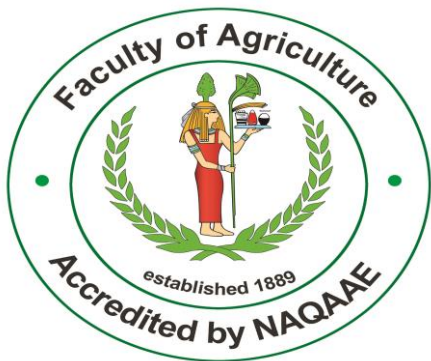




Fermentation strategies for the valorisations of Olive cake to improve their nutritional value in Broiler's feeds

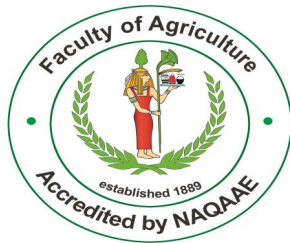


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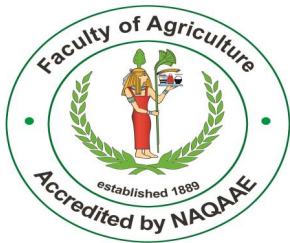
International trainer - Missouri State University – USA.

**Scientific Supervisor of the Cows, Buffaloes, Sheep, and Goats Unit at
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22/6/2023

CHANIA 2023 Conference



Introduction

Objective

Material and Method

Result

Conclusion



Introduction

Olive tree in Egypt

Egypt recently announced an ambitious plan to plant 100 million olive trees by 2022.



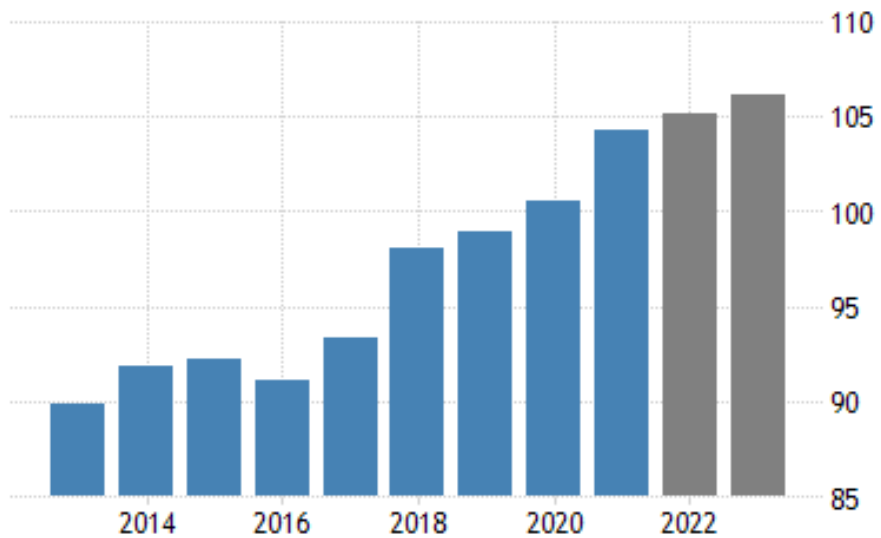
Egypt's production of olive oil is forecast to reach 42,200 tonnes in 2026, up 3.4% from 34,500 tonnes in 2021. Since 2006, production has grown 10.4% annually. The country ranked 10th in 2021, behind Argentina. Greece, Italy, and Tunisia were the top three in terms of production.



VectorStock

Raw material







2 main raw material

~~CRISIS~~
SOLUTION



Objective



- The development and adoption of **alternative animal feeds** setting up a circular economy approach in the livestock production by **turning the by-products of the food industry into high value secondary feedstuff for animal feed.**
- The project also focusses on the **increase of the sustainability of the Mediterranean livestock** through the valorization of local food industry byproducts that will lead to **reduced environmental impact and costs**



Materials AND Methods

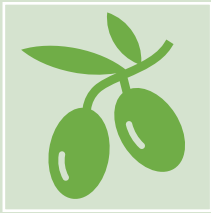
3 Parts

Lab. Scale
Fermentation

Large Scale
Fermentation

Bird Trail

Olive Cake



Olive Cake is an olive oil industry by-product that is available in large quantities, especially in the Mediterranean Sea region.



The **challenge** in our Case Study is how to improve the **nutritional value** of the Olive Cake with its **high fiber content** to be used in **poultry** feeding.



Sample collection and chemical analysis

The chemical composition of the Untreated olive cake OC

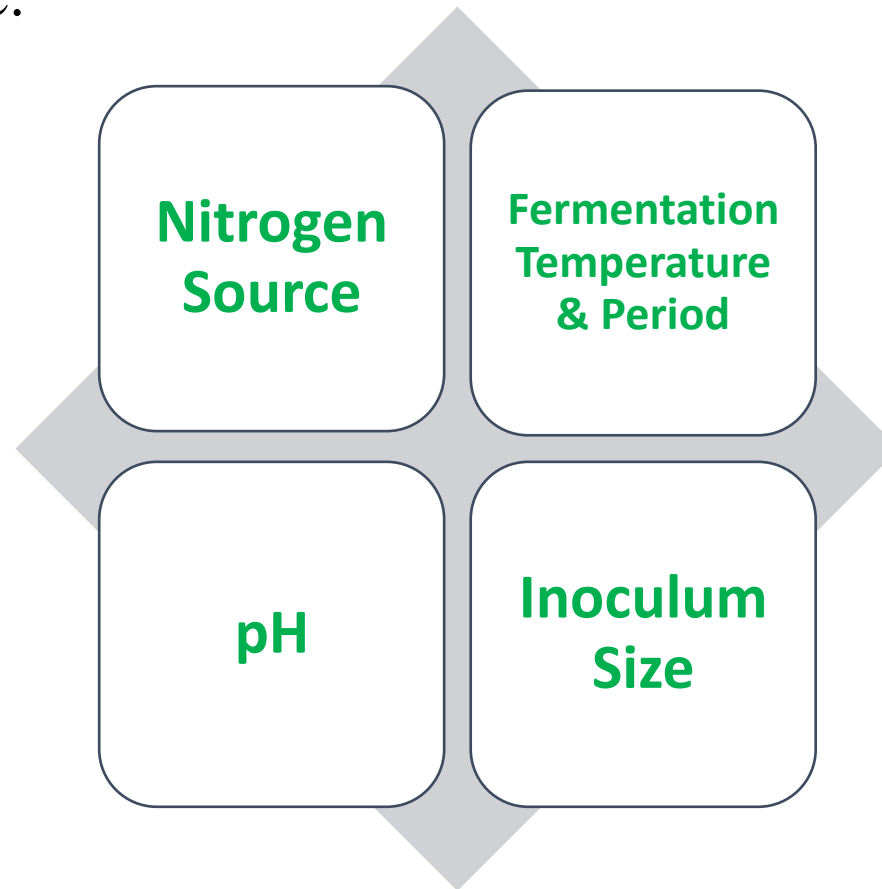
	Untreated OC %(DM)
Ash	3.43
CP	6.53
CF	45.25
EE	14.77
NFE	35.19
NDF	91.77
ADF	74.26
ADL	41.74
HEMI.	17.83
CELL.	32.19
LIGN.	39.78
GE cal/Kg	4613

Lab Scale Valorization of Olive Cake.....

