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Bio-remediation agro-based industry's wastewater and mass production of Spirulina (*Spirulina platensis* (Gomont) Geitler 1925)

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INTRODUCTION

Spirulina platensis (Gomant)Geitler 1925)

- **Prokaryotic blue green microalgae**
- **A well known single cell protein**
- **helical shape**
- **Varying degree of Spiralization**
  - **- Different thickness**
  - **- Number of spirals**
- **Effective phytoremediation tool**

Bio-remediation

- **Bio remediation is a process coupling with living microorganisms to break down environmental pollutants, by consuming nutrients present in those waste in order to clean a polluted site.**
- **organic substance synthesis are carbon (C), nitrogen (N) and phosphorus (P) (Delrue et al., 2016).**
- **low-cost nitrogen source**

Justification for this research

- **Increase the usage of local protein *Spirulina***
- **Demonstration & encourages its production in small scale**
- **Waste management by waste recycling.**
- **Encourages the cultivation of local protein in farms**

Objectives

Quick waste removal from selected wastewater from agro-based industries, and identify the suitable organic wastes as the costless media for growing S. platensis for its powder production

MATERIALS & METHODOLOGY

Culturing Spirulina in Zarrouk's media

Collection and preparation of mother culture

Zarrouk's Media preparation

Inoculation of purified mother culture

Sample maintenance

Measuring OD value at initial & end days

Culturing Spirulina in Agro-based wastes

Selection of agro based waste liquids

Sterilization of selected waste (Autoclave,121 ℃ 15mints)

Treatment arrangements

Sample maintenance

Growth measurements by Optical density values

Experimental setup

Type of waste	Treatment	Volume Ratio of waste	Ratio of distilled water (Total volume 1000ml)
Fish pond water			
	T1	1	3
	T2	2	2
	T3	3	1
	T4	4	-
Parboiled rice liquid	T1	1	3
	T2	2	2
	T3	3	1
	T4	4	-
Poultry unit waste water	T1	1	3
	T2	2	2
	T3	3	1
	T4	4	-
Grain soaked water	T1	1	3
	T2	2	2
	T3	3	1
	T4	4	-

