

**EFFECT OF FOLIAR APPLICATION OF MORINGA (*Moringa oleifera*) LEAF  
EXTRACT WITH RECOMMENDED FERTILIZER ON GROWTH AND YIELD OF  
OKRA (*Abelmoschus esculentus* L.) cv. HARITHA IN SANDY REGOSOL.**



**A.M.KANCHANI DARSHIKA MANIKE ATTANAYAKA**



FAG531



Project Report  
Library - EUSL



**FACULTY OF AGRICULTURE ;**

**EASTERN UNIVERSITY**

**SRI LANKA**

**2018**

**PROCESSED**  
Main Library, EUSL

## ABSTRACT

A field experiment was carried out at the crop farm of Eastern University, Sri Lanka during the period June 2018 to September 2018 to study the effects of different concentrations and frequencies of Moringa (*Moringa oleifera*) Leaf Extract (MLE) as a foliar application with recommended fertilizer on growth and yield of okra (*Abelmoschus esculentus*) plants grown in the sandy regosols of Batticaloa district, with the variety of Haritha.

This experiment was laid out in a Randomized Complete Block Design (RCBD) with three replicates with following treatments; T<sub>0</sub> – control (Distilled water) T<sub>1</sub> – 10% MLE at once a week interval, T<sub>2</sub> – 10% MLE at once in two weeks interval, T<sub>3</sub> – 20% MLE at once a week interval, T<sub>4</sub> – 20% MLE at once in two weeks interval, T<sub>5</sub> – 30% MLE at once a week interval and T<sub>6</sub> – 30% MLE at once in two weeks interval. Foliar application of MLE was started at two weeks after germination and the performance was recorded at 4, 6 and 7 WAP.

The results showed that foliar application of MLE had a significant ( $p < 0.05$ ) effects on tested parameters of okra over the control. MLE with 10% of foliar application at once a week interval increased plant height (1.2%), number of branches/plant (76.1%), number of leaves/plant (47.5%), length of tap root (37.2%), leaf area (75.0%), leaf area index (46.4%), number of flowers/plant (14.2%), total dry weight/ha (64.3%), number of pods/plant (85.2%), length of pod (23.8%), girth of pod (58.6%), number of seeds/pod (27.2%), fresh weight of pods/ha (34.9%), dry weight of pods/ha (104.4%), total yield/ha (134.38%), chlorophyll content (81.7%), total soluble solid (29.7%).

The results suggest that under the conditions in the experiment yield could be increased by three fold (3.34). The use of Moringa leaf extract as a plant growth enhancer can

# TABLE OF CONTENT

ABSTRACT.....	I
ACKNOWLEDGEMENT.....	III
TABLE OF CONTENT.....	IV
LIST OF TABLES.....	IX
LIST OF FIGURES.....	XII
ABBREVIATIONS.....	XIII
1.0.INTRODUCTION.....	1
2.0.REVIEW OF LITERATURE.....	6
2.1.Okra ( <i>Abelmoschus esculentus</i> ).....	6
2.1.1. Origin, History and distribution.....	7
2.1.2. Classification.....	8
2.1.3. Botanical description.....	8
2.1.4. Uses and nutritional composition.....	9
2.1.5. Recommended varieties in Sri Lanka.....	10
2.2.Foliar application.....	12
2.2.1. Foliar application of nutrients.....	12
2.2.2. Foliar application of plant growth regulators.....	13
2.2.3. Foliar application of antioxidants.....	14
2.3.Sources of nutrients, PGRs and antioxidants.....	15
2.3.1. Moringa.....	16
2.3.2. Classification.....	17



