University of Agricultural Sciences, Raichur

Ad-hoc Project Report

On

"Seed rhizome quality enhancement technique for better seedling establishment in Ginger"

Submitted
To

Dr. Suresh Bhat
High-Tech Agri Services, # 47, 2nd CROSS
P&T colony, RT Nagar, Benagaluru - 560 032

Submitted by

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COLLEGE OF AGRICULTURE, RAICHUR

"Submission of Research Project to High-Tech Agri Services, Benagaluru for funding"

1.	**Title of the project**	Seed rhizome quality enhancement technique for better seedling establishment in Ginger
2.	**Location**	College of Agriculture, Raichur
3.	**Duration**	*Rabi* 2016
4.	**Principal Investigator**	**Dr. N.M Shakuntala** Professor and Head Department of Seed Science and Technology College of Agriculture, Raichur 584 104
5.	**Co- PI (s)**	1. **Dr. Ashok Hugar** Professor and Head Department of Horticulture College of Agriculture, Raichur 584 104 2. **Dr. Vijaykumar K** Assistant Professor Department of Seed Science and Technology College of Agriculture, Raichur 584 104 3. **Dr. Sekhar Patil** Assistant Professor Department of Horticulture College of Agriculture, Raichur 584 104

6. Objective:

To study the effect of bio-priming of seed rhizomes with "Magic"bio-product for enhancing the seedling vigor of Ginger.

7. Justification:

Ginger belongs to the *Zingiberaceae* family and is closely related to turmeric, cardomon and galangal. The rhizome (underground part of the stem) is the part commonly used as a spice. It is often called ginger root, or simply ginger. Ginger has a very long history of use in various forms of traditional/alternative medicine. It has been used to help digestion, reduce nausea and help to fight the flu and common cold, etc. Ginger can be used fresh, dried, powdered, or as an oil or juice, and is sometimes added to processed foods and cosmetics. It is a very common

ingredient in recipes. The unique fragrance and flavour of ginger come from its natural oils, the most important of which is gingerol. Gingerol is the main bioactive compound in ginger, responsible for much of its medicinal properties. It has powerful anti-inflammatory and antioxidant effects.

The major ginger producing countries are India, China, Nigeria, Indonesia, Bangladesh, Thailand, Philippines, Jamaica etc. Nigeria ranks first with respect to area under ginger covering about 56.23 % of the total global area followed by India (23.6%), China (4.47%), Indonesia (3.37%) and Bangladesh (2.32%). India ranks first with respect to ginger production contributing about 32.75% of the world's production followed by China (21.41%), Nigeria (12.54%) and Bangladesh (10.80%).

Ginger is important spice crop of India and accounts for 45 % of the world's ginger production. Mainly grown in Kerala and on very small area in Karnataka, Tamil Nadu, West Bengal, Bihar, Himachal Pradesh, Uttar Pradesh and Maharashtra. Area under cultivation in India is about 63,000. ha with total production of about 2 lakh tones. The average productivity is about 3tones/ha.

Now a days phytohormones have been commercialized in-high value horticultural crops which play an important role on growth and yield of field crops by increasing total biological yield or the harvest index. Hormones regulate physiological process and synthetic growth regulators may enhance growth and development of field crops thereby increase total dry mass of a field crops. Plant growth regulators are synthesized indigenously by plants, however, several studies demonstrated that plants can be respond to exogenous application of these chemicals. An exogenous application of plant growth regulators affects the endogenous hormonal pattern of the plant, either by supplementation of sub-optimal levels or by interaction with their synthesis, translocation or inactivation of existing hormones levels.

Priming technique is used to modify physiological performance during germination or early seedling growth and bringing as many individual seeds as possible to the brink of radicle emergence using controlled hydration process. The final aim is to enhance germination percentage or speed, which translates into faster, more uniform field emergence and final level of establishment. Since the ginger is rhizomatous crop, good germination, early establishment

of seedlings and better root growth is required for better development of the crop. Here the seed rhizomes are primed with the product in different concentrations for different durations to know its effect on seedling emergence.

8. Methodology:

1.	Design used for analysis	Completely Randomised Block Design (CRBD)
3	No. of replications	Three

Ginger is propagated by using portions of healthy mother rhizomes called as sets. Each healthy set to be used for planting should be 2.5 to 5 cm long, weighing 20-25 g and having two or three buds each. The seed rhizomes will be soaked in different concentrations of Magic growth regulator for different durations, drained and then used for planting. These treatment imposed sets will be tested in plastic cups filled with sand and soil media mixture of suitable size will be used for raising the seedlings of all recommended treatments comprising three treatments. The effect of seed rhizome priming with the product Magicon seedling vigour and speed of seedling emergence will be determined based on different observations.