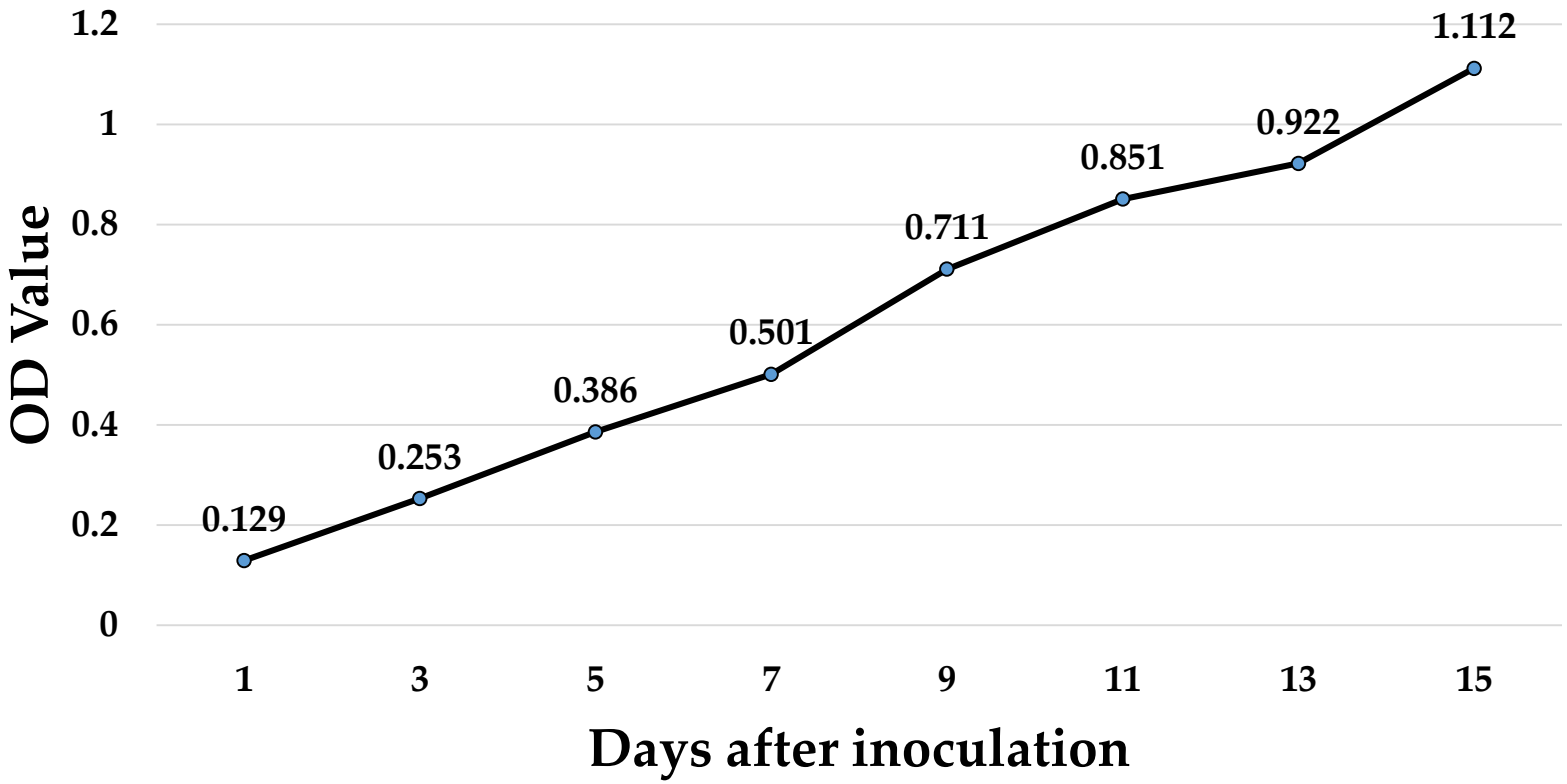
Statistical Analysis

- Data collected in the whole study was analyzed by Microsoft Excel 2013 and SAS software (9.4 version).

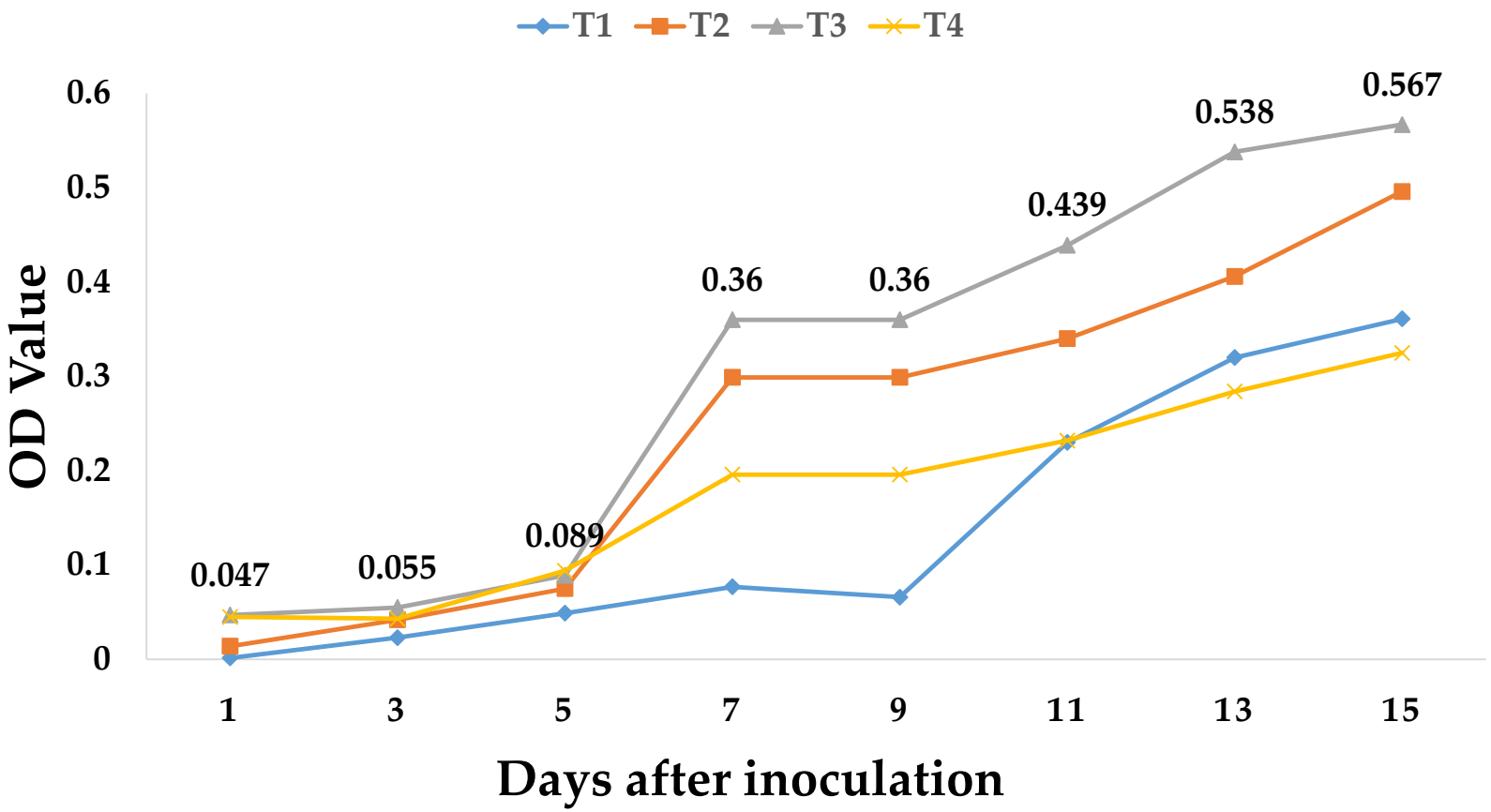
- Duncan's Multiple Ranges Test (DMRT) was used to determine the least significant differences among the treatments at $P > 0.05$.

