J. Indian bot. Soc. e-ISSN:2455-7218, ISSN:0019 - 4468 Vol. 99 (3&4) 2020:00-00

EFFECT OF DYE MONASTRAL FAST BLUE BS ON COLONY DEVELOPMENT OF RHIZOBIUM AND ON GERMINATION OF GREEN GRAM (*VIGNA RADIATA*)

MADHUMITA SINGH[1], PADMAWATI GAUTAM[2], ANAND BIHARI[3] AND ANKIT SRIVASTAVA[4]

[1]Assistant Professor Department of Botany Public Mahila Sahar Degree college, Mau,UP
[2]Assistant Professor Department of obstetrics and gynecology, Government Medical College, Azamgarh,UP
[3]Statistician Cum Assistant Professor, Department of community Medicine, Government Medical College, Azamgarh,*UP* [4]*Lecturer, Department of Anatomy, Government Medical College, Azamgarh,UP*
Email Id:anandbhu05@gmail.com and madhu530614@gmail.com
Date of online publication: 3oth June 2020
DOI:10.5958/2455-7218.2020.00013.3

Seed germination is a primary event in the life cycle of a crop plant. Seed germination unfolds the hidden embryo to develop into a healthy plant. Efforts are made to find the effect of the dye on colony development of *Rhizobium* and *on seed* germination of *Vigna radiata.* There was a gradual decrease in seed germination with increasing concentrations of the dye . The germination study was carried out in Petriplates under laboratory conditions with different concentration of dye Monastral fast blue. The effect of lower concentration (25%) was found more stimulatory than of higher concentration (100%).

Key words: *Rhizobium* species, Green gram (*Vigna radiata*), Dye Monastral fast blue

The present work is undertaken to study the effect of different concentrations of the monastral fast blue BS dye on colony development of *Rhizobium* sp. and on seed germination of green gram (*Vigna radiata* L.Wilczek). Mung bean [*Vigna radiata* (L.) Wilczek] also known as green gram, green bean, mash bean, golden gram and green soy is an excellent source of easily digestible proteins with low flatulence which complements the staple rice diet in Asia. In India, nearly 8% of the area is occupied by green gram, which is the third important pulse crop of India.

The monastral fast blue BS dyes, produced from the dye industries and their effluents are discarded into the fields through irrigation channels, have a negative impact on the cultivation .It shows toxic effects on both flora and fauna and reduce the productivity of the crops causing socio-economic problems. A huge demand of fabrics has brought about the existence of textile industry along with various sectors such as garments, silk, woolen and cotton textiles, etc. The dyes are back bone of this industry. This rapid increase in textile industries has resulted in speedy development of dyes/industries. Dyes are highly stable and also resistant to microbial attack therefore is readily and is not removed from water by conventional waste water treatment system.

Brar and Lal (1991) found an increase in number of nodules per plant. Many researchers carried out experiments on *Rhizobium* inoculation with and without fertilizers on legume crops (Malik *et al*. 2002, Ashraf 2003, Hayat *et al.* 2004, Muhammad *et al.* 2004, Nadeem *et al.* 2004) and found increased nitrogen contents of seed, number of nodules, yield and yield components. The increase in nitrogen uptake by plant due to inoculation application was also reported by Basu and Bansy Upadhyay (1990) and Rashid *et al.* (1999).

The objective of present study was to find effect of different concentration of dye Monastral Fast Blue on colony development of *Rhizobium* species and to evaluate the different concentration of dye Monastral Fast Blue BS and *Rhizobium* inoculants on germination and germination physiology of green gram.

Received on February 22, 2020 www.indianbotsoc.org Accepted on March 30, 2020

MATERIAL AND METHODS

In normal agricultural practices various pollutants viz. pesticides, heavy metals and dye effluents etc. are applied directly or indirectly by irrigation channel. To ensure the effect of monestral fast blue dye on bacterial biofertilizer after inoculation to the present *Vigna radiata seed coverd on*, seed germination, studies were made. In the experiment the seed were pretreated with *Rhizobium* species with different concentrations of dye Monastral fast Blue BS viz-25%, 50%, 75%, 100% for a period of 24, 48, 72, and 96 hours. The results of the effect of dye on *Rhizobium* species as well as on murg seed germination were studied.