The most promising microbial isolate
Optimization and Identification

Lab Scale Valorization of Olive Cake.....

The **Mold** isolate that exhibit the best results of degradation of the crude fiber through solid-state fermentation was optimized for the following parameters in the lab to be used on the large/Pilot scale.

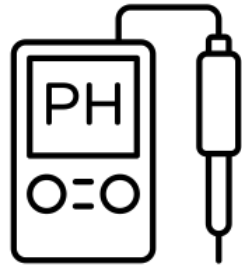


Solid-State Fermentation Conditions Based on the Optimization of the best Results:



Nitrogen Source

Beef Extract
Penton
KNO₃



pH Value

6,7,8 & 9



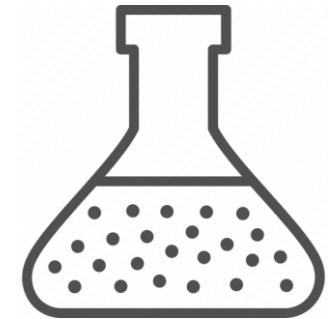
Incubation

Temperature & Period

25, 28, 30, 32 & 35°C

for

3, 7, 14 & 21 Days

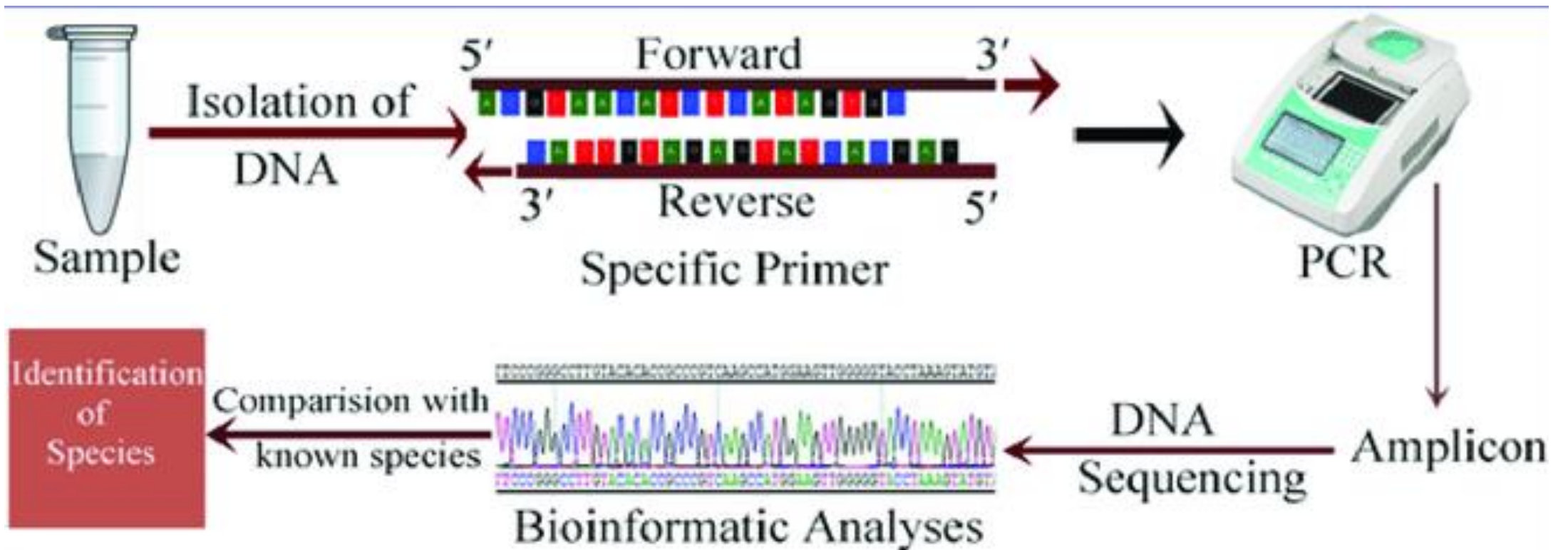


Inoculum Size

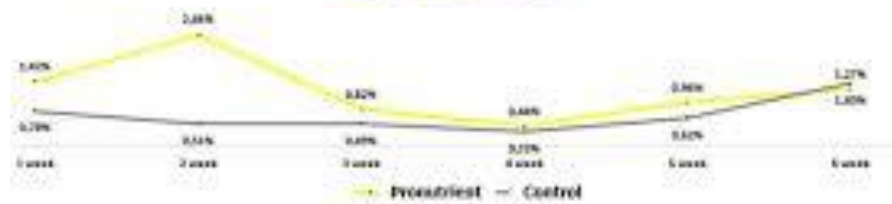
1,2,3,4 & 5%

Mold Isolate Identification

Molecular Identification was done for the **mold** isolate using ITS gene sequencing.

