

STUDIES ON UTILIZATION OF WASTE BIOMASS (WBM) FOR THE SEED HEALTH OF CARROT, RADISH AND ONION

Dhekle N.M.

Department of Botany, ACS College, Shankarnagar Tq. Biloli Dist. Nanded

Abstract

During the present studies fresh waste biomass (WBM) in the form of roots, stems and leaves of the selected vegetable plants such as Carrot (*Daucus carota*), Radish (*Raphanus sativus*), Onion (*Allium cepa*), Methi (*Trigonella foenum-graecum*), Palak (*Spinacia oleracea*), Cabbage (*Brassica oleracea var. capitata*), Cauliflower (*Brassica oleracea var. botrytis*), Tomato (*Lycopersicon esculentum*) and Bhendi (*Abelmoschus esculentus*) was collected. The collected WBM was surface sterilized, washed and dried in shade. The dried biomass was brought in to fine powder with the help of blender. The powder was collected in polythene bags. Aqueous extracts of different percentage of the WBM of the test vegetables were prepared and screened against mycoflora and seed health (seed germination, root length and shoot length) of Carrot (*Daucus carota*), Radish (*Raphanus sativus*), Onion (*Allium cepa*) and the results are recorded.



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INTRODUCTION

Plants were used medicinally in India, China, Egypt and Greece long before the beginning of the Christian era (Patwardhan and Hopper, 1991). Attempts have been made to discuss the finding by earlier workers on utilization of plants against seed borne fungi, seed germination, seedling emergence and seed viability of important plants. Plants and their constituents have shown the presence of potent, harmless and easily available fungi toxicants in contrast to synthetic chemicals which often impose various undesirable side effects. The vegetables of different category like root vegetables, stem vegetables leafy vegetables fruit vegetables and cole vegetables are cultivated in the Marathwada region of the Maharashtra State. In the Maharashtra particularly in the Nanded district of the Marathwada region the vegetables like as Carrot (*Daucus carota*), Radish (*Raphanus sativus*), Onion (*Allium cepa*), Methi (*Trigonella foenum-graecum*), Palak (*Spinacia oleracea*), Cabbage (*Brassica oleracea var. capitata*), Cauliflower (*Brassica oleracea var. botrytis*), Tomato (*Lycopersicon esculentum*) and Bhendi (*Abelmoschus esculentus*) are commonly cultivated. They produce huge waste biomass (WBM). The vegetable WBM like waste biomass of other plants may be utilized for

the seed borne fungi, seed germination, seedling emergence and seed viability of plants. Considering these facts, present studies have been carried out.

MATERIALES AND METHODS

During the present studies fresh waste biomass (WBM) in the form of roots, stems and leaves of the selected vegetable plants such as Carrot (*Daucus carota*), Radish (*Raphanus sativus*), Onion (*Allium cepa*), Methi (*Trigonella foenum-graecum*), Palak (*Spinacia oleracea*), Cabbage (*Brassica oleracea var. capitata*), Cauliflower (*Brassica oleracea var. botrytis*), Tomato (*Lycopersicon esculentum*) and Bhendi (*Abelmoschus esculentus*) was collected. The collected WBM was surface sterilized, washed and dried in shade. The dried biomass was brought in to fine powder with the help of blender. The powder was collected in polythene bags. Aqueous extracts of different percentage of the WBM of the test vegetables were prepared and screened against mycoflora and seed health (seed germination, root length and shoot length) of the seeds of Carrot (*Daucus carota*), Radish (*Raphanus sativus*), Onion (*Allium cepa*) were soaked separately in 5% aqueous extract of the WBM of the test vegetables for twenty four hours. The soaked seeds were plated on moist blotter plates. The plates were incubated for ten days at room temperature. After incubation percent incidence of seed mycoflora, percentage of seed germination, root length and foliage length were studied. The seeds soaked in sterile distilled water for twenty four hours, plated on moist blotter plates and incubated for ten days at room temperature were served as control.

RESULTS AND DISCUSSION

From the results presented in table-1 it is evident that the WBM of all the test vegetables was found to be inhibitory for the incidence of seed mycoflora in more or less degree. The Carrot seeds treated with the WBM of leaf of *Allium cepa* showed much reduced percentage of incidence of mycoflora (30%). The WBM of leaf of *Daucus carota* and *Raphanus sativus* was found to be stimulatory for the seed germination and growth in root length of the Carrot where as the test WBM of rest of the test vegetables was found to be inhibitory for the seed germination, growth in length of root and shoot of the Carrot.

