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Short Communication

Evaluation of rhizobial strains for bacteriocin production from *Sesbania sesban*

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Abstract
Fourteen rhizobia were isolated from the root nodules of *Sesbania sesban* using soil samples collected from diverse field of India. Result of bacteriocin production on the YEMA plates having bacteriocin sensitive culture PPM-37D showed that out of fourteen isolates five isolates were bacteriocin producer.

Keywords: Rhizobia, Diverse field, Bacteriocin, Sensitive

Introduction
Bacteriocins are extracellularly discahrged and ribosomally synthesized short molecular mass peptides or proteins including bactericidal or bacteriostatic mode of activity, in specific against a broad scale of generally densely connected Gram positive bacteria, however the producer cells are immune to their own bacteriocins (Digaitiene *et al*., 2012; Marwati *et al*., 2018) [2, 5]. Bacteriocins are identified to be formed via lots of Gram positive and Gram negative bacteria. The Gram negative bacteria are well examined for their bacteriocin production property. *Rhizobium leguminosarum* strains have been revealed to produce bacteriocins which have been define as tiny, middle or high bacteriocin producers depend on their clearing zone (Hirsch, 1979) [4].

Materials and Methods
Isolation of rhizobia nodulating *Sesbania sesban*
Sesbania sesban rhizobia were isolated using healthy pink nodules on YEMA medium plates containing congo red dye. The plates were incubated at 28±2 ºC and growth was observed daily for 2-7 days. Rhizobial isolates were purified and maintained on YEMA medium slants at 4 ^{0}C in a refrigerator for further studies.

Bacteriocin production
Actively growing log phase cells were used to detect bacteriocin production. Bacteriocin sensitive culture (0.1 ml) was spreaded on YEMA medium plates. Five µl of different rhizobia were spotted on the plates having bacteriocin sensitive culture PPM-37D. Zone of inhibition on plates was recorded after incubation at 28±2 ºC for 3-4 days, which indicated the bacteriocin production.

Results and Discussion
Isolation of rhizobia nodulating *Sesbania sesban*
A total of 14 rhizobial isolates were isolated from root nodules of *Sesbania sesban* and maintained separately on YEMA medium slants at 4 °C for further study. Similarly, Singh and Gera (2018) [6] isolated 20 rhizobial isolates from root nodules of *Sesbania grandiflora* grown in pots holding soils collected from diverse regions of India.

Bacteriocin production
All the rhizobial isolates were tested for bacteriocin production against already existing bacteriocin sensitive isolate PPM-37D (pigeon pea rhizobia isolated from Mahendergarh district of Haryana). Out of 14 *Sesbania sesban* rhizobial isolates, six isolates were found to produce bacteriocin as these isolates inhibited the growth of sensitive rhizobia PPM-37D and formed a zone of inhibition around the colony (Table 1 and Plate 1).

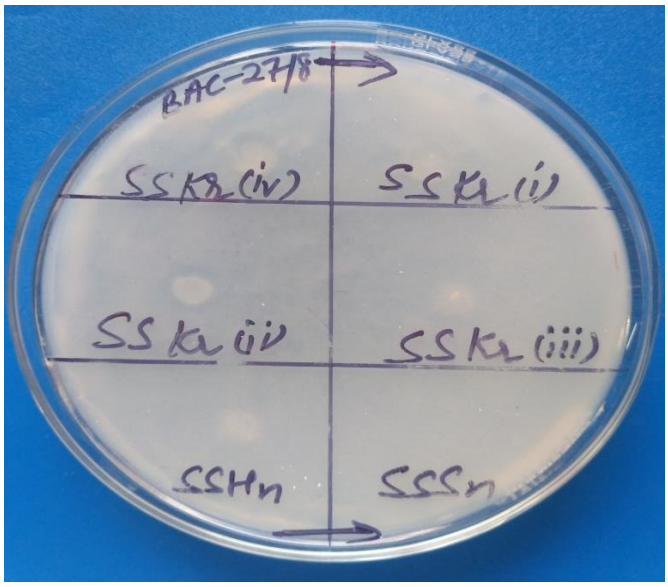

Plate 1: Bacteriocin production on YEMA medium plates by some *Sesbania sesban* rhizobial isolates

Similarly, Hafeez *et al*. (2005) [3] reported bacteriocin production ability by ten strains of *Rhizobium*, *Bradyrhizobium* and *Agrobacterium* species. It was noticed that *Rhizobium leguminosarum* bv. *viciae* strain LC-31 formed an average typed bacteriocin which was found to be well efficient in growth inhibition of various isolates of *R. leguminosarum* bv. *viciae* and *Agrobacterium* spp. Ansari and Rao (2014) [1] assessed bacteriocin production in native soybean rhizobia in vertisols of central India and other soils. The slow developing soybean strain R33 robustly repressed the enlargement of 19 rhizobial strains.

Table 1: Authentication of rhizobial isolates

Sr. No.	Rhizobial isolates	Bacteriocin production
1.	SSUd	-
2.	SSTn	-
3.	SSKe(i)	-
4.	SSKe(ii)	-
5.	SSGh	+
6.	SSBh	-
7.	SSKr(i)	-
8.	SSKr(ii)	+++
9.	SSKr(iii)	++
10.	SSKr(iv)	+
11.	SSHn	+++
12.	SSSn	-
13.	SSHs	+
14.	SSPr	-

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