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Root knot nematode management using chitin rich fish industry by product in organic Brinjal cultivation

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INTRODUCTION

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Brinjal (*Solanum melongena* L .) : Solanaceae

- **Nutrient food in low income people** **(Sharma *et al.*, 2016)**
- **Presence of antioxidant, ranked among top ten vegetables**

(Kandoliya *et al.*, 2015)

- **Brinjal production: 11.93t/ha**

(Department of census and statistics, 2019)

- **78% of damages occur - soil borne pathogens and pest incidence**

(Ndereyimana *et al.*, 2014)

Root knot nematode, *Meloidogyne* spp.

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- ***Meloidogyne incognita*** **is major pest - brinjal**

(Discussion with farmers and DOA, 2020)

- **Nematode population reaches peak at crop maturity stage in susceptible plant** **(Pakeerathan *et al.*, 2009)**

- **Yield reduces by 15-25% to 80%**

(Jiang *et al.*, 2018 and Navarrete *et al.*, 2017)

- **Adequate food supply, less competition of nutrient and susceptible host induce nematode multiplication rate**

(Hussain *et al.*, 2011)

Justification of this research

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- *Meloidogyne incognita*
  - ✓ Reduce yield
  - ✓ Increase cost of production

(Thanduvan, Mullaithevu)

- Reduce synthetic nematicide application

(Nedunkeny, Vavuniya)

OBJECTIVES

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To determine the chitin rich fish industry by-product use as economical nematicidal product on root-knot nematodes, Meloidogyne incognita on Thirunelvelly purple brinjal.

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MATERIALS & METHODOLOGY

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- **This study was carried out in Department of Agricultural Biology, Faculty of Agriculture, University of Jaffna.**

- **Root and soil samples were taken on random sampling method over the field in Nedunkeny, Thanduvan and Omanthai.**

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Isolation & identification

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Nematode infected field identified

Above ground

Below ground

Plant and soil samples collected

Isolation

Direct examination

Oostenbrink dish

Extracted

Exoskeleton of rich fish industry by products used to test against *Meloidogyne incognita*