From the results presented in table-2 it is clear that the WBM of all the test vegetables was found to be inhibitory for the incidence of seed mycoflora on the Radish seeds in more or less degree. The Radish seeds treated with the WBM of leaf of *Raphanus sativus* showed much reduced percentage of incidence of mycoflora (30%). The WBM of leaf of *Raphanus sativus*, *Daucus carota*, *Lycopersicon esculentum* and *Trigonella foenum-graecum* was found to be

stimulatory for the seed germination and growth in root length of the Radish. The WBM of *Raphanus sativus* and *Lycopersicon esculentum* was found to be stimulatory for the growth in length of shoot of the radish. The WBM of rest of the test vegetables was found to be inhibitory for the seed germination, growth in length of root and shoot of the Radish.

From the results presented in table-3 it is clear that the WBM of all the test vegetables was found to be inhibitory for the incidence of seed mycoflora on the Onion seeds in more or less degree. The Onion seeds treated with the WBM of leaf of *Daucus carota* showed much reduced percentage of incidence of mycoflora (48%). The WBM of leaf of *Allium cepa* and *Abelmoschus esculentus* was found to be inhibitory and the WBM of rest of the vegetables stimulatory for the seed germination of Onion. The WBM of *Daucus carota*, *Spinacia oleracea*, *Brassica oleracea var. capitata*, *Brassica oleracea var. botrytis* and *Lycopersicon esculentum* was found to be stimulatory and the WBM of rest of the vegetables was found to be inhibitory for the growth in length of root of the Onion. The WBM of *Spinacia oleracea*, *Brassica oleracea var. capitata* and *Lycopersicon esculentum* was found to be Stimulatory and The WBM of rest of the vegetables inhibitory for the growth in length of foliage of the Onion.

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TABLES

Table-1: Effect of waste biomass (WBM) of vegetables on mycoflora and seed health of Carrot (*Daucus carota*) by moist blotter plate method after ten days of incubation at room temperature

| Sr. No | Name of the vegetable | WBM of vegetables | Incidence of mycoflora (%) | Seed health of Carrot | | |
|--------|--|-------------------|----------------------------|-----------------------|---------|---------|
| | | | | SG (%) | RL (cm) | SL (cm) |
| 01. | <i>Daucus carota</i> | Leaf | 42 | 85 | 4.6 | 3.1 |
| 02. | <i>Raphanus sativus</i> | Leaf | 45 | 80 | 5.1 | 3.4 |
| 03. | <i>Allium cepa</i> | Leaf | 30 | 45 | 2.2 | 1.4 |
| 04. | <i>Trigonella foenum-graecum</i> | Stem | 50 | 41 | 2.5 | 1.5 |
| 05. | <i>Spinacia oleracea</i> | Stem | 55 | 40 | 1.8 | 1.3 |
| 06. | <i>Brassica oleracea var. capitata</i> | Leaf | 70 | 35 | 1.8 | 1.5 |
| 07. | <i>Brassica oleracea var. botrytis</i> | Leaf | 65 | 33 | 1.7 | 1.0 |
| 08. | <i>Lycopersicon esculentum</i> | Root | 35 | 30 | 3.0 | 1.8 |
| 09. | <i>Abelmoschus esculentus</i> | Root | 80 | 25 | 1.0 | 0.9 |
| | | Control | 100 | 80 | 3.5 | 2.0 |

SG= Seed germination, RL= Root length, SL= Shoot length

Table-2: Effect of waste biomass (WBM) of vegetables on mycoflora and seed health of Radish (*Raphanus sativus*) by moist blotter plate method after ten days of incubation at room temperature

| Sr. No | Name of the vegetable | WM of vegetables | Incidence of mycoflora (%) | Seed health of Radish | | |
|--------|--|------------------|----------------------------|-----------------------|---------|---------|
| | | | | SG (%) | RL (cm) | SL (cm) |
| 01. | <i>Daucus carota</i> | Leaf | 40 | 80 | 4.0 | 1.4 |
| 02. | <i>Raphanus sativus</i> | Leaf | 30 | 90 | 4.8 | 4.0 |
| 03. | <i>Allium cepa</i> | Leaf | 63 | 30 | 2.5 | 2.0 |
| 04. | <i>Trigonella foenum-graecum</i> | Stem | 35 | 70 | 3.0 | 1.8 |
| 05. | <i>Spinacia oleracea</i> | Stem | 60 | 30 | 2.0 | 1.6 |
| 06. | <i>Brassica oleracea var. capitata</i> | Leaf | 38 | 15 | 1.8 | 1.6 |
| 07. | <i>Brassica oleracea var. botrytis</i> | Leaf | 39 | 25 | 1.8 | 1.3 |
| 08. | <i>Lycopersicon esculentum</i> | Root | 63 | 80 | 3.2 | 2.3 |
| 09. | <i>Abelmoschus esculentus</i> | Root | 82 | 20 | 2.3 | 2.1 |
| | | Control | 95 | 70 | 2.5 | 3.0 |