OBSERVATION AND RESULTS

A. Effect of different concentration of dye Monastral fast blue on colony Development of *Rhizobium* Species: The colony development of *Rhizobium* Species culture was found 4.6 cfu/ml to 5.5 cfu/ml in the absence of dye best at 25% concentration between 24 hrs to 96 hrs intervals. However it was stimulated in all concentrations between 24 hours to 96 hours but lower concentration 25% was found more stimulatory than the of higher concentration i.e., 4.5 cfu/ml to 3.0 cfu/ml after 24 hours of incubation. On the other hand with lapse of time colony development increcsed at all concentration (Table-1).

Table 1: Effect of different concentration of dye Monastral Fast Blue on colony development of *Rhizobium s*pecies (of CFU/ml)

Conc.% V/V(x)	Time(in hours) After Treatment				C	Mean	C^2
	24	48	72	96			
Control	4.6	5.0	5.3	5.5	20.4	5.10	416.16
25	4.5	4.9	5.2	5.5	24.0	6.00	576.00
50	4.2	4.6	5.0	5.4	19.2	4.80	368.64
75	4.0	4.5	4.9	5.2	18.6	4.65	345.96
100	3.9	4.2	4.6	5.0	17.7	4.43	313.29
T	25.2	23.2	24.0	26.5	99.9		$?C^2$ 2020.05
Mean	5.04	4.64	4.80	5.13	$?T^2$		
T^2	635.04	538.24	576.00	702.25	2451.53		

$?y^2$=510.73 CF= 509.14 TSS=1.66 SST=1.29 SSC= 0.11 SSE=0.02

S.S. due to	d.f.	S.S.	M.S.	F
Time	3	1.296	0.5605	F1=217.2480*
Conc.	4	0.115	0.0342	F2=13.2751*
Error	12	0.024	0.0025	
Total	19	1.435		
CD(Time) = 0.435			CD(Conc.) = 0.0782	

B. Colony Development And Growth After One Week: After the treatment of dye, it was found that at higher concentration the colony development and growth was as lower as two colonies while at lower concentration it was six colonies. A reduction of four colonies between higher and lower concentration of dye was recorded. Table-2 shows that number of colonies vary with concentration of dye.

C. Fresh weight changes after one week: After the treatment with dye of different concentrations (with *Rhizobium)* it was found

Table 2: Colony development and growth after one week of treatment with different concentrations of dye Monastral Fast Blue on *Rhizobium* Species (CFU/ml)

Dye Concentration % V/V (x)	Rhizobium spe. Colony development (y)	(xy)	x^2	y^2
0	7	0	0	49
25	6	150	625	36
50	5	250	2500	25
75	4	300	5625	16
100	2	200	10000	4

Table 3: Fresh weight (mg) after one week of treatment with different concentration of dye Monastral Fast Blue on *Rhizobium* species in l.

Conc.% V/V (x)	Fresh weight, mg (y)	(xy)	x^2	y^2
0	1.68	0	0	2.82
25	1.65	41.25	6.25	2.72
50	1.60	80.00	2500	2.56
75	1.54	115.50	5625	2.37
100	1.50	150.00	10000	2.25

Table 4: Dry weight (mg) after one week with treatment of different concentration of dye Monastral Fast Blue on *Rhizobium* species (in mg)

Conc.% V/V (x)	Dry weight (y)	(xy)	x^2	y^2
0	1.35	0	0	1.82
25	1.30	32.50	625	1.69
50	1.28	64.00	2500	1.63
75	1.22	91.50	5625	1.48
100	1.20	120.00	10000	1.44

Table 5: Biomass after one week of treatment with different concentrations of dye Monastral Fast Blue on *Rhizobium* species (in mg).

Conc.% V/V (x)	Dry weight, mg (y)	(xy)	x^2	y^2
0	35.6	0	0	1267.36
25	35.4	885	625	1253.16
50	35.0	1750	2500	1225.00
75	34.6	2595	5625	1197.16
100	34.0	3400	10000	1156.00

that at higher concentrations the fresh weight of v. was 1.5mg while at lower concentration it was 1.65mg . Therefore a reduction of 0.18mg was observed at higher concentration in comparison to control. It indicates that there was a dose dependent effect (Table 3).

