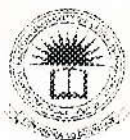


**EVALUATION OF DIFFERENT SEED TREATMENT
METHODS FOR CHILLI (*Capsicum annum L.*)**



BY

DEEGODA GAMAGE BAWANI MALSHA



FAG544



Project Report
Library - EUSL

DEPARTMENT OF AGRICULTURAL BIOLOGY

FACULTY OF AGRICULTURE

EASTERN UNIVERSITY

SRI LANKA

2018

PROCESSED
Main Library, EUSL

ABSTRACT

Seed borne pathogens can cause ample damages to seeds and seedlings of chilli. The present investigation was undertaken at the Eastern University (EUSL), Sri Lanka to evaluate different seed treatment methods for chilli (*Capsicum annuum* L.). Chilli seeds of variety PC-1 were collected from the EUSL farm. This study consisted of 4 types of experiments. Among them up to third experiment, they were conducted under *in vitro* condition and fourth experiment was conducted under *in vivo* condition. All the four experiments were laid out in the Completely Randomized Design (CRD). The first two experiments were carried out in order to obtain the best Clorox solution with the combination of concentration and soaking time period with the twelve different treatments with three replications and best Bougainvillea leaf extract with the combination of concentration and soaking time duration with the eight different treatments with three replications.

The potential of the treatments were evaluated. Clorox (5% concentration with 40 minutes soaking time duration), Bougainvillea leaf extract (20% concentration with one hour soaking time duration), Captan (4g / kg) and water (overnight) for the seed treatment of variety PC-1. Then the seeds were treated in each treatment. Each treatment had five replications. The treated seeds were placed on moistened sterilized filter paper. Data were recorded on germination percentage, number of days taken to germinate 50% of seeds. Among the seed treatment agents which were used in present study found to be Clorox and Captan effective in germination percentage. The highest germination percentage was achieved in Captan and the lowest germination percentage was obtained in water. The same result was obtained in number of days taken to

germinate 50% of seeds. In compared captan with water germination percentage was increased in seeds which were treated by captan by 58.10% over the water.

In calculation of Colony Forming Unit (CFU), it was consisted with five replications. Lowest CFU value was obtained by seed suspension which was treated by Captan. Then it was followed by Clorox. Highest CFU value was gained by water. After the 12 days of incubation, inoculated the fungi with conidia to a new petridish from the petridish which were used in CFU calculation. *Aspergillus flavus* and *Rhizopus* sp. were found to be associate with tested chilli seeds sample.

In the fourth experiment it was conducted as field experiment under *in vivo* condition and measured the disease incident percentage, leaf area, seedling length and seedling vigour index. In the field experiment, seedling characters such as seedling length and leaf area were significantly influenced by Captan treatment. Seedling vigour index and Disease incidence percentage were significantly influenced by Clorox and Captan.

Captan increased the seedling length (67.5%), leaf area (98%), seedling vigour index (71.8%) over the water. Clorox increased seedling length by (32%), leaf area (96%), seedling vigour index (64.9%) over the water. Bougainvillea leaf extract increased seedling length (40.2%), leaf area (95.3%) and seedling vigour index (37.5%) over the water.

Captan, Clorox and Bougainvillea leaf extract reduced the diseases incidence percentage by 54.13%, 45.83 and 4.16% respectively over the water. This could be due to antimicrobial properties of Captan, Clorox and Bougainvillea leaf extract.

TABLE OF CONTENTS

Page no.

