International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(5): 1395-1396

Received: 10-07-2019
Accepted: 12-08-2019

M Surya Prakash Reddy
Department of Plant Pathology, JNKVV Jabalpur, Madhya Pradesh, India

Jayant Bhatt
Department of Plant Pathology, JNKVV Jabalpur, Madhya Pradesh, India

Santha Lakshmi Prasad
ICAR-Indian Institute of Oilseeds Research, Hyderabad, India

Correspondence
M Surya Prakash Reddy
Department of Plant Pathology, JNKVV Jabalpur, Madhya Pradesh, India

Effect of Different Culture Media on the Growth of *Macrophomina phaseolina*

M Surya Prakash Reddy, Jayant Bhatt and Santha Lakshmi Prasad

Abstract
Sesame (*Sesamum indicum* L.) is an ancient and traditional oilseed crop in India. Root rot caused by the fungus, *Macrophomina phaseolina* Tassi (Goid) is a very serious disease on sesame crop in India. It shows presence of black ashy discolorations of stem followed by death of whole plant. In severe infection, the stem becomes black and the roots rot with large number of black sclerotia being formed on the affected portions. The rhizosphere of the plant that exuades many metabolites, carbon and nitrogen sources it may influence attack of soil borne pathogen. The effect of ten different compositions media used for *Macrophominia phaseolina* mycelial growth and to test media that influence growth or restrict for different intervals.

Keywords: *Macrophominia phaseolina,* different media compositions

Introduction
Sesame (*Sesamum indicum* L.) is one of the ancient oilseed crops, with early origins in east Africa and India. It is also an ancient oil yielding crop and popularly known as "Queen of Oilseeds". Sesame oil which has been traditionally used for cooking and as a flavour additive in food products of Asian and Western countries (Pastorello *et al*., 2001) [6]. It having antioxidant and anticancer properties have been studied in Sesame seeds (Osawa *et al*., 1990) [5]. Sesamin and sesamolin two unique phytoconstituents isolated from seeds possess excellent cholesterol-lowering effect in humans and prevents high blood pressure. They serve as a good source of copper, manganese and calcium which are effective in reducing pain in osteoporosis and in reduction of swelling in rheumatoid arthritis (Chakraborthy *et al*., 2008) [1]. *M. phaseolina* is a soil-borne fungus, it poses a greater problem in managing the disease. In India the disease was present in all sesamum growing areas. Although it has been recorded mainly from Madhya Pradesh (Pearl, 1923) [7], Bihar (Mc Rae, 1930) [2] and Madras (Sundararaman, 1931) [9]. Singh *et al*. (1991) [8] surveyed sesame fields in Delhi, Haryana, Uttar Pradesh, Karnataka and Tamil Nadu for root rot incidence in fields varied from 6.0 to 71.5% (av. 17.01%) depending on the soil conditions and crop season. All organisms require easily digestible nutrients, and for fungi these need to be in the form of carbohydrates. The growth of *M. phaseolina* is strongly influenced by the ingredients of the culture medium. For most fungal species the monosaccharides glucose and fructose and the disaccharides maltose and sucrose are the most easily digested. The aim of this work was to detect of *M. phaseolina* based on micro- and macromorphological characters future study. It was hoped to identify the optimum medium for fungal growth, to determine how the various media influenced colony morphology and microsclerotia, to discover which nutrient source was most efficiently utilized by the pathogen and whether it could grow on different media given below.

Materials and Methods
The following material and methods were used to Experiment and related studies conducted at IIOR- Rajendra nagar, Hyderabad.

Collection of diseased specimens and purification of the pathogen
Diseased Sesame plants exhibiting root rot typical symptoms of *Macrophomina phaseolina* infection were collected from the experimental field of IIOR at Rajendra nagar. The root affected disease portions of plant (like stem, root etc.) were cut with the help of sharp razor and rinsed with sterilised water to remove traces of dirt. These were surface sterilised by dipping in 1:1000 mercuric chloride solution for one minute and washed twice with sterile

water. These pieces were transferred aseptically to sterilised Petridishes containing solidified PDA in a laminar air flow. The Petri-dishes were incubated at 25±2 ºC. The growth of fungus was observed after 72 hours and isolations were made from developing colonies for further study. The pathogen was further purified through single spore method and sub-cultured on PDA slants and kept at 4 ºC for further use. The growth of *M. phaseolina* on different solid media were compared by pouring 20 ml of each solid media was poured into 90mm diameter Petri dishes. Inoculation was done by transferring 5 mm disc of mycelial mat, taken from the periphery of seven days old culture on various media. The plates were incubated at 25 ± 1OC for replicated thrice. The radial mycelial growth was measured at different intervals after incubation.