Shrimp exoskeleton

Crab exoskeleton

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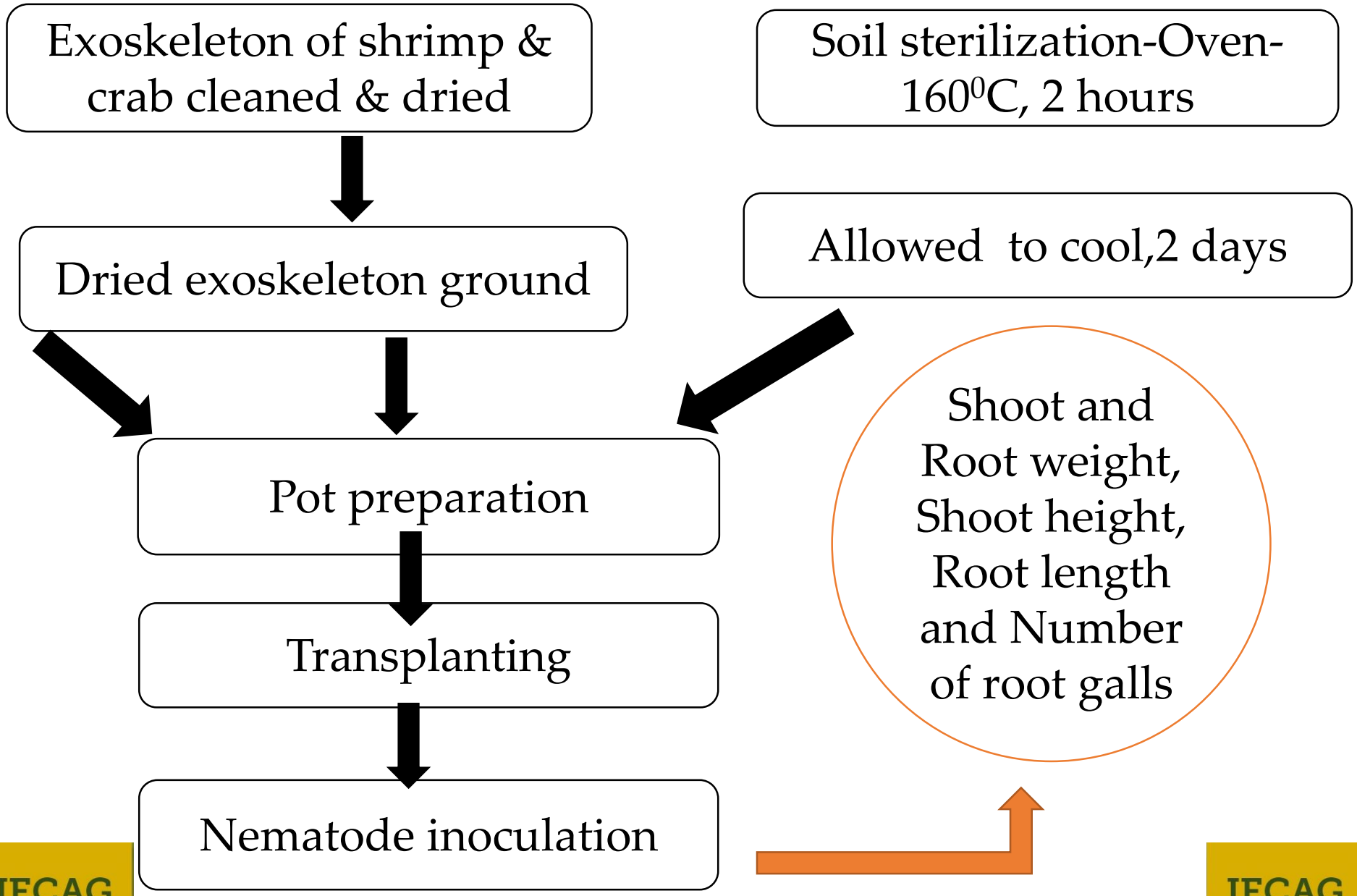

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Statistical Analysis

- Experiments were carried out under Complete Randomized Design significant differences among the treatments at $P > 0.05$.

- Results were analyzed by SAS University Edition.

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RESULTS AND DISCUSSION

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Symptoms of root knot nematode

