

RESEARCH ARTICLE

Application of certain homoeopathic medicines used against fruit rot of apple caused by *Penicillium expansum* Link

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Manuscript details:	ABSTRACT
<p>Received: 01 February, 2015 Revised : 23 February, 2015 Accepted: 18 March, 2015 Published : 30 March, 2015</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Baviskar RN and Suryawanshi NS (2015) Application of certain homoeopathic medicines used against fruit rot of apple caused by <i>Penicillium expansum</i> Link., <i>Int. J. of Life Sciences</i>, 3(1): 96-98.</p> <p>Copyright: © 2015 Author(s), This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>Blue mold of apple caused by <i>Penicillium expansum</i> is one of the most important serious destructive post harvest disease in India. Twenty three isolates of <i>Penicillium expansum</i> were isolated from rotted fruits of apple collected from APMC fruit market of Vashi, Navi Mumbai. Their sensitivity was tested against carbendazim. It was found that Pe-9 was sensitive while pe-15 resistant. MIC values ranged from 750.6-970.3µg/ml. Sensitive isolate was selected for further studies and treated with chemical and physical mutagens and resistant mutant of <i>P.expansum</i> (Pe-EMS-10) was found (4850.6g/ml). Of 13 homoeopathic medicines were used for the management of carbendazim resistant mutant of <i>Penicillium expansum</i> (EMS-Pe-10). <i>Sepia officinale</i> was more effective PCE value (40.42) when used individually and in mixture with carbendazim PCE value was increased as compared to individual (53.25) and followed by <i>Arsenicum album</i>, <i>Tabacum</i>, <i>Cynopodium</i>, <i>Baptisia tinctoria</i>, <i>Ustilago maydis</i>, <i>Iris versicolor</i>, <i>Zincum metallicum</i> and <i>Argentum metallicum</i>.</p> <p>Key words: Apple, Blue mould, <i>Penicillium expansum</i>, Homoeopathic medicines, Carbendazim.</p>
	<h3>INTRODUCTION</h3> <p>Blue mould of apple (<i>Pyrus malus</i> L.) caused by <i>Penicillium expansum</i> is one of the most important post harvest disease. Apple plays a vital role in human diet by supplying the necessary nutritional components such as vitamins and minerals that can help to keep a good state of health. It contain high level of sugar, minerals and nutrient elements and their low pH value make them susceptible for fungal attack and are being rotten (Singh and Sharma, 2007). Fungi not only cause rot to a number</p>

of fruits but also reduce their market values (Arya, 2004). Some fungal pathogens viz. *Colletotrichum acutatum*, *Venturia inaequalis*, *Monilinia fructicola*, *Botrytis cinerea*, *Alternaria alternata*, *Aspergillus fumigatus*, *A. flavus*, *Sclerotinia fructigena*, *Rhizopus stolonifer*, *Mucor piriformis* and *Penicillium expansum* on apple was reported during the transportation and storage condition. Among the pathogens *Penicillium expansum* was more serious and dominant in the store houses of local and central fruit market of Navi Mumbai, APMC Fruit Market, Vashi in packing boxes noticed damages of apple. 20-25% losses of the post harvested fruits are decayed by certain fungal pathogens during post harvest handling even in developed countries (Al-Hindi *et al.*, 2011).

Carbendazim is recommended to manage various fruit rot of pathogens during post harvest. Fungicides resistance few cases have been reported in India and abroad (Chander and Thind, 1995; Gangawane and Reddy, 1987; Gangawane, 2008). Apple growers rely heavily on the use of fungicides for control of fruit rot of apple. Excessive use of carbendazim was harmful to apple fruit as well as *Penicillium expansum*. Therefore, substitute for carbendazim presently suggested that the use of homeopathic medicines to control various pathogens was highly effective and safe for fruit and environment. Inhibitory effect of homoeopathic drugs such as *Lycopodium*, *Thuja*, *Arsenicum*, *Zincum* etc. against *Alternaria alternata*, *Fusarium moniliforme*, *Gloeosporium psidii*, *Colletotrichum gloeosporioides* and *Pestalotia sp.* and certain fruit rot pathogens have been reported by (Khanna and Chandra, 1989 and 1992; Chandra *et al.*, 1981; Wilson *et al.*, 1991). The present investigation showed that the effect of homoeopathic medicines i.e. *sepia officinale* was fruitful PCE (40.42) value individually and in mixture with carbendazim PCE value increased upto 53.25.

