024, 13, 135. <https://doi.org/10.3390/foods13010135>

<https://www.mdpi.com/journal/foods>





4 FLYERS | 4 LANGUAGES

Relevancia del arroz y retos

“La relevancia del arroz en la dieta Europea se ha incrementado debido a su papel fundamental en las dietas modernas saludables. La demanda de arroz en Europa crece y se cultiva en países como:

- PRESENCIA DEL ARROZ EN EL MUNDO**
La producción de arroz en el mundo es de \$10 M, proporcionando el 20% de las calorías que se consumen.
- CONSUMO DE ARROZ**
En EE.UU.: 5.5 kg./pere/capita/año
En el mundo: 72.5 kg./pere/capita/año
- EL ARROZ EN EL MEDITERRÁNEO**
E Mit en 2018, los productores principales son Egipto, Italia, España, Portugal

“Los desafíos para la mejora y desarrollo sostenible del arroz:

- HACER ALIMENTOS SALUDABLES
- CONSERVACIÓN DEL SUELO
- CONFORMACIÓN DEL ARROZ

Objetivos específicos

TRACE-RICE se centra en proporcionar a la industria arrocerera mediterránea:

- TECNOLOGÍAS ANALÍTICAS Y DIGITALIZACIÓN ALIMENTARIA** eficientes y adaptables que facilitan una trazabilidad rápida y el control de la autenticidad de las variedades de arroz.
- NUEVOS ALIMENTOS basados en arroz, nutritivos, saludables y sabrosos, y productos con alto valor añadido basados en una aproximación interdisciplinaria integrada en toda la cadena y en la economía circular.**

Aproximación

Estructura del proyecto

Arroz-Relevância e desafios

66 milhares de arroz na dieta

Europa tem crescido devido ao seu uso na culinária e na indústria alimentar, que é parte considerável da Europa e produzido nos países da União Europeia.

- PRESUNA ARROZ**
Produção mundial de 120 MMt, com 10% da produção destinada à exportação.
- CONSUMO ARROZ**
UE - 5,1 kg/capita/ano
- ARROZ NO MEDITERRÂNEO**
4 Mil ton 2018, principais produtores são Egito, Itália, Espanha, Portugal

Objetivos específicos

TRACE-RICE está focado em fornecer aos diferentes atores da fileira do arroz do Mediterrâneo:

- PILOTO 1:** Melhorar a eficiência da extracção rápida e controlada de amido das variedades de arroz;
- PILOTO 2:** Melhorar a eficiência da extração de óleo de arroz;
- PILOTO 3:** Melhorar a eficiência da extração de proteínas de arroz;
- PILOTO 4:** Melhorar a eficiência da extração de fibra de arroz;

Nova alimentação saudável baseada em arroz, nutrimento e saudável e produtos de alto valor nutricional, que contribuirá para uma abordagem interdisciplinar integrada de economia circular e de floresta.

Estrutura do projeto





TRACE-RICE
264 seguidores
1 m •

"Rice authenticity & traceability, elements of sustainability and quality differentiation" -
Presentation ...visualizar mais

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TRACE-RICE - Presentations
trace-rice.eu

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TRACE-RICE

Tracing rice and valorizing side streams along Mediterranean blockchain.

Pesquisa e desenvolvimento científico •
Oeiras • 724 seguidores



TRACE-RICE
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1 d •

NEW ADVANCES FROM ...visualizar mais
[Visualizar tradução](#)



New advances from PRIMA projects - NEXT WEEK

trace-rice.eu • 1 min de leitura





TRACE RICE VIDEO





TraceRICE project activities in Egypt

TRACE RICE videos

Promotional activities



IBET Promotional Video



Trace Rice Project 2022 IATA Promotional Video

A smartphone displaying the "Field Records" screen of the "Digital Field book for Integrated Rice Production". The screen shows a map of a rice field plot, registration details (Register number: 1312297369001, Plot area (ha): 132.536), and rice variety information (Variety of rice: Canavera).