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Above ground symptom

Yellowing

Below ground symptoms

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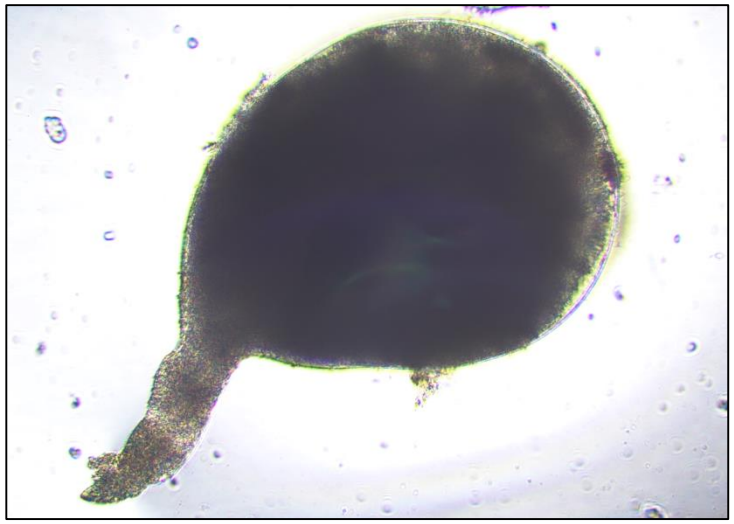
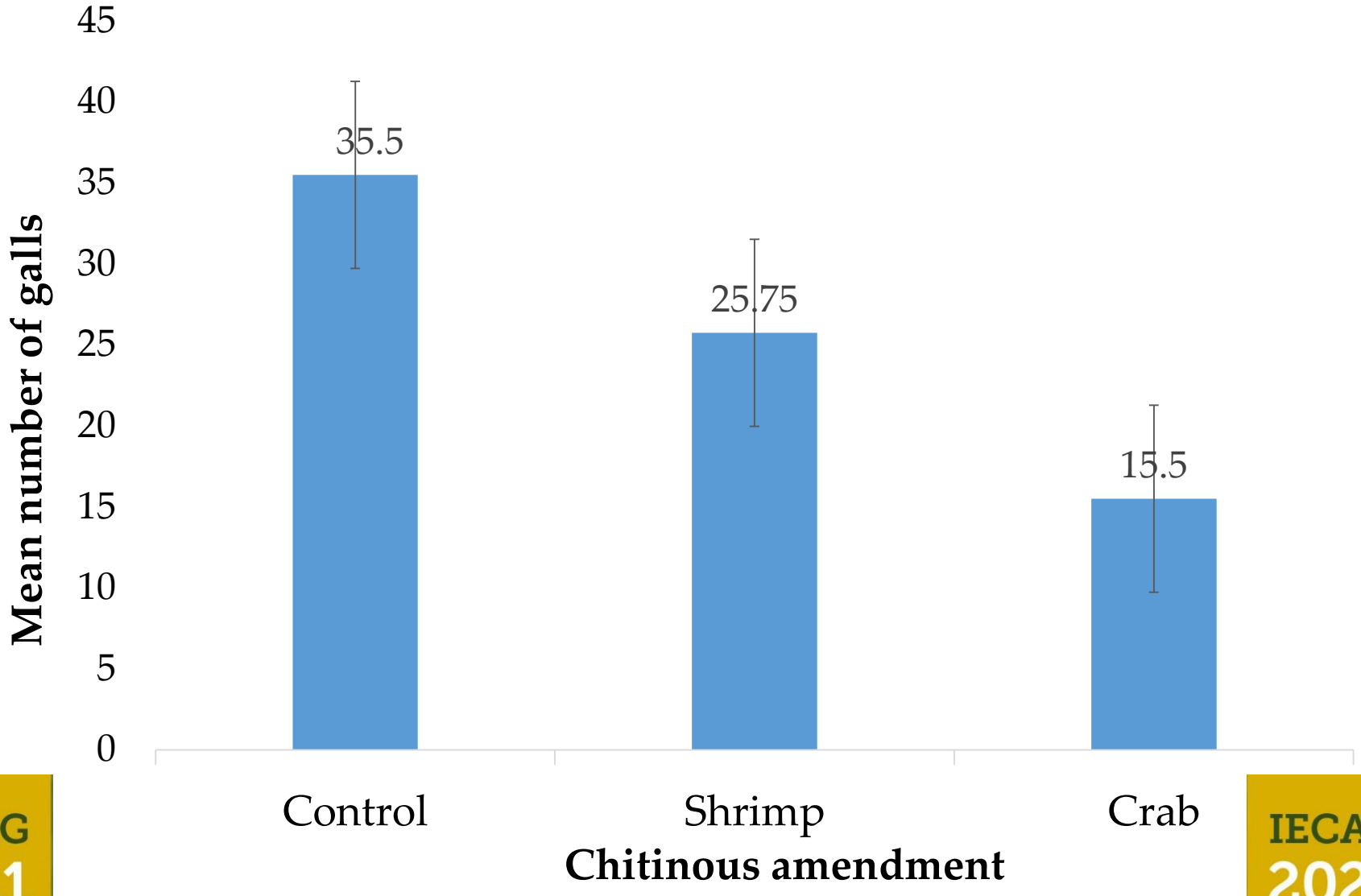