MATERIALS AND METHODS

Homoeopathic medicines viz; *Belladonna*, *Tabacum*, *Thuja occidentalis*, *Argentum metallicum*, *Sepia officinale*, *Lycopodium clavatum*, *Ustilago maydis*, *Iris versicolor*, *Cynopodium*, *Zincum metallicum*, *Arsenicum album*, *Baptisia tinctoria* and *Teucrium marum verum* etc. was purchased from wholesale market of Vashi. Potency (200) of all these medicines was used. The antifungal homoeopathic medicines were tested individually and in mixture with carbendazim

(970.3µg/ml) against mycelial growth of carbendazim resistant mutant (Pe-EMS-10) of *Penicillium expansum* using potato dextrose agar (PDA) medium by food poisoning method (Nene and Thapliyal, 1982). Percentage Control Efficacy (PCE) was determined using formula.

$$PCE = \frac{C - T}{T} \times 100$$

Where, C - Mycelial Growth in Control
T - Mycelial Growth in Treated

RESULTS AND DISCUSSION

Results are present in (Table.1) observed that thirteen homoeopathic medicines were used for the management of carbendazim resistant mutant (Pe-EMS-10) of *Penicillium expansum*. It was seen that all homoeopathic medicines were inhibitory against *Penicillium expansum*. *Sepia officinale* showed significantly increased PCE (40.42) individually and followed by *Arsenicum album* (38.75), *Tabacum* (38.56), *Cynopodium* (38.00), *Baptisia tinctoria* (36.58), *Ustilago maydis* (36.56), *Iris versicolor* (36.32), *Zincum metallicum* (34.80), *Argentum metallicum* (32.58) and four homoeopathic medicines showed PCE 20.72-30.58 individually. In other hand all 13 homoeopathic medicines were mixed with carbendazim PCE against *penicillium expansum* was increased. *Sepia officinale* mix with carbendazim the PCE (53.25) value increased as compared to individual PCE value. The lowest PCE (35.85) was observed in *Belladonna* and followed by other homoeopathic medicines which showed values of PCE more than 52.65. There are few reports on the use of homoeopathic medicines against plant pathogens correlate with other researcher. (Dahiwalé and Suryawanshi, 2010) observed that fruit rot of pomegranate caused by *Alternaria alternata* is one of the most important post harvest diseases. It was revealed that certain homoeopathic medicines were inhibitory against *A. alternata* (Dahiwalé and Suryawanshi, 2014) also revealed that the control of grey mould of grape caused by *Botrytis cinerea* using homoeopathic medicine. Fruit rot of strawberry caused by *Alternaria alternata* control using homoeopathic medicines. *Nux vomica* shows higher PCE (50) when used individually while Sulphur 30 CH was effective showing maximum PCE (84.45) when

Table 1: Percentage Control Efficacy (PCE) of carbendazim individually and in mixture with homoeopathic medicines against resistant mutant of *Penicillium expansum* on PDA medium.