D. Dry weight changes after one week: After the treatment with dye of different concentration with *Rhizobium* species it was found that at higher concentration the dry weight was 1.20mg while at lower concentration it was 1.30mg (Table 4).

E. Biomass changes after one week: After the treatment of *Rhizobium with* dye of different concentration it was found that at higher concentration the Biomass was 34.0mg while at lower concentration it was 35.4mg . There observed a reduction of 1.60 at higher concentration and 0.20 at lower concentration. It indicates the dose low dependent effects (Table-5).

F. Germination percentage: The effect of dye and *Rhizobium* inoculant on percentage germination of green gram showed inhibition of all the concentrations of dye. The inhibitory effect in all the treatments continued upto 96 hours after seed germination. 25%

Table 6: Effect of different concentrations of dye Monastral Fast Blue and *Rhizobium* inoculants on percentage germination of *Vigna radiate* in term of percentage germination.

Conc.% V/V(x)	Time(in hours) After Treatment				C	Mean	C^2
	24	48	72	96			
Control	0	8.0	8.5	12.5	29.0	7.25	841.00
25	0	7.5	8.0	12.0	27.5	6.87	756.25
50	0	6.5	6.6	9.2	22.3	5.57	497.29
75	0	6.0	6.0	8.0	20.0	5.00	400.00
100	0	5.2	5.2	7.5	17.9	4.47	320.41
T	0	33.2	34.3	49.2	116.7		$?C^2$
Mean	0	6.64	6.86	9.84	$?T^2$		2814.95
T^2	0	1102.24	1176.49	2420.64			
$?y^2$=780.72	CF=542.52	TSS=247.20	SST=202.12	SSC= 27.52	SSE=19.75		

S.S. due to	d.f.	S.S.	M.S.	F
Time	3	202.12	67.275	$F1=47.2156^0$
Conc.	4	27.52	8.522	$F2=4.8752^0$
Error	12	19.75	2.912	
Total	19	249.39		
CD(Time) = 0.21			CD(Conc.) = 0.17	

Concentration showed us significantdecline in effect on percentage of seed germination.

CONCLUSION

In relation to *Rhizobium* the effect of dye Monastral Fast Blue BS indicate a gradual decrease in all the parameters with different concentrations. Higher concentration of the dye and *Rhizobium* inoculant, which inhibited seed germination seems to be due to an alteration in the permeability of the testa allowing poor diffusion of water molecules into the embryo of the seeds.

I would like to extend my sincere gratitude to my research guide and to all the non teaching staff of my college.

REFERENCES

Ashraf M M, Mueen-ud-din and Warraich, N H 2003. Production efficiency of mungbean (*Vigna radiate* L.) as affected by seed inoculation and NPK application. *Int. J. Agric. Biol*. **5** 179–80

Brar J S and Lal P B 1991 Effect of Rhizobium inoculation, phosphorous and molybdenum on yield and its components in Mungbean. *Ind. Agriculturist,* **35** 67–9

Basu T K and Bansyopadhyay S 1990 Effect of *Rhizobium* inoculation and nitrogen application on some yields attributes of mung. *Environ. Ecol*. **8** 650–4

Hayat R, Ali S and Khan F S 2004 Effect of nitrogen and Rhizobium inoculation on yield, N up take and economic of mungbean. *Int. J. Agric. Biol*. **6** 547–51

Malik M A, Hussain S, Warraich E A, Habib A and Ullah S 2002. Effect of seed inoculation and phosphorus application on growth, seed yield and quality of mungbean (*Vigna radiate* L.) CV. NM-98. *Int. J. Agric. Biol*. **4** 515–6

Muhammad D, Gurmani A H and Khan M, 2004 Effect of Phosphorus and *Rhizobium* inoculation on the yield and yield components of mungbean under the rainfed conditions of D.G. Khan. *Sarhad J. Agric.* **20** 575–82

Nadeem M A, Ahmad R and Ahmad M S 2004 Effects of seed inoculation and different fertilizers levels on the growth and yield of mungbean. *J. Agron*. **3** 40–2

Thakur A K and Panwar J D S 1995 Effect of Rhizobium VAM interactions on growth and yield in Mungbean. Indian J. P. Physiol. **38** 62–5