Table 1: Effect of Different Media used for Growth of *Macrophomina phaseolina*

Different Media	48 hours	72 hours	96 hours	120 hours	Mycelial growth (mm) Mean
Corn meal Agar	25.83	39.00	52.66	63.66	45.29
Pikovskaya's Agar	25.83	31.50	41.83	53.83	38.25
Carrot agar	20.50	29.33	37.00	48.50	33.83
Potato Carrot Agar	18.83	24.50	35.00	43.83	30.54
Oat Meal Agar	45.16	79.33	90	90	76.12
Nutrient Agar	9	9	14	16	12.08
Bugs agar	6.16	6.66	16.66	18.00	11.87
Elad chat medium	36.16	55.66	90	90	67.95
Malt dextrose Agar	50.33	64.83	88.33	90	73.37
Czapek's agar	33.66	42.33	61.66	81.66	54.83
Mean	27.15	38.21	52.73	59.56	
CV	8.91				
Media CD(P≤ 0.05)	3.21				
Hours CD(P≤0.05)	2.03				
Media x Hours	6.43				

The radial growth of the *Macrophomina phaseolina* at different intervals of ten media. The radial growth fungi ranged from 11.87 to 76.12. The maximum radial growth was recorded 76.12 with Oat meal agar is followed by 73.37 malt dextrose agar. Minimum radial growth was recorded bugs agar 11.87 is followed by NA 12.08. A mong ten media of oat meal agar, malt dextrose agar elad chat agar, Czapeks agar significant growth of four intervals. Radial growth of fungi on Oat meal agar is coverd 90mm within 96 hours is followed by Elad chat medium. Mycelial growth of *Macrophomina phaseolina* at different media to identify specific or selective media for growth it is also shows which media can effect or restrict growth of fungi. The restrict or suppress growth of mycelial on bugs agar and nutrient agar. Mukkopadhyay *et al*. (1991) [4] found that MFA medium was ideal for the growth of the fungus. Similarly, observations revealed that the MFA medium was most favourable for pathogen growth, followed by SGA, MEA and PDA. Tandel *et al*. (2012) [10] who reported that among the various liquid media tested, higher dry mycelial weight was yielded in Richard's medium as compared to rest of media. Mukhopadhyay and Nandi (1975) [3] reported that sucrose, fructose and glucose were best carbon sources for mycelial growth and sclerotial production.

Acknowledgement
The authors are thankful to Department of Plant Pathology JNKVV, Jabalpur, M.P and ICAR-Indian Institute of Oilseeds Research (IIOR) Rajendra Nagar, Hyderabad providing for field and laboratory facilities to carry out the research.

References

1. Chakraborthy GS, Sharma G, Kaushik KN. *Sesamum indicum*: A review. J herb med toxicol. 2008; 2(2):15-19.
2. Mc Rae W. Report of the Imperial Mycologist, Sci. Rep. Imp. Agric. Res. Inst. Pusa1930, 1928-29, 20-26.
3. Mukhopadhyay D, Nandi B. Nutrition in relation to growth and formation of sclerotia in *Macrophomina phaseolina*. Sci. Cul. 1975; 6(2):312-315.
4. Mukkopadhyay M, Kundu S, Samaddar KR. Increased susceptibility of mung bean to *Macrophomina phaseolina* at low temperature. Journal of Mycopathol. Res.1991; 29:1-7.
5. Osawa TH, Kumon M, Namiki S, Kawakishi, Fukuda Y. Antimutagenic heat stable antioxidants, in Mutagens and Carcinogens in the Diet. Edited by M. W. Pariza, H. U. Aeschbacher, J. S. Felton and S. Sato. Wiley-Liss, New York, 1990, 223-238.
6. Pastorello AE, Varin EL, Farioli V, Pravettoni C, Ortolani C, Trambaioli D *et al*. The major allergen of sesame seeds (*Sesame indicum*) is a 2S albumin. J Chromatogr. B. Biomed. Sci. 2001, 756:85-93.
7. Pearl RT. Report of the mycologist to the Government of the central provinces and Berar. Rept. Deptt. Agric. Central provinces and Berar, for the year ending, 1923, 19-20.
8. Singh, Amar, Bhowmik TP, Singh A. Prevalence and severity of root rot of sesamum caused by *Macrophomina phaseolina*. Indian Phytopath. 1991; 44(2):235-238.
9. Sundararaman S. Administration report of the mycologist for the year 1929-30: 30 pp. (Deptt. Agric. Madras), 1931.
10. Tandel DH, Sabalpara AN, Patel RC. Evaluation of different solid and liquid media for the growth and sclerotial formation of *Macrophomina phaseolina in vitro*. The Bio Scan. 2012; 7(4):743-745.