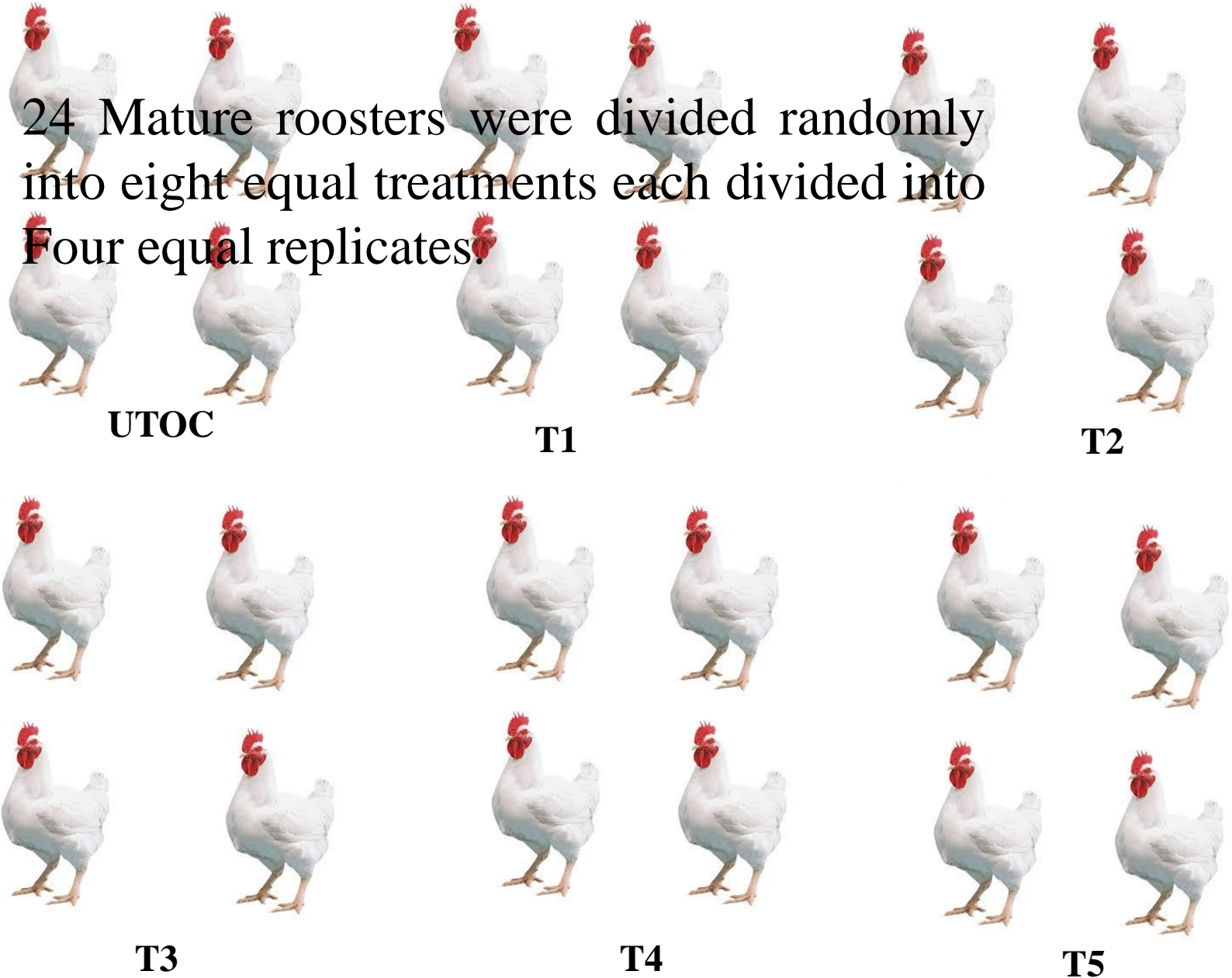


Biological evaluation on birds

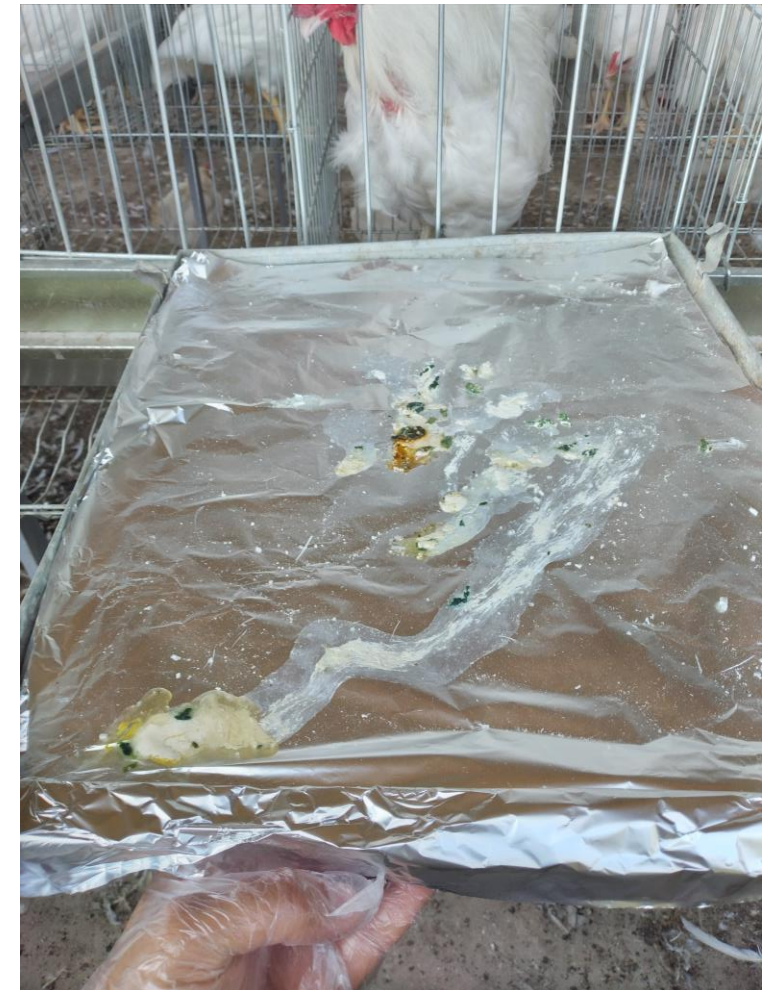


24 Mature roosters were divided randomly into eight equal treatments each divided into Four equal replicates.

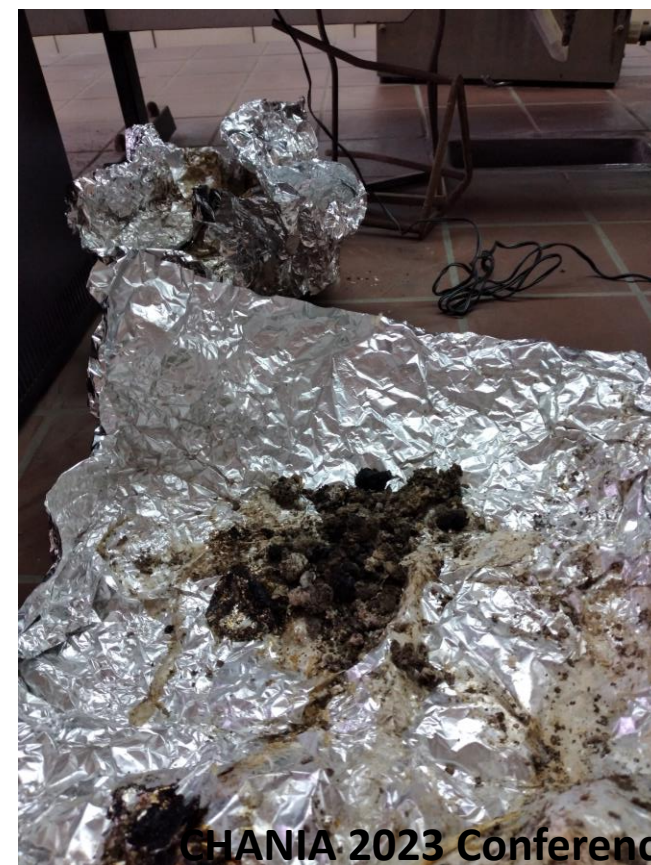