Meloidogyne incognita female×100

M. incognita juveniles ×100

Stylet

Effect of exoskeleton amendments on *Meloidogyne incognita* root galling



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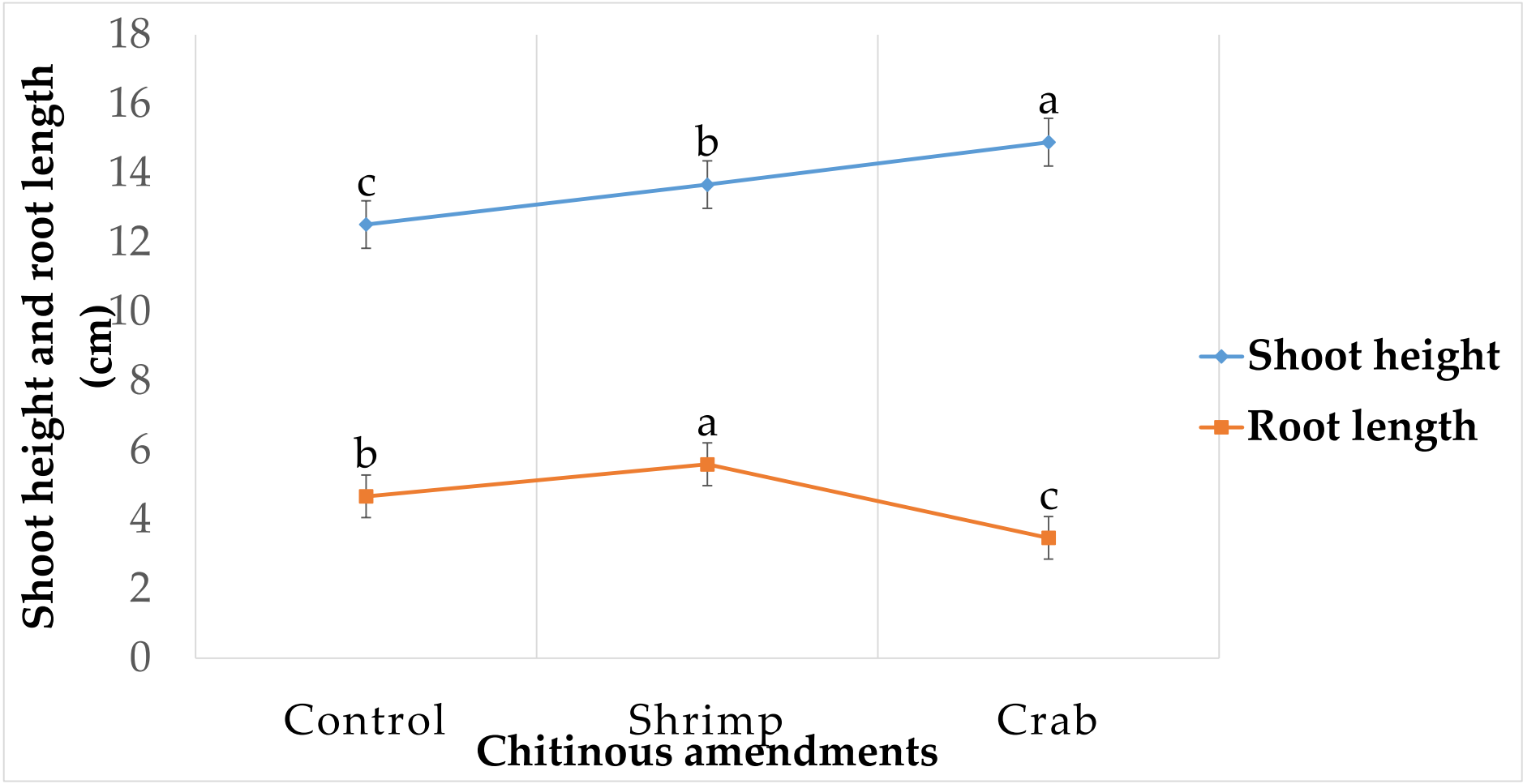
Effect of fish rich by products on plant growth