Treatment Details

Treatment No.	Treatment
Experiment I	**Standardization of Seed rhizome priming duration**
Ginger seed rhizomes were soaked in different concentrations of Magic growth regulator solution for two hours, as minimum 1 hour is required to absorb the growth regulator. After two hours rhizomes were taken out by properly draining water from the solution and directly sown in the cups and observed for vigour parameters after 45 days.	
Experiment II	**Effect of Seed rhizome priming with Different concentrations of bioproduct on seedling emergence**
T1	Control (seed rhizome without treating)
T_2	Magic" 1 gms / litre of water
T_3	Magic" 2 gms / litre of water
T_4	Magic" 3 gms / litre of water
T_5	Magic"4 gms / litre of water
T_6	Magic" 5 gms / litre of water
T7	Magic" 6 gms / litre of water

9. Observations:

Growth parameters

Sprouting percentage

Number of rhizomes sprouted in each treatment was counted after 45 days planted in sand in trays under laboratory condition and was expressed in percentage.

Plant height

The plant height was recorded from the ground level upto the base of fully opened youngest leaf. The average value of three plants was taken for analysis at all stages. Plant height was expressed in centimeters.

Number of tillers

Total number of tillers produced per plant was recorded from the average value of three plants for each treatment.

Number of leaves

Fully opened leaves from each of three random plants were counted and the average was expressed as number of leaves per shoot.

Leaf Area

The length of the leaf was measured from the leaf blade joint to the tip of the leaf along the midrib and the width was recorded at the widest point of leaf lamina. The leaf area was found by multiplying the product of leaf length and width with a conversion factor 0.666 and total number of leaves per plant to arrive at the actual leaf area.

Treatment	Sprouting percentage	Plant height(cm)	Root length (cm)	Seedling vigour index	No of tillers	No of leaves	Leaf area(dm2)
T1 (1 ml/ltr of water)	72	20.9	5.3	1886	1	5	14.6
T2(2 ml/ltr of water)	80	20.7	5.6	2104	1	5	15.2
T3 (3 ml/ltr of water)	80	22.9	5.6	2280	1	5	15.8
T4(4 ml/ltr of water)	80	22.8	6.3	2328	1	6	15.9
T5 (5 ml/ltr of water)	92	**26.2**	**7.5**	3100	**2**	**6**	**19.5**
T6 (6 ml/ltr of water)	90	26.0	7.6	3024	2	6	19.8
T7 control	71.2	20.6	5.2	1837	1	5	14.5

The results showed that treatment with magic growth regulator had significant effect on all the growth parameters.Among the different concentrations, ginger rhizomes treated @ of 5ml/ l showed better performance with respect to Sprouting percentage (92), Plant height(26.2cm), No of tillers/plant(2), No of leaves/plant(6) and Leaf area(19.5 dm2) as compared to control.

Raising of seedlings using waste cups will definitely help the farmers to transplant healthy seedlings so as to achieve 100 percent establishment of seedlings in the field. Further they can also raise seedlings near to their houses instead of main field so that they can save time for transplanting and care seedlings easily.

10. Budget Requirement : Rs.39600=00 for one season (Table enclosed)

11. Submission of report:

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Signature of the Principal Investigator

N.M. Shakuntala :

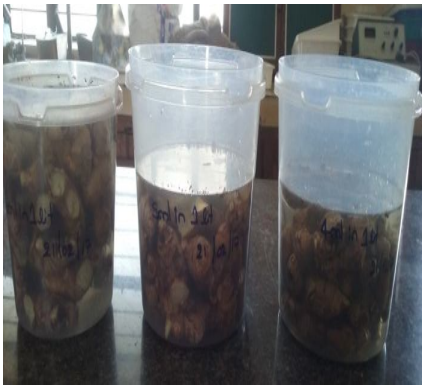
Details of budget requirement for conduct of Seed rhizome quality enhancement technique for better seedling establishment in Ginger

Sl No.	Particulars	DAC. NO	Amount (Lakhs)
1	Field technician/ Laboratory Assistants @ 6000/month/person for three months	310	18000=00
2	Critical inputs- seeds rhizomes, chemicals, fertilizer, compost, portrays , etc)	502	16,000=00
3	Office contingency	200	2000=00
4	Institutional charges (at the rate of 10 % of the total cost)	609	4000=00
	Grand Total		**40,000=00**

Effect of rhizome priming with MAGIC growth regulator on seedling vigor in ginger

Growth regulator

Solutions of different concentration



Rhizomes soaked in solution

Rhizomes sown in trays

Sprouting of rhizomes

Seedlings showing differences in vigour

UNIVERSITY OF AGRICULTURAL SCIENCES, RAICHUR

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No: UASR/SST/project report /2016-17 Date:01.01.2018

To,

The Director of Research
UAS, Raichur

(Through Proper Channel)

Sir,

Sub: Submission of research report – reg……

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I am herewith submitting project report on **"Seed rhizome quality enhancement technique for better seedling establishment in Ginger** to High-Tech Agri Services, Bengaluru. Kindly forward the report to below mentioned agency.

Dr. Suresh Bhat
High-Tech Agri Services
#47, 2nd Cross, P&T Colony, R.T. Nagar
Bangalore – 560032 INDIA.
Email-id: info@hightechagri.com
Phone: 080 23634371

Thanking you,
Yours faithfully

(N.M. Shakuntala)

Submitted to Director of Education, UAS, Raichur for further needful