ABSTRACT	I
ACKNOWLEDGEMENTS.....	III
TABLE OF CONTENTS.....	IV
LIST OF TABLES.....	VII
LIST OF FIGURES.....	VIII
LIST OF PLATES.....	IX
ABBREVIATIONS.....	X
CHAPTER 1 INTRODUCTION.....	1
CHAPTER 2 LITERATURE REVIEW.....	2
2:1 Chilli.....	5
2.1.1 Taxonomy.....	6
2.1.2 Botany of chilli.....	6
2.1.3 Use and importance.....	7
2.1.4 Nutritional importance.....	9
2.1.5 Global production.....	10
2.1.6 Production constraints.....	11
2.1.7 Pathogenic diseases associated with chilli crop.....	13
2.1.8 Seed bone diseases in chilli.....	18
2.2 Importance of seeds.....	20
2.2.1 Seed treatment.....	21
2.2.2 Synthetic chemicals as seed treatments.....	24
2.2.3 Plant extraction as seed treatment.....	25
2.2.4 GRAS compounds as seed treatment.....	26
2.2.5 Effect of seed treatment on growth of plants.....	27
2.3 Colony Forming Unit counting in seed suspension.....	27

CHAPTER 3 MATERIALS AND METHODS.....	28
3.1 Experimental site.....	28
3.2 Collection of seeds.....	28
3.3 Seed treatments.....	28
3.4 Sterilization of materials needed.....	28
3.4.1 Moist heat sterilization.....	28
3.4.2 Dry heat sterilization.....	29
3.5 Preparation of Bougainvillea leaf extract as a seed treatment.....	29
3.6 Preparation of Clorox as a seed treatment.....	30
3.7 Experiment 1 Determination of effective Clorox treatment for the seed Treatment of chilli.....	30
3.7.1 Determination of germination percentage.....	30
3.8 Experiment 2 Determination of effective Bougainvillea treatment for the Seed treatment of chilli.....	31
3.8.1 Determination of germination percentage.....	31
3.9 Experiment 3 <i>In vitro</i> evaluation of different seed treatment methods.....	31
3.9.1 Determination of germination percentage and days taken to germinate 50% of seeds undergone different seed treatments.....	32
3.9.2 Counting total number of viable micro organisms.....	32
3.9.2.1 Preparation of PDA medium.....	32
3.9.2.2 Pouring of PDA media.....	33
3.9.2.3 Preparation of serial dilution plate technique.....	33
3.9.3 Identification of pathogenic fungi by their morphological Characteristics.....	34
3.10 Experiment 4 <i>In vivo</i> evaluation of different seed treatment methods...	35
3.10.1 Preparation of pots.....	35
3.10.2 Experimental design.....	35
3.11 Statistical analysis	38

CHAPTER 4 RESULTS AND DISCUSSIONS	39
4.1 Experiment 1 Determination of effective Clorox treatment for the seed treatment of chilli.....	39
4.1.1 Germination percentage of chilli seeds.....	39
4.1.2 Number of days taken to germinate 50% of chilli seeds.....	41
4.2 Experiment 2 Determination of effective Bougainvillea treatment for the Seed treatment of chilli.....	43
4.2.1 Germination of percentage under different concentrations of Bougainvillea solution.....	43
4.2.2 Number of days taken to germinate 50% of chilli seeds under different Concentrations of Bougainvillea solution.....	46
4.3 Experiment 3 <i>In vitro</i> evaluation of different seed treatment methods.....	47
4.3.1 Germination percentage of chilli seeds.....	47
4.3.2 Number of days taken to germinate 50% of seeds.....	49
4.3.3 Counting total number of viable micro organisms.....	50
4.3.4 Identification of fungi by their morphological characteristics.....	51
4.4 Experiment 4 <i>In vivo</i> evaluation of different seed treatment methods.....	52
4.4.1 Seedling length of chilli seedlings under different treatments <i>in vivo</i> Conditions.....	52
4.4.2 Diseases incident percentage of chilli seedlings under different treatments <i>in vivo</i> conditions.....	53
4.4.3 Seedlings vigour index under different treatments <i>in vivo</i> condition....	54
CHAPETR 5 CONCLUSIONS.....	55
SUGGESTIONS FOR FUTURE STUDIES.....	56
REFERENCES.....	57
APPENDICES	