UTOC:- Untreated Olive cake (Control),
T1, T2:- (Bacterial Isolates),
T3 (Yeast Isolate) and
T4:- (Mold Isolate)
T5:- (Consortium of T3 +T4).



Collection of the dropping

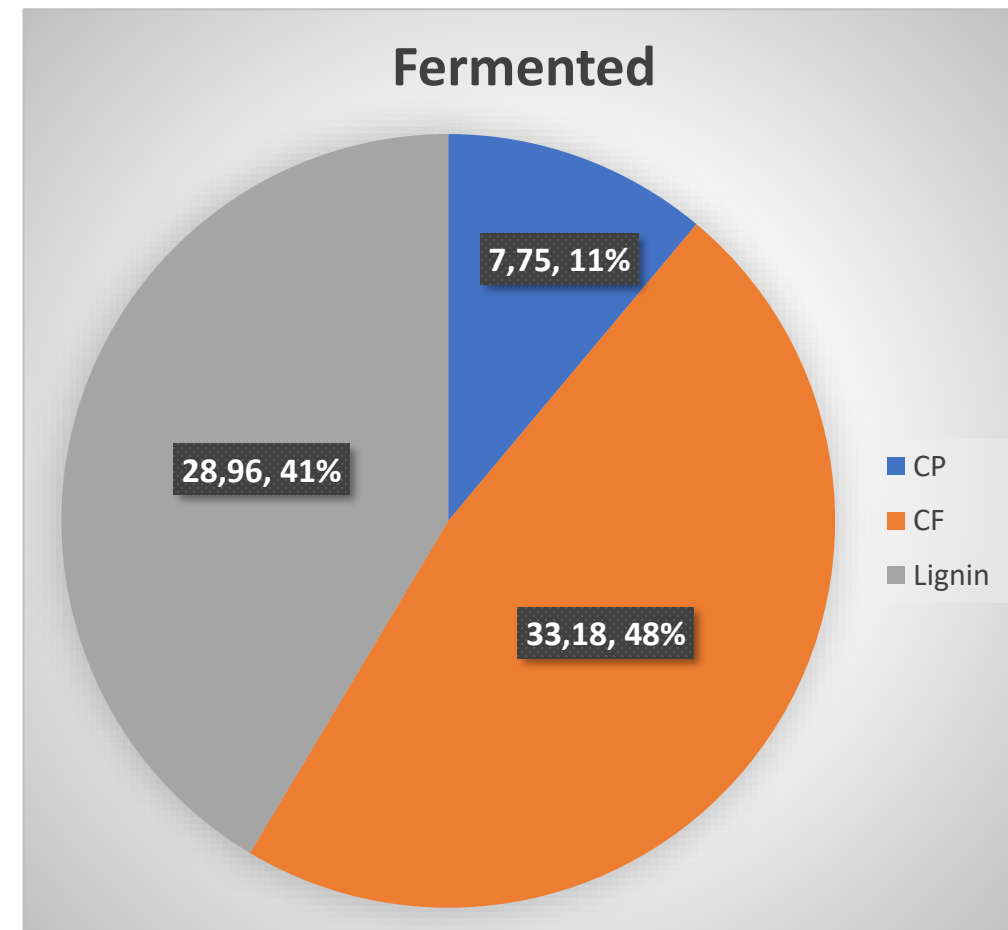
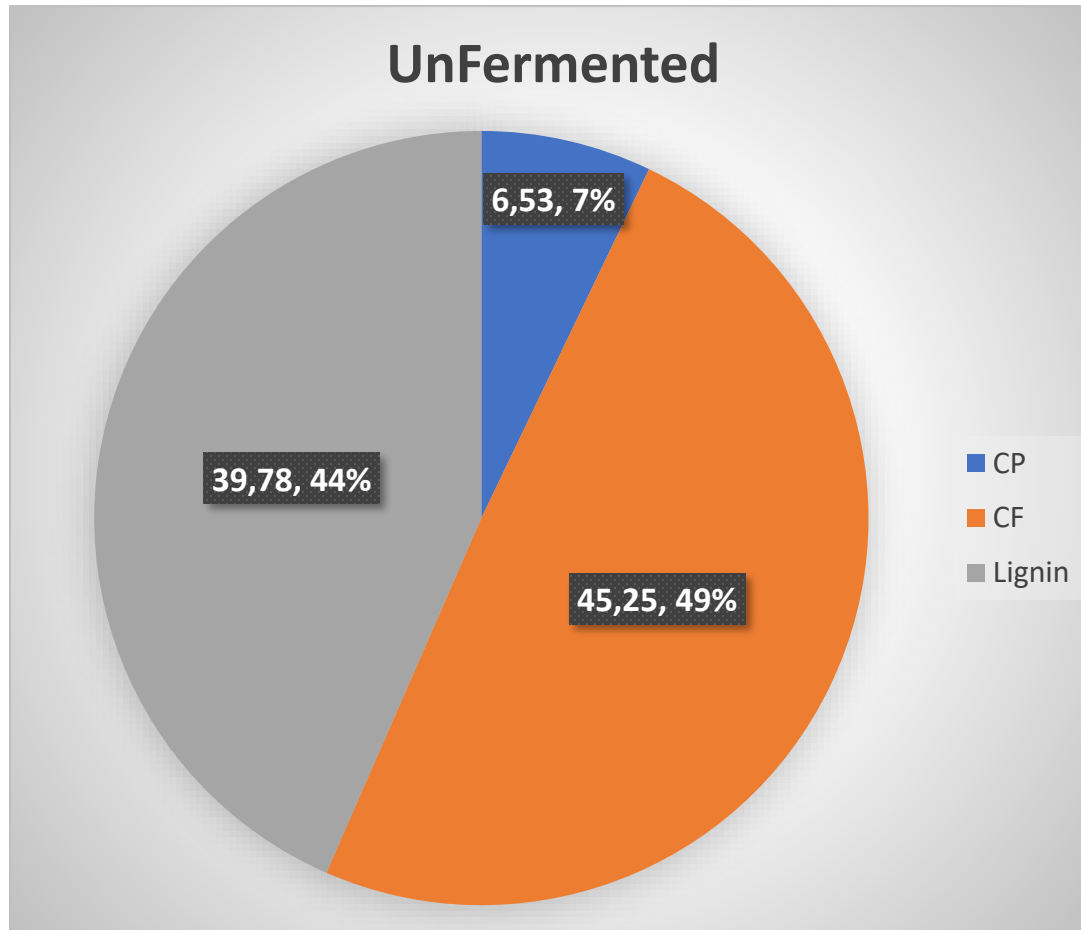