RESULTS & DISCUSSION

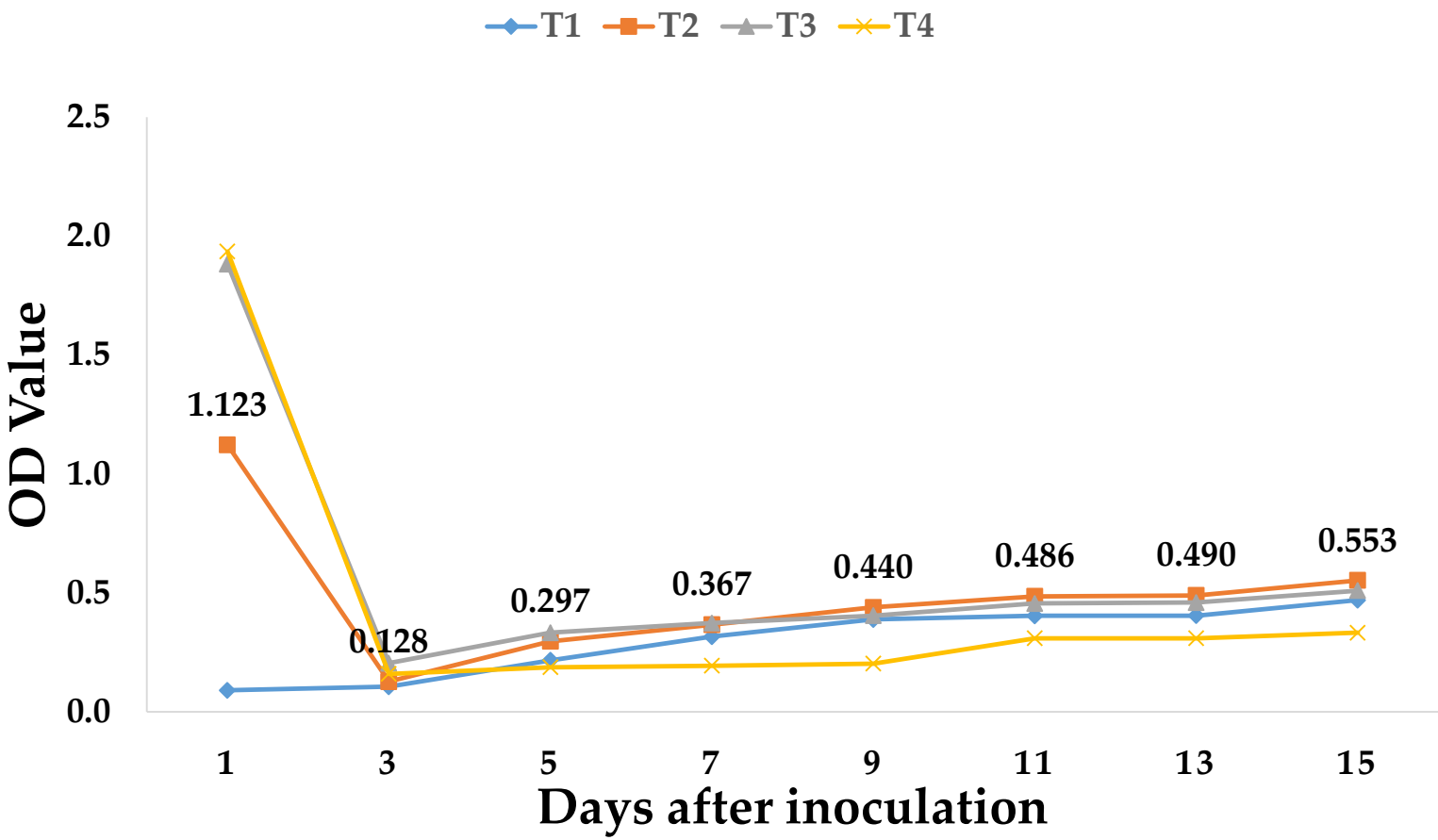
Optical density values of *S.platensis* in Zarrouk's media