In same letters indicate that there are not significant difference at α=0.05

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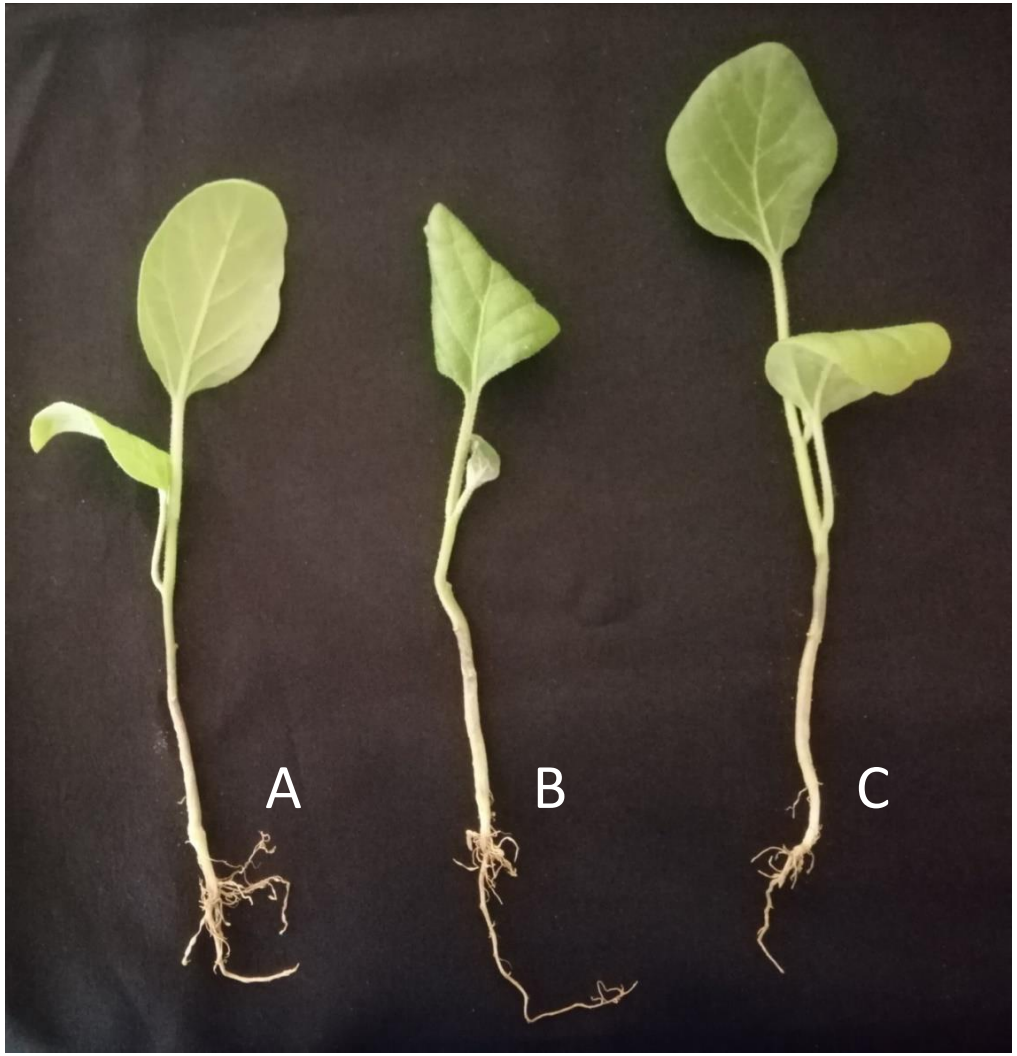
Effect of exoskeletons on *Meloidogyne incognita*

Treatment	Fresh weight (g)		Dry weight (g)	
	Shoot	Root	Shoot	Root
Control	2.84	1.53	1.4	0.14
Shrimp	3.78	0.9	2.66	0.05
Crab	5.39	0.49	4.46	0.02

Performance of *Meloidogyne incognita* infected Thirunevelly purple brinjal under different exoskeletons