SG= Seed germination, **RL=** Root length, **SL=** Shoot length

Table-3: Effect of waste biomass (WBM) of vegetables on mycoflora and seed health of Onion (*Allium cepa*) by moist blotter plate method after ten days of incubation at room temperature

| Sr. No. | Name of the vegetable | WBM of vegetables | Incidence of mycoflora (%) | Seed health of Onion | | |
|---------|--|-------------------|----------------------------|----------------------|---------|---------|
| | | | | SG (%) | RL (cm) | SL (cm) |
| 01. | <i>Daucus carota</i> | Leaf | 48 | 86 | 4.2 | 3.3 |
| 02. | <i>Raphanus sativus</i> | Leaf | 50 | 88 | 2.5 | 1.8 |
| 03. | <i>Allium cepa</i> | Leaf | 75 | 50 | 3.2 | 2.0 |
| 04. | <i>Trigonella foenum-graecum</i> | Stem | 90 | 62 | 3.0 | 2.6 |
| 05. | <i>Spinacia oleracea</i> | Stem | 80 | 60 | 4.8 | 4.2 |
| 06. | <i>Brassica oleracea var. capitata</i> | Leaf | 47 | 80 | 4.8 | 4.2 |
| 07. | <i>Brassica oleracea var. botrytis</i> | Leaf | 49 | 85 | 4.5 | 3.7 |
| 08. | <i>Lycopersicon esculentum</i> | Root | 60 | 85 | 5.5 | 4.6 |
| 09. | <i>Abelmoschus esculentus</i> | Root | 90 | 38 | 3.4 | 2.0 |
| | | Control | 95 | 60 | 2.5 | 6.0 |

SG= Seed germination, **RL=** Root length, **SL=** Shoot length

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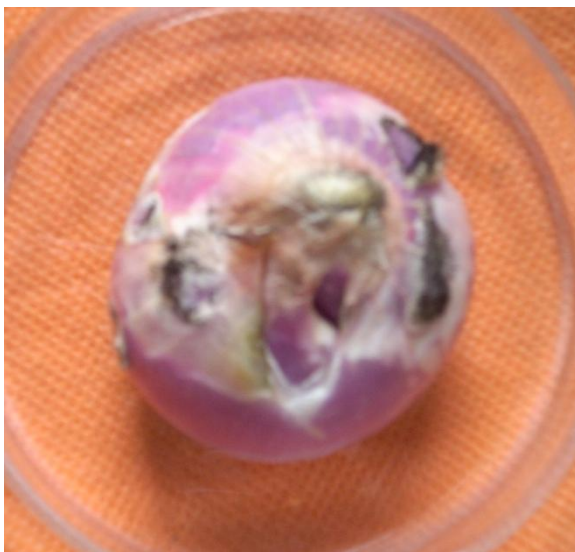
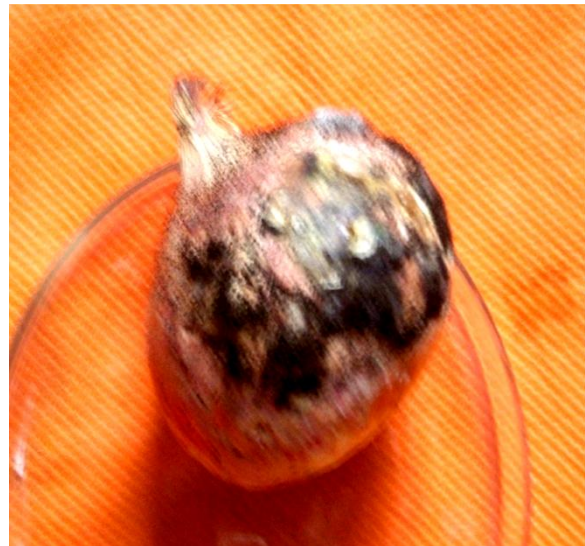


Roots of Carrot



Roots of Radish

Plate-1: Incidence of mycoflora on the roots of Carrot and Radish



Onion Bulbs

Plate-2: Incidence of mycoflora on the Onion Bulbs