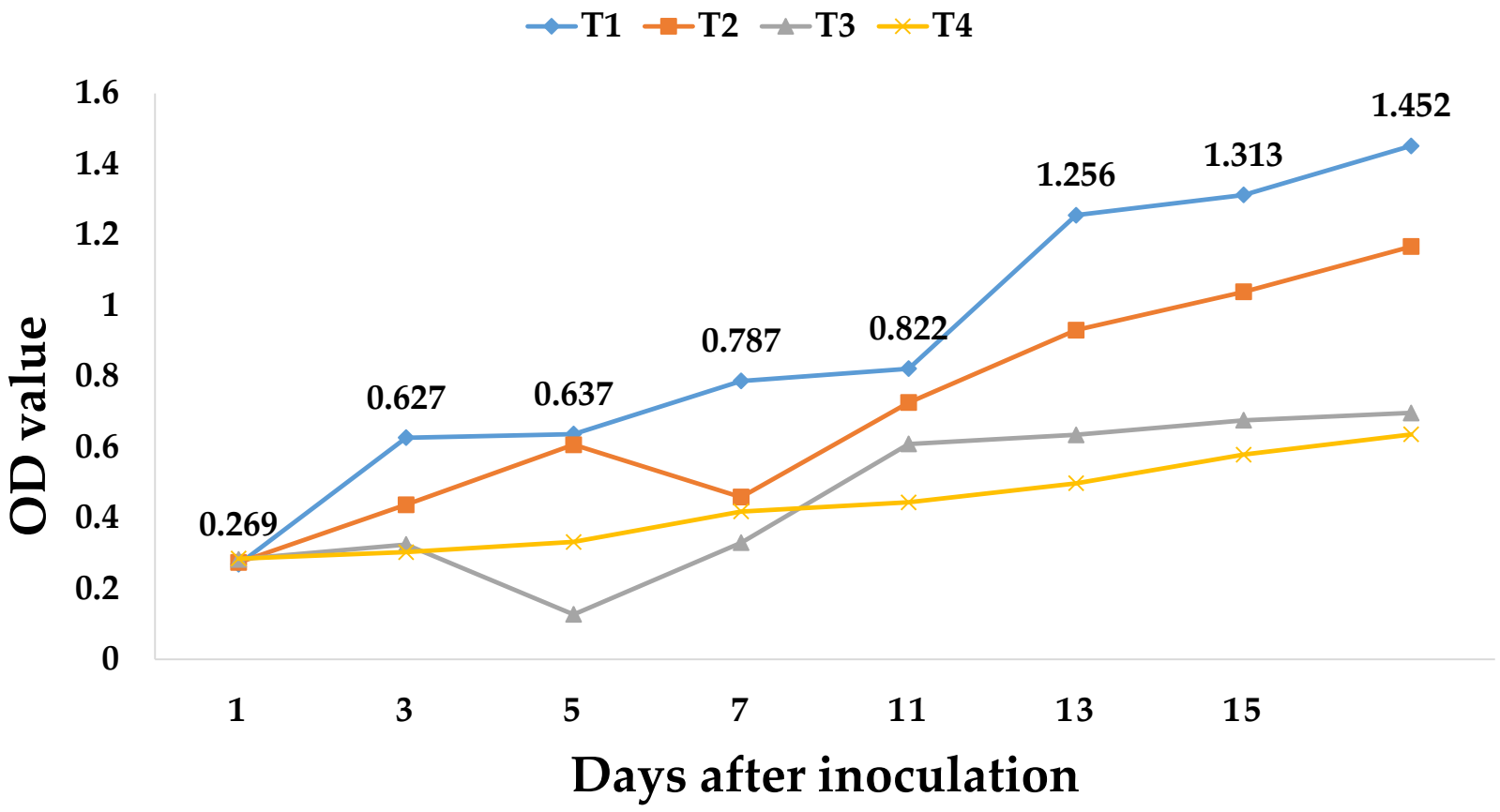
Optical density values of *S.platensis* in fish pond water