Lab. Scale drying then wt. then analysis





Chemical analysis for the Fermented and un-fermented Olive Cake (on DM basis).

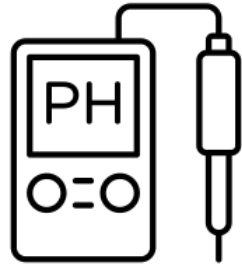


Optimization medium composition for the valorization of olive cake under solid-state fermentation.

Best Solid-State Fermentation Conditions based on the Optimization Results:



Nitrogen Source



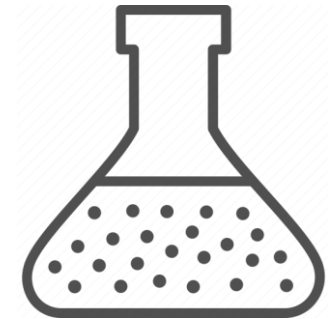
pH Value

6



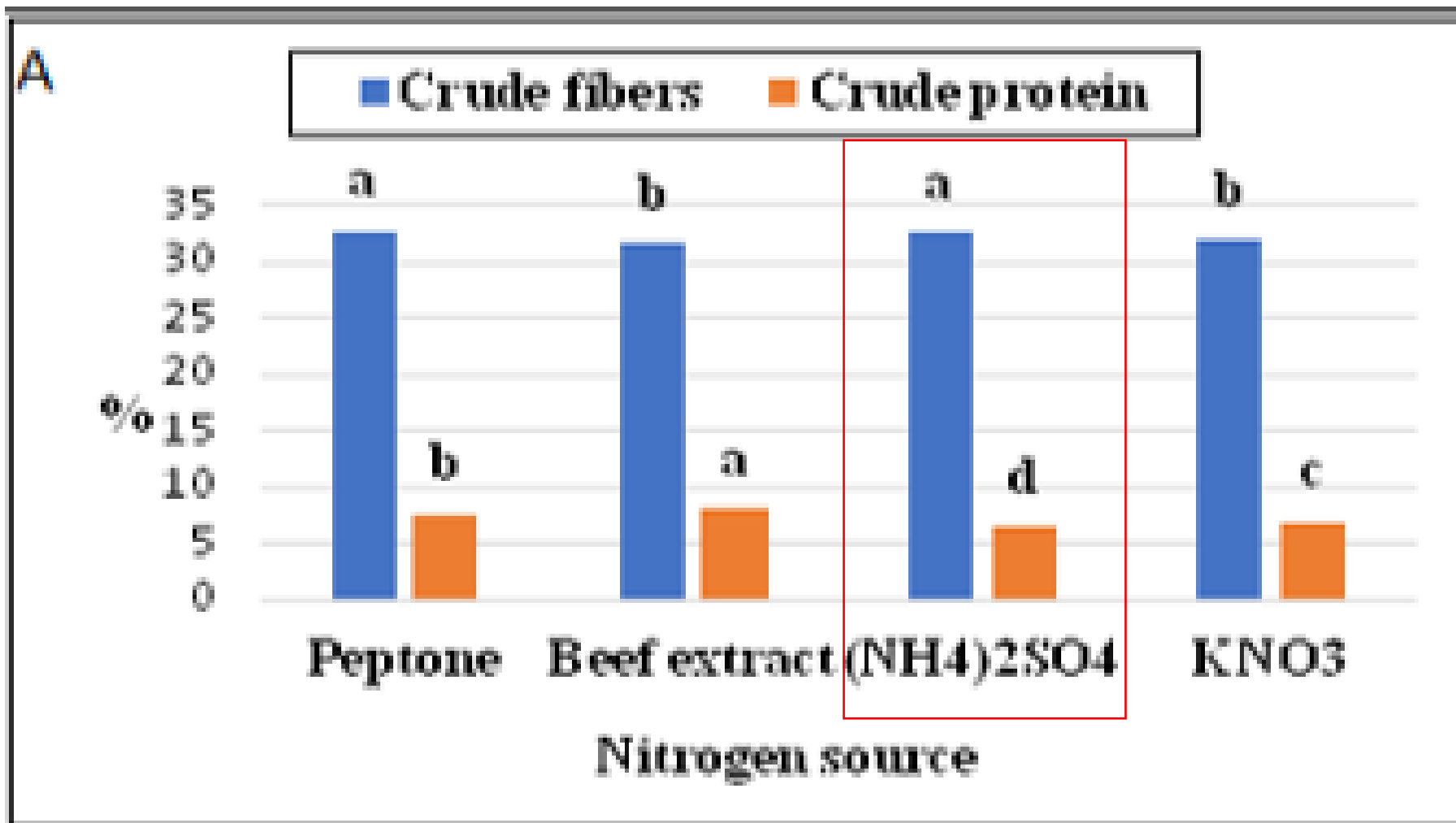
**Incubation
Temperature & Period**

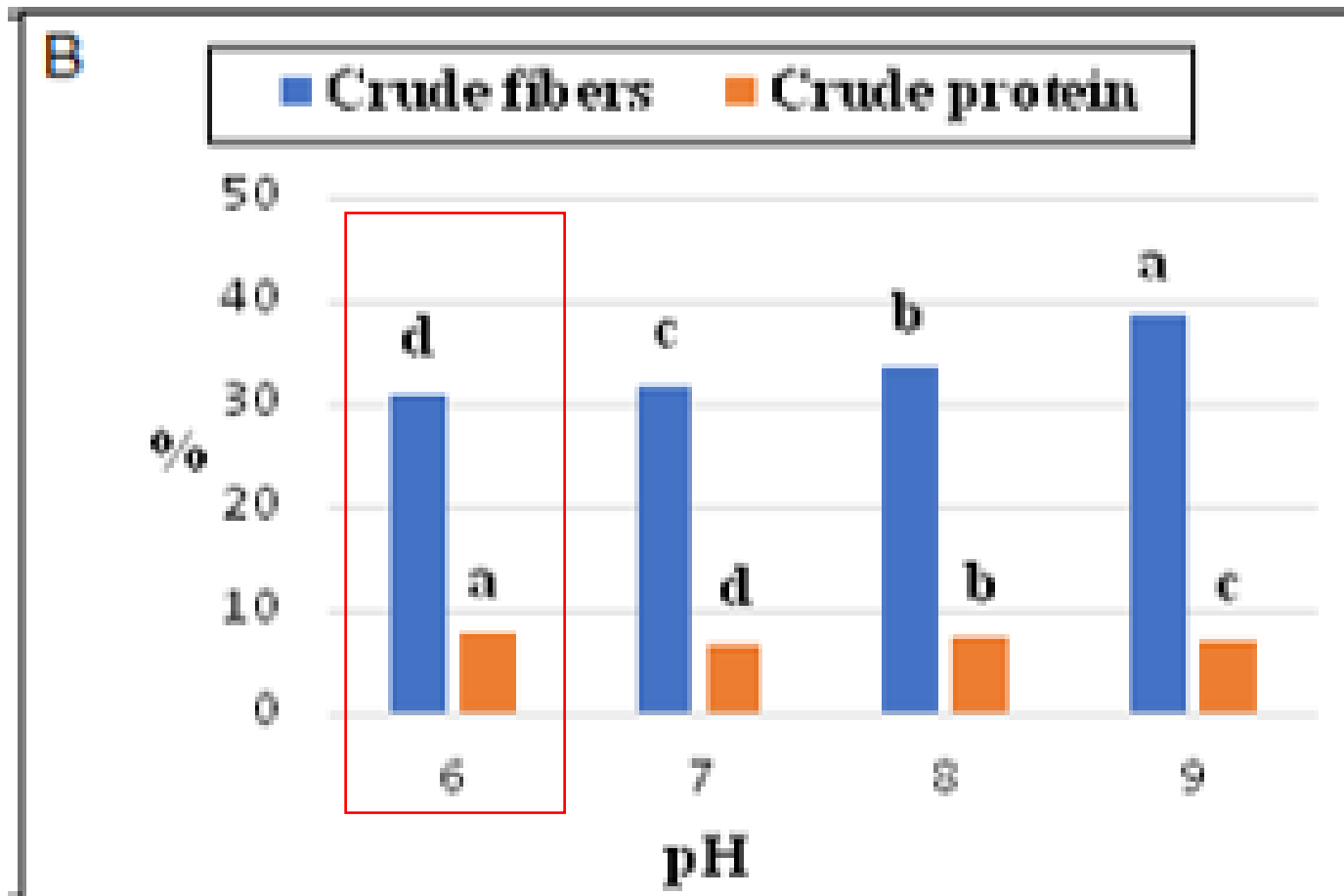
28°C for 14 Days

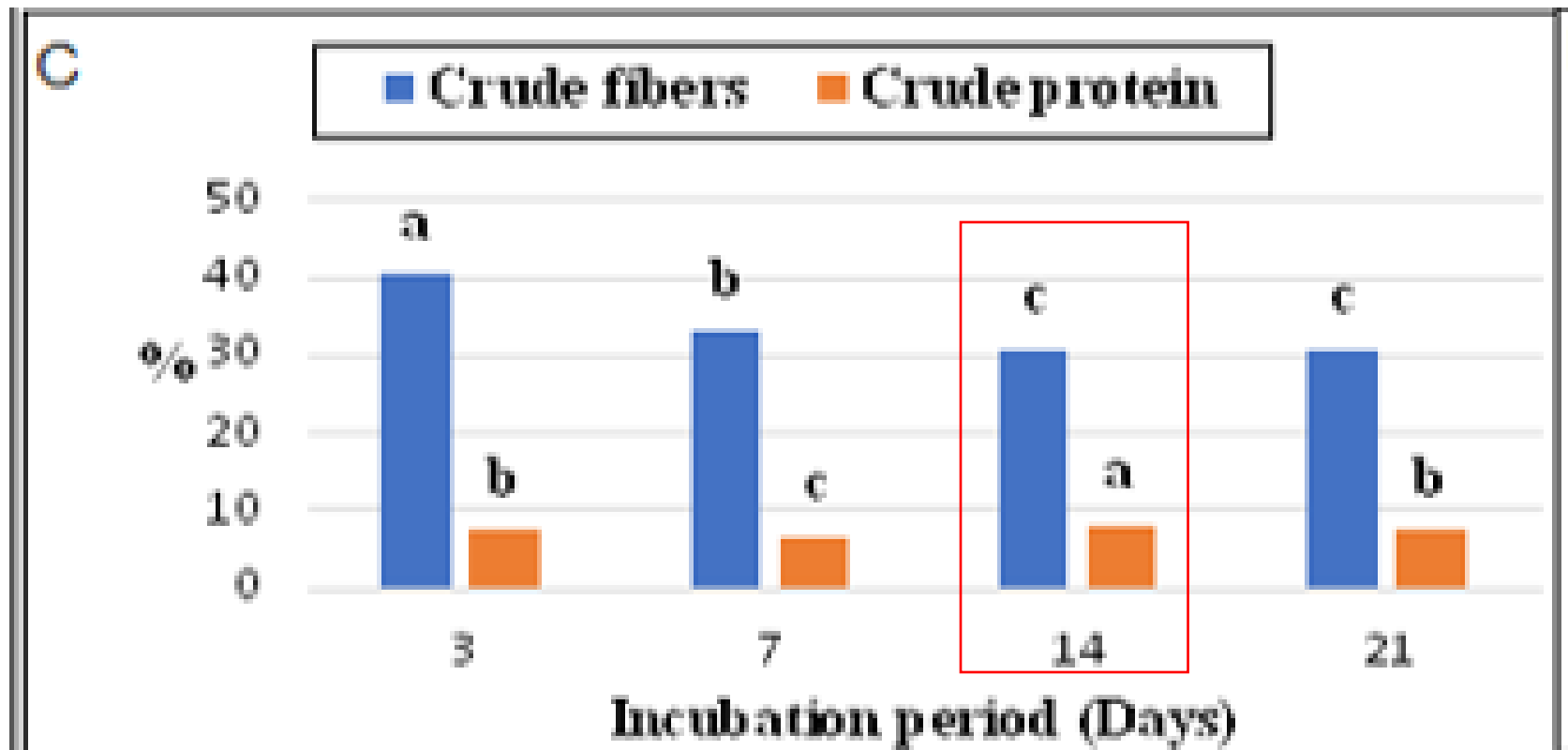