Field Records

Plot location

Register number
1312297369001

Plot area (ha)
132.536

Variety of rice
Canavera

TraceRICE

Digital Field book for Integrated Rice Production





YOUTUBE CHANNEL



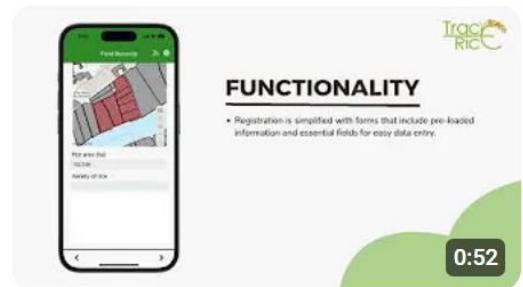
Trace Rice

@tracerice3944 · 9 subscriptores · 6 vídeos

Mais acerca deste canal ...[mais](#)

[Subscrever](#)

Vídeos



FUNCTIONALITY

• Registration is simplified with forms that include pre-loaded information and essential fields for easy data entry.

0:52



6:12



0:45

Digital Field Data Recording App -
TraceRice Project

DACSA ATLANTIC Full Supply Chain
Control

TraceRice project activities in Egypt
34 visualizações · há 6 meses





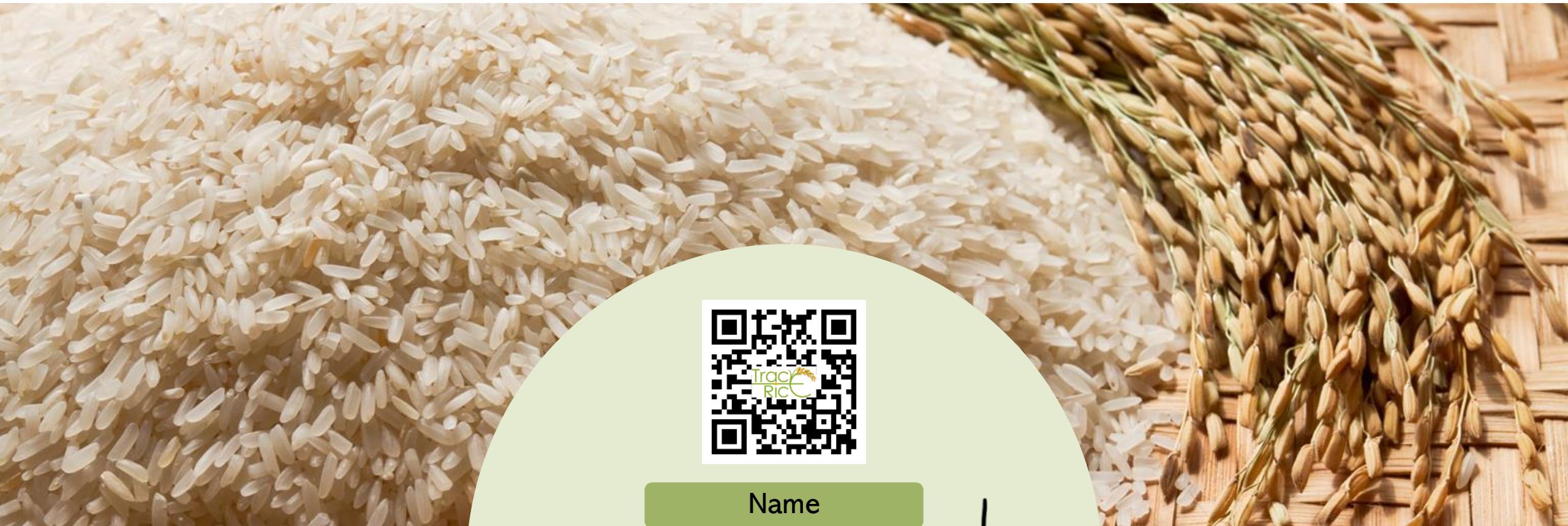
iBET

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جامعة الإسكندرية
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UNIVERSITY



Name

thank you!