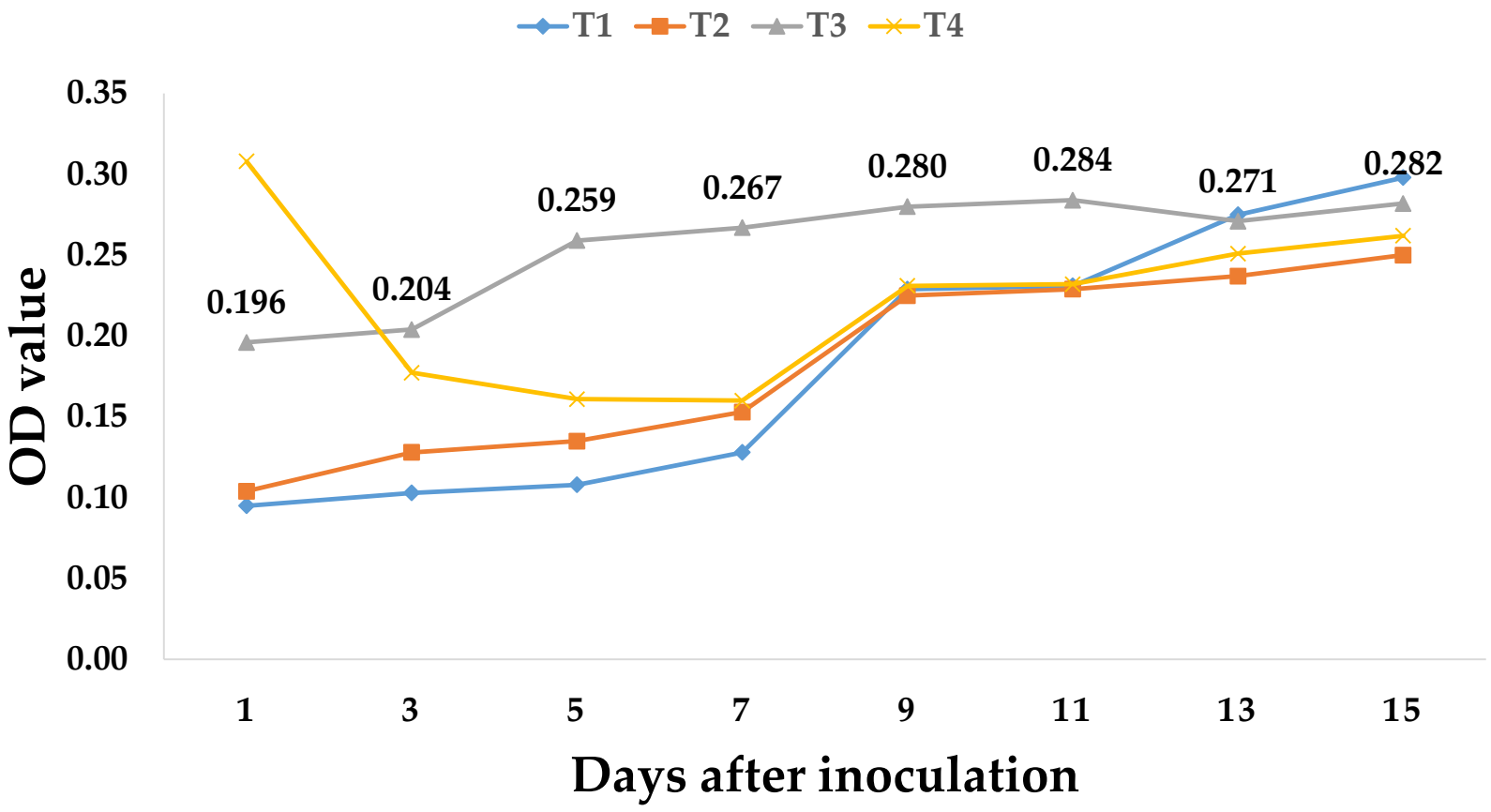
Optical density values of *S.platensis* in parboiled rice liquid



Optical density values of *S.platensis* in poultry unit waste



Optical density values of *S.platensis* in grain soaked water



Comparison of chemical characters

No	Substrate	Chemical characters at the beginning of culturing		Chemical characters at the end of culturing	
		pH	EC(mS/cm)	pH	EC(mS/cm)
1	Parboiled rice liquid	5.21	1.79	6.01	1.01
2	Poultry unit	9.28	1.501	7.5	9.11
3	Fish pond wastewater	7.89	1.87	6.9	9.98
4	Grain soaked water	8.21	1.99	7.1	8.34

Conclusions

- poultry wastewater promotes better growth of S. platensis than other locally available wastewater tested.
- agro-based industry's wastewater can be bio-remediated by growing Spirulina, and nutrient-enriched wastewater can be used for mass culturing of Spirulina without nutrient supplements.

Acknowledgments

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