A- Control, B- Shrimp exoskeleton and C- Crab exoskeleton

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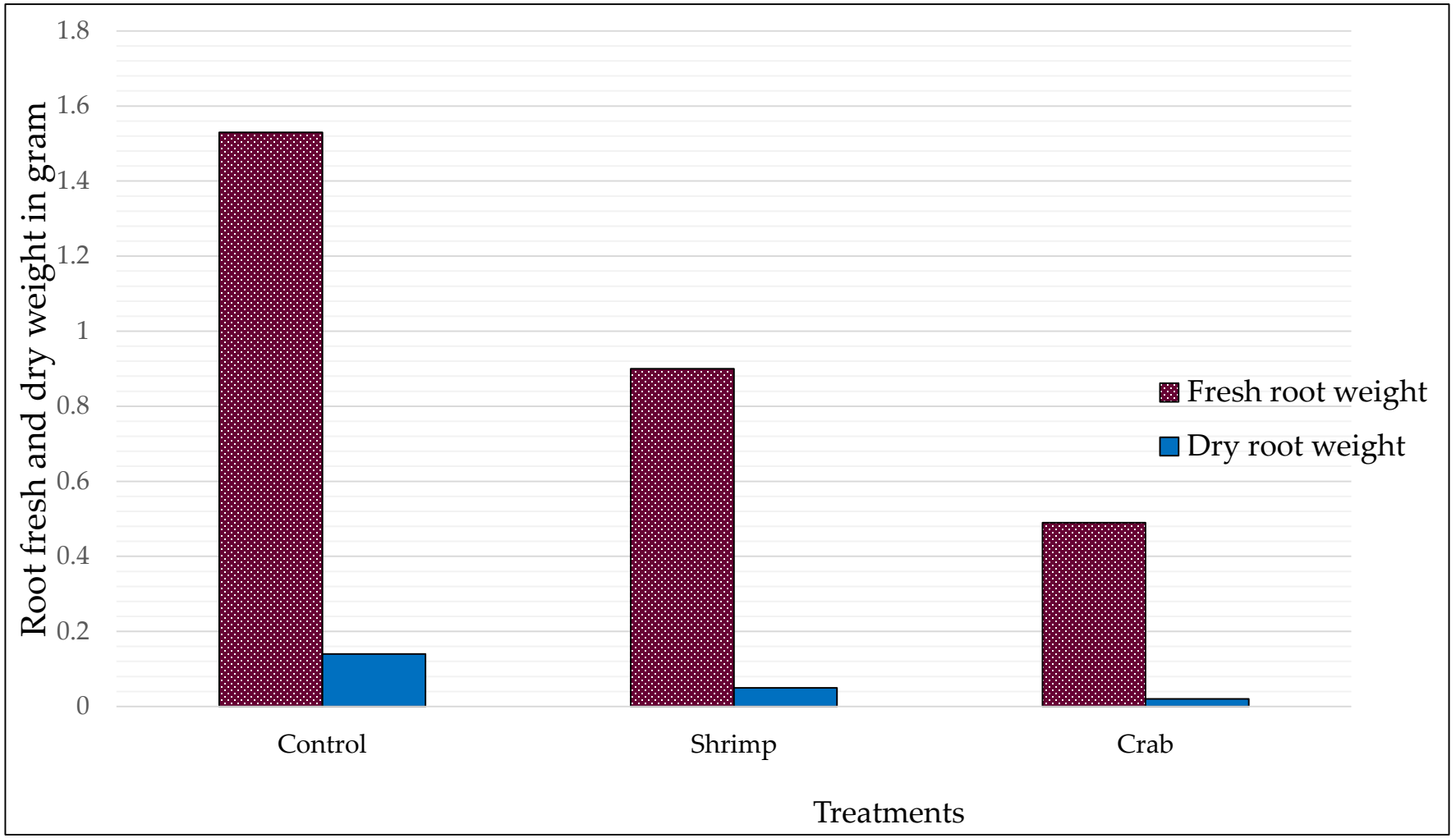
Shoot fresh and dry weight in different exoskeleton treatments