2.3.3. Botanical description.....	17
2.3.4. Origin and geographical distribution.....	18
2.3.5. Ecological requirements.....	19
2.3.6. Common uses and nutritional composition.....	19
2.3.7. Areas of cultivation in Sri Lanka.....	21
2.3.8. Moringa Leaf Extract (MLE).....	21
2.3.8.1. Chemical properties of the MLE.....	22
2.3.8.2. Effect of MLE on seed germination.....	23
2.3.8.3. Effect of MLE on plant growth.....	24
2.3.8.3.1. Plant height.....	24
2.3.8.3.2. Number of leaves.....	25
2.3.8.3.3. Length of roots.....	25
2.3.8.3.4. Leaf area.....	26
2.3.8.3.5. Total biomass.....	26
2.3.8.4. Effect of MLE on crop yield and components.....	27
2.3.8.5. Effect of MLE on quality parameters.....	28
2.3.8.6. Other effects of MLE on plants.....	29
<b>3.0. MATERIALS AND METHODS.....</b>	<b>30</b>
3.1. Location.....	30
3.2. Climate.....	30
3.3. Species and variety.....	30
3.4. Experiment.....	30
3.4.1. Experimental design.....	31
3.4.2. Plot size.....	31

3.4.3. Preparation of foliar application.....	32
3.4.3.1.Collection of Moringa leaves.....	32
3.4.3.2.Preparation of Moringa Leaf Extract (MLE).....	32
3.4.3.3.Physio-Chemical analysis of MLE.....	33
3.5.Agronomic practices.....	34
3.5.1. Land preparation.....	34
3.5.2. Planting.....	35
3.6.Cultural practices.....	35
3.6.1. Thinning out and gap filling.....	35
3.6.2. Fertilizer application.....	35
3.6.3. Watering.....	36
3.6.4. Weeding.....	36
3.6.5. Pest and disease management.....	36
3.6.6. Foliar application of MLE.....	36
3.7.Growth assessment.....	37
3.7.1: Growth parameters.....	37
3.7.1.1.Plant height.....	37
3.7.1.2.Number of branches.....	37
3.7.1.3.Number of leaves.....	37
3.7.1.4.Length of tap root.....	37
3.7.1.5.Leaf area.....	37
3.7.1.6.Leaf area index.....	37

3.7.1.7. Number of flowers.....	37
3.7.1.8. Length of pod.....	38
3.7.1.9. Girth of pod.....	38
3.7.1.10. Weight of plant.....	39
3.7.1.11. Days for 50% and 100% flowering.....	39
3.7.2. Yield and yield components.....	39
3.7.2.1. Number of pods.....	39
3.7.2.2. Number of seeds.....	39
3.7.2.3. 100 seeds weight.....	39
3.7.2.4. Yield per hectare.....	39
3.7.3. Quality parameters.....	40
3.7.3.1. Chlorophyll content.....	40
3.7.3.2. Total soluble solids.....	40
3.8. Statistical analysis.....	40
<b>4.0. RESULTS AND DISCUSSION.....</b>	<b>41</b>
4.1. Effect of foliar application of MLE on growth parameters of okra.....	41
4.1.1. Plant height.....	41
4.1.2. Number of branches/plant.....	42
4.1.3. Number of leaves/plant.....	44
4.1.4. Length of tap root.....	44
4.1.5. Leaf area.....	47
4.1.6. Leaf area index.....	47
4.1.7. Days for 50% and 100% flowering.....	49
4.1.8. Number of flowers/plant.....	50

4.1.9. Dry weight of leaves/hectare.....	52
4.1.10. Dry weight of stems/hectare.....	53
4.1.11. Dry weight of roots/hectare.....	55
4.1.12. Total dry weight of leaves, stems, roots, pods.....	56
4.1.13. Length of pod.....	58
4.1.14. Girth of pod.....	58
4.2.Effect of foliar application of MLE on yield and yield components.....	60
4.2.1. Number of pods/plant.....	60
4.2.2. Number of seeds/pod.....	61
4.2.3. Fresh weight of pods/hectare.....	63
4.2.4. Dry weight of pods/hectare.....	63
4.2.5. Total yield (ton/ha).....	65
4.2.6. 100 seed weight.....	66
4.3.Effect of foliar application of MLE on quality parameters of okra.....	68
4.3.1. Leaf chlorophyll content.....	68
4.3.2. Total Soluble Sugar (TSS) content of pods.....	68
5.0.CONCLUSION .....	71
6.0.REFERENCES.....	72