Sr. No.	Homoeopathic medicines	Percentage Control Efficacy *	
		PCE individual	PCE mixture With Carbendazim
1.	<i>Belladonna</i>	20.72	35.85
2.	<i>Tabacum</i>	38.56	52.52
3.	<i>Thuja occidentalis</i>	28.45	43.55
4.	<i>Argentum metallicum</i>	32.58	45.75
5.	<i>Sepia officinale</i>	40.42	53.25
6.	<i>Lycopodium clavatum</i>	30.58	45.38
7.	<i>Ustilago maydis</i>	36.56	49.95
8.	<i>Iris versicolor</i>	36.32	51.50
9.	<i>Cynopodium</i>	38.00	52.58
10.	<i>Zincum metallicum</i>	34.80	49.46
11.	<i>Arsenicum album</i>	38.75	51.00
12.	<i>Baptisia tinctoria</i>	36.58	52.65
13.	<i>Teucrium marum verum</i>	28.50	43.78
14.	Carbendazim (970.3µg/ml)	51.00	---
	SE	1.929	1.716
	CD at 0.05	4.008	3.581
	at 0.05	4.733	4.240

* Values are replicates.

used in mixture with mancozeb and followed by *Cina*, *Rhus toxicodendron*, *Arnica montana*, *Sanguinaria canadensis*, *Tarentula hispana* and *Selenium* (Patil and Suryawanshi, 2014).

REFERENCES

- Al-Hindi RR, Al-Najada AR and Mohamed SA (2011). Isolation and identification of some fruit spoilage fungi: Screening of plant cell wall degrading enzymes. *African Journal of Microbiology Research*, 5(4): 443-448.
- Arya A (2004). "Tropical fruit diseases and pests", Kalyani Publications, Ludhiana, India, pp. 217.
- Chander M and Thind TS (1995) Development of carbendazim resistance in *Gloeosporium ampelophagum* and strategies for its management. *Int. J. Mycol. Pl. Path.* 24(1 and 2): 25-33.
- Chandra H, Dubey N K, Asthana A, Tripathi R D and Dixit SN (1981) Effect of some homoeopathic drugs against spore germination of some fungi. *Natural Acad. Sci. Letter* 4(4):161-164.
- Dahiwal MA and Suryawanshi NS (2010) Integrated management of carbendazim resistant *Alternaria alternata* using homoeopathic medicine. *Bionano frontier*. 3(2): 330-331.
- Dahiwal MA and Suryawanshi NS (2014) Grey mould of grape caused by *Botrytis cinerea*- control using homeopathic medicine. *Fungi and Agriculture*, p.3-5.
- Gangawane LV and Reddy BRC (1987) Distribution and survival of toxigenic strain of *Aspergillus flavus* resistant to fungicides in Marathwada. In: *Progress in Venum and Toxin Research* (P. Gpoalkrishnakone and C.K. Ten Eds.). *National University of Singapore Publ.* pp. 658-388.
- Gangawane LV (2008) Glimpses of phytopathology for sustainable agriculture. *Indian Phytopath.* 61(1): 2-8.
- Khanna HR and Chandra S (1992) Effect of homoeopathic on respiration of germinating fungal spores. *Ind. Phytopath.* 45(3):348-353.
- Khanna KK and Chandra S (1989) Further investigations of the control of storage rot of mango, guava and tomato fruits with homeopathic drugs. *Indian Phytopathology*. 13:436-440.
- Nene YL and Thapliyal PN (1982) Fungicide in plant disease controls. *Oxford and IBH Publ. Co. Pvt. New Delhi*. 212-349.
- Patil JS and Suryawanshi NS (2014) Fruit Rot of Strawberry Caused By *Alternaria Alternata* Control Using Homoeopathic Medicines. *Int. J. of Pharmaceutical Sci. Invention* .3(2): 57-58.
- Singh D and Sharma RR (2007) Post harvest diseases of Fruits and Vegetables and their management. In: Prasad, D. (Ed.), *Sustainable Pest Management*", Daya Publishing House, New Delhi, India.
- Wilson Charles L, Michael E Wisniewski, Charles L Biles, Randy McLaughlin, Edo Chalutz and Samir Droby (1991) Biological control of post harvest diseases of fruits and vegetables: alternatives to synthetic fungicides. *Crop Protection*. 10:172-177.