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STUDIES ON UTIILIZATION OF WASTE BIOMASS (WBM) OF VEGETABLES FOR THE SEED HEALTH OF CAULIFLOWER, TOMATO AND BHENDI

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Abstract

During the present studies fresh waste biomass (WBM) in the form of roots, stems and leaves of the selected vegetable plants such as 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 Cauliflower (Brassica oleracea var. botrytis), Tomato (Lycopersicon esculentum) and Bhendi (Abelmoschus esculentus) and the results are recorded.

Key words- *Waste Biomass (WBM), Vegetables, Seed Health*

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 discus 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. *T*he 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 biomas (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 Cauliflower (*Brassica oleracea var. botrytis*), Tomato (*Lycopersicon esculentum*) and Bhendi (*Abelmoschus esculentus)* 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 observed that the WBM of all the test vegetables was found to be inhibitory for the incidence of seed mycoflora on the Cauliflower seeds in more or less degree. The Cauliflower seeds treated with the WBM of *Brassica oleracea var. capitata* showed much reduced percentage of incidence of mycoflora (37%). The WBM of all the test vegetables was found to be inhibitory for the seed germination, root and shoot length of the Cauliflower.

From the results presented in table-2 it is observed that the WBM of all the test vegetables was found to be inhibitory for the incidence of seed mycoflora on the Tomato seeds in more or less degree. The Tomato seeds treated with the WBM of *Daucus carota* showed much reduced percentage of incidence of mycoflora (50%). The WBM of *Daucus carota* and *Raphanus sativus* was found to be stimulatory and the WBM of rest of the vegetables inhibitory for the seed germination of Tomato. The WBM of *Daucus carota* 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 and shoot of the Tomato.

From the results presented in table-3 it is observed that the WBM of all the test vegetables was found to be inhibitory for the incidence of seed mycoflora on the Bhendi seeds in more or less degree. The Bhendi seeds treated with the WBM of *Brassica oleracea var. capitata* showed much reduced percentage of incidence of mycoflora (38%). The WBM of *Daucus carota, Brassica oleracea var. capitata, Brassica oleracea var. botrytiss,* and *Lycopersicon esculentum* was found to be stimulatory and the WBM of rest of the vegetables inhibitory for the seed germination of Bhendi. The WBM of *Daucus carota, Raphanus sativus, Allium cepa, , Brassica oleracea var. capitata* 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 Bhendi. The WBM of *Daucus carota, Raphanus sativus, Allium cepa, Trigonella foenum-graecum, Spinacia oleracea, Brassica oleracea var. capitata* 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 shoot of the Bhendi. The WBM of *Abelmoschus esculentus* was found to be inhibitorier for the growth in length of shoot of the Bhendi as compared to the WBM of rest of the test vegetables.

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TABLES

Table-1: Effect of waste biomass (WBM) of vegetables on mycoflora and seed health of Cauliflower (*Brassica oleracea var. botrytis)* 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 Cauliflower**		
				SG **(%)**	RL **(cm)**	SL **(cm)**
01.	*Daucus carota*	Leaf	43	85	4.3	3.9
02.	*Raphanus sativus*	Leaf	42	75	3.2	2.8
03.	*Allium cepa*	Leaf	75	35	4.0	3.5
04.	*Trigonella foenum-graecum*	Stem	82	40	3.3	2.7
05.	*Spinacia oleracea*	Stem	83	42	3.5	3.0
06.	*Brassica oleracea var. capitata*	Leaf	37	82	3.6	3.1
07.	*Brassica oleracea var. botrytis*	Leaf	40	80	4.8	4.0
08.	*Lycopersicon esculentum*	Root	75	50	4.0	3.5
09.	*Abelmoschus esculentus*	Root	80	45	3.8	3.0
		Control	87	90	4.2	3.7

SG= Seed germination, **RL**= Root length, S**L**= Shoot length

Table-2: Effect of waste biomass (WBM) of vegetables on mycoflora and seed health of Tomato (*Lycopersicon esculentum)* 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 Tomato**		
				SG **(%)**	RL **(cm)**	SL **(cm)**
01.	*Daucus carota*	Leaf	50	90	4.8	3.0
02.	*Raphanus sativus*	Leaf	60	95	3.5	2.9
03.	*Allium cepa*	Leaf	90	45	4.2	3.8
04.	*Trigonella foenum-graecum*	Stem	80	35	3.0	2.3
05.	*Spinacia oleracea*	Stem	85	40	3.4	3.0
06.	*Brassica oleracea var. capitata*	Leaf	56	70	3.9	3.5
07.	*Brassica oleracea var. botrytis*	Leaf	57	75	34	2.8
08.	*Lycopersicon esculentum*	Root	87	30	4.5	3.9
09.	*Abelmoschus esculentus*	Root	83	35	2.9	2.5
		Control	92	80	4.5	3.8

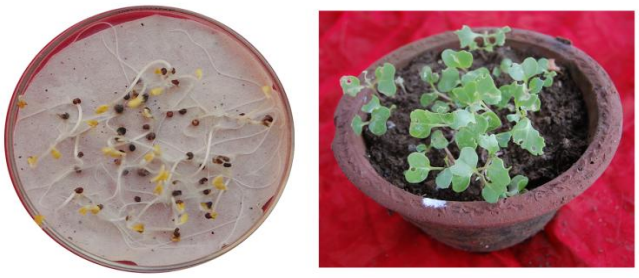
SG= Seed germination, **RL**= Root length, S**L**= Shoot length

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

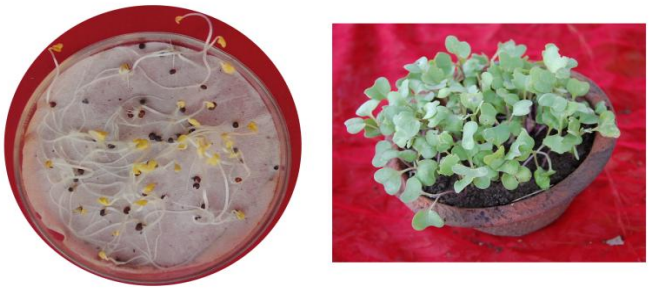
Sr. No.	**Name of the vegetable**	**WBM of vegetables**	**Incidence of mycoflora (%)**	**Seed health of Bhendi**		
				SG **(%)**	RL **(cm)**	SL **(cm)**
01.	*Daucus carota*	Leaf	40	80	5.6	5.3
02.	*Raphanus sativus*	Leaf	48	75	4.5	3.8
03.	*Allium cepa*	Leaf	78	45	4.7	4.0
04.	*Trigonella foenum-graecum*	Stem	70	30	3.9	3.0
05.	*Spinacia oleracea*	Stem	75	40	3.8	3.2
06.	*Brassica oleracea var. capitata*	Leaf	38	80	4.4	3.6
07.	*Brassica oleracea var. botrytis*	Leaf	40	82	3.6	2.9
08.	*Lycopersicon esculentum*	Root	65	85	4.2	3.1
09.	*Abelmoschus esculentus*	Root	68	38	2.8	2.0
		Control	90	80	4.2	3.0

SG= Seed germination, **RL**= Root length, S**L**= Shoot length

PLATES



Untreated seeds of Cauliflower



Treated seeds of Cauliflower

Plate-1: Seed germination and seedling emergence of Cauliflower (*Brassica oleracea var.botrytis* L.)

Untreated seeds of Bhendi

Treated seeds of Bhendi

Plate-2: Seed germination and seedling emergence of Bhendi (*Abelmoschus esculentus* L.)