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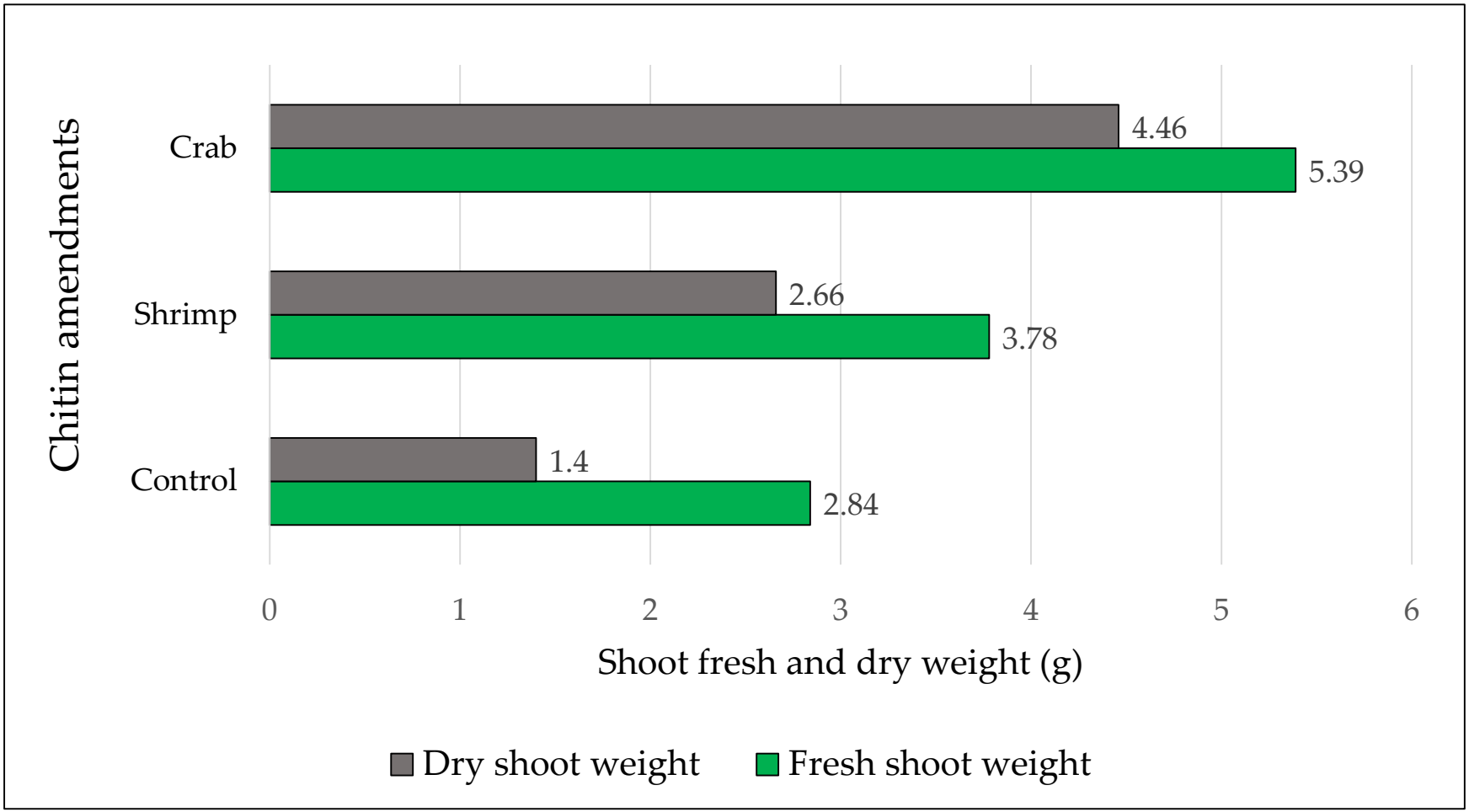
Plant root fresh and dry weight in different fish rich by products



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CONCLUSIONS

- Shrimp shell as well as crab exoskeletons were fought against root knot nematode, *M. incognita*.
- Exoskeleton powders not only reduced the extend of root galls but also stimulate the plant growth parameters.
- Efficient utilization of these amendments reduces the cost of production in agriculture.

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Acknowledgment

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Thank you

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