Inoculum Size

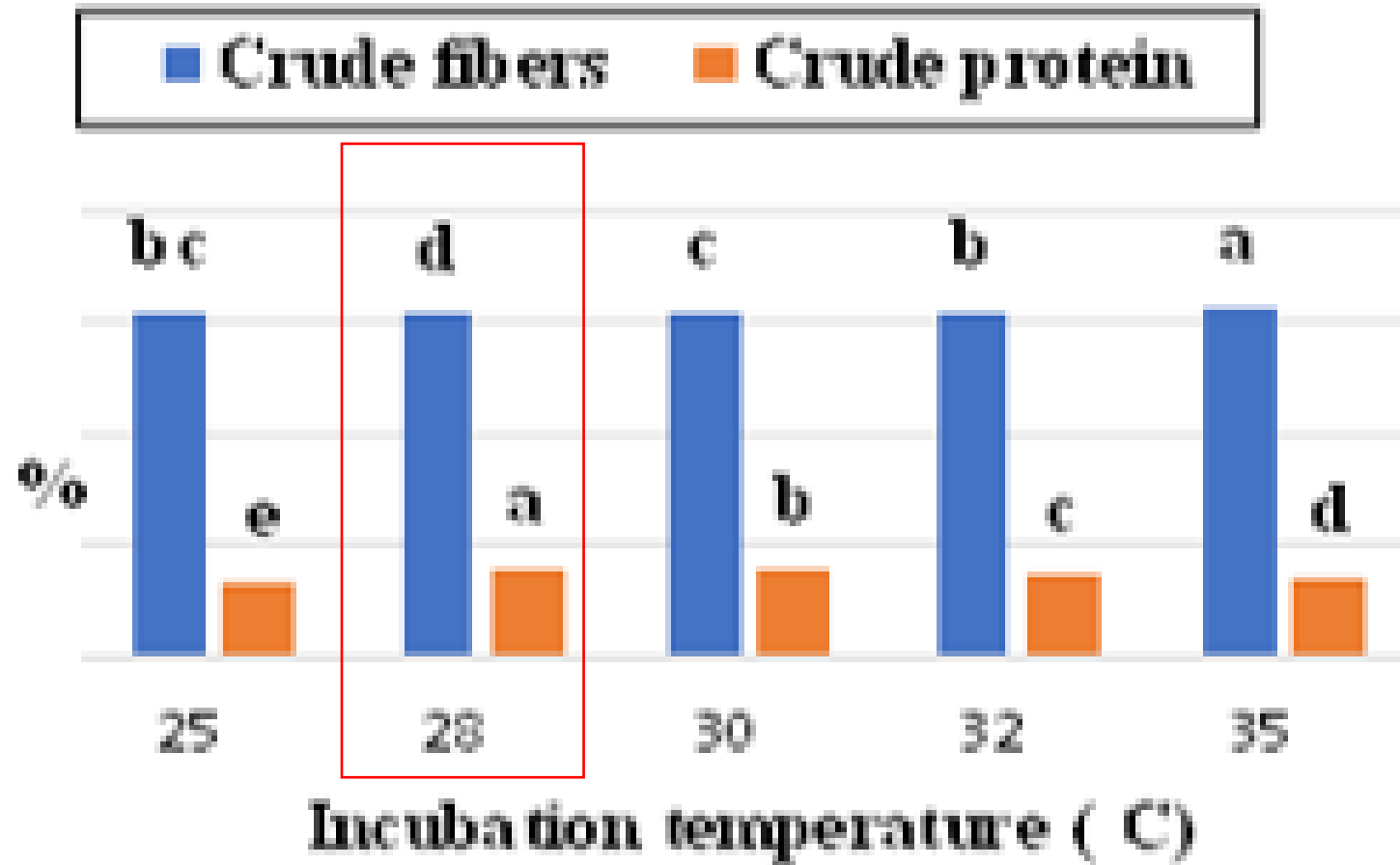
3%

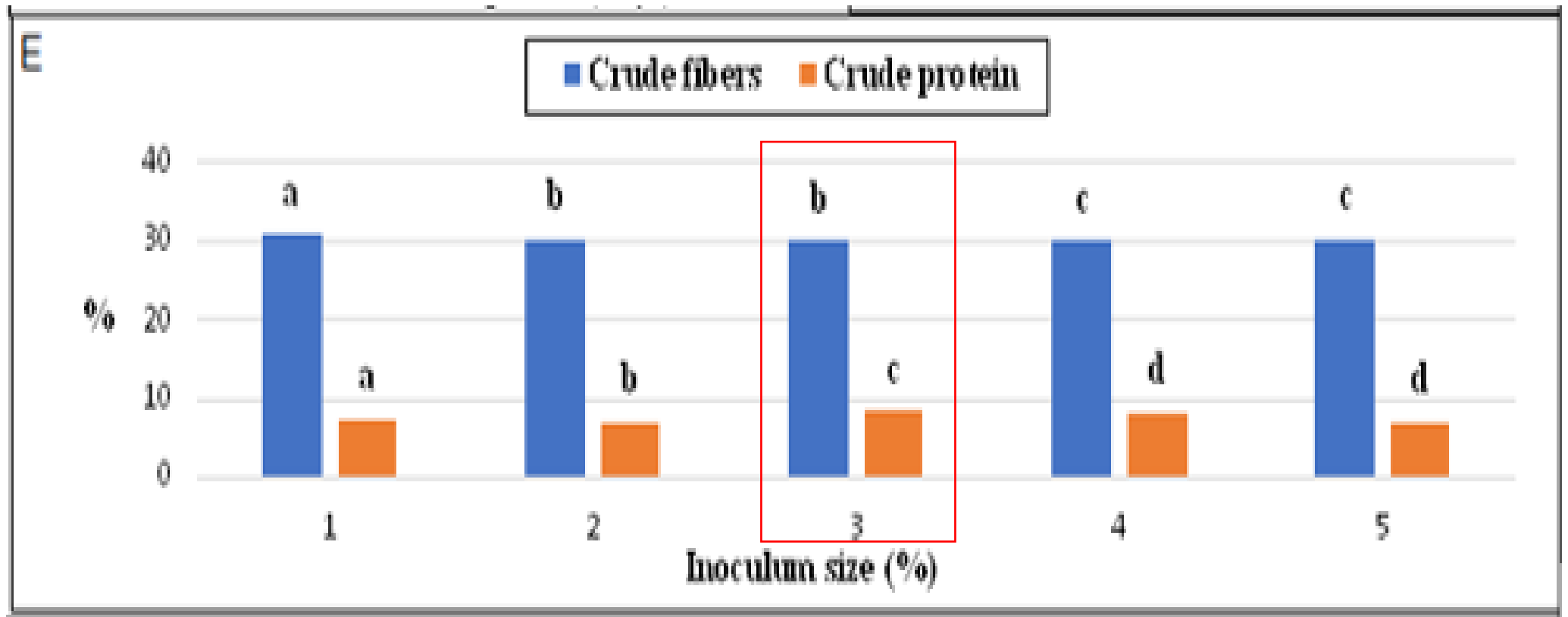






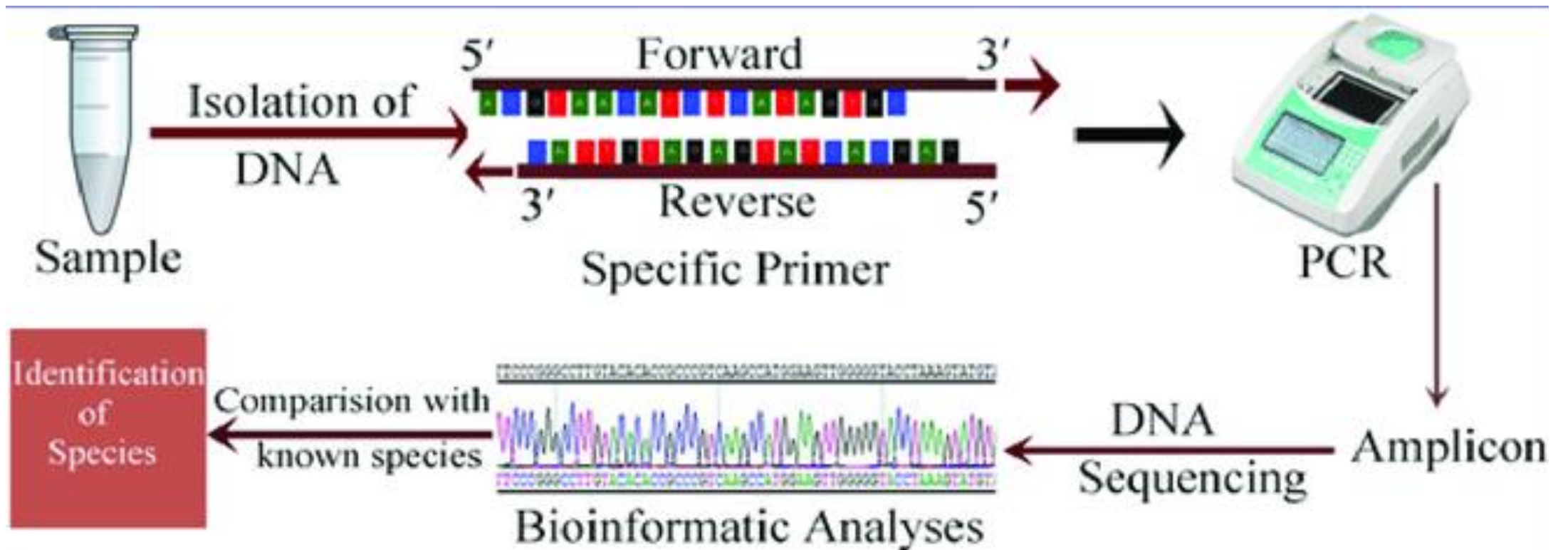
D





Mold Isolate Identification

Molecular Identification was done for the **mold** isolate using ITS gene sequencing.





Aspergillus oryzae

Biological evaluation



Result of First Digestibility trail

Raw material

Table2. Gross energy (GE), apparent metabolizable energy (AME) values (cal/Kg) of treated olive cake.

Treatments	GE	AME
UTOC	4613 ^C	2226 ^b
T1	4663 ^b	2214 ^C
T2	4838 ^a	2367 ^a *
T3	4778 ^{ab}	2226 ^b
T4	4762 ^b	2214 ^C
T5 (Consortium of T3 +T4)	4784 ^a	2367 ^a *

UTOC, Untreated Olive cake, T1, T2 (Bacterial Isolates) T3 (Yeast Isolate) and T4 (Mold Isolate) T5(Consortium of T3 +T4).



Feed evaluation





Conclusion

According to the findings in this study

- OC is a valuable ingredient and may be included in broiler diets.
- Furthermore, these findings support modifying the composition of agricultural by-products to make them more suitable for use in poultry feed.
- leading to a significant reduction in the feeding cost, improving economic returns, and decreasing environmental pollution.

Conclusion

- The Solid-state fermentation (SSF) could be an effective pre-treatment for OC, which could significantly improve available nutrient content.
- In addition, a combination of different treatments may lead to higher digestibility and quality processes of the end product.

Acknowledge

The research leading to these results has received **funding from the European Union's PRIMA Program** for Research, Technological Development, and Demonstration under grant agreement n°2013 and the Basque Country government through the FEADER funds.





SCAN ME



Thank you



Any Questions?