The Pharma Innovation Journal 2023; 12(10): 133-134

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(10): 133-134

www.thepharmajournal.com
Received: 04-08-2023
Accepted: 06-09-2023

Raut Pooja
College of Agriculture, Nagpur, Dr. PDKV, Akola, Maharashtra, India

Ingle RW
Professor and Head, Department of Plant Pathology, College of Agriculture, Nagpur, Dr. PDKV, Akola, Maharashtra, India

Corresponding Author:
Raut Pooja
College of Agriculture, Nagpur, Dr. PDKV, Akola, Maharashtra, India

In vitro evaluation of bactericides against *Ralstonia solanacearum* of chilli

Raut Pooja and Ingle RW

Abstract
Ralstonia solanacearum is a devastating plant pathogen known to cause bacterial wilt in chili plants, leading to significant yield losses and economic implications for chili growers. In order to mitigate the impact of this pathogen, it is essential to develop effective control strategies. This study presents an *in vitro* evaluation of various bactericides against *Ralstonia solanacearum*, with a specific focus on their potential efficacy in managing bacterial wilt in chili plants. In this research, a comprehensive screening of bactericides *viz.*, Validamycin 3%, Streptomycin sulphate, Streptocycyclin, Copper oxychloride, Kasugamycin 5% + Copper oxychloride 45%, WP, Streptocyclin sulphate + Streptocyclin, Hexaconazole + Validamycin 2.5% SC was conducted at concentrations of 100 ppm, 300 ppm and 500 ppm using *in vitro* assays. The results of this study provide valuable insights into the effectiveness of bactericides Streptomycin sulphate with Streptocycline and streptocycline as potential tools for controlling *Ralstonia solanacearum* in chili plants.

Keywords: *Ralstonia solanacearum*, bactericides, inhibition, chilli

Introduction
Chilli (*Capsicum* spp.) is a widely cultivated and economically important crop, valued for its culinary versatility and its role as a primary ingredient in many cuisines around the world. However, the cultivation of chilli plants is frequently challenged by various pathogens, with one of the most notorious being *Ralstonia solanacearum*. This bacterial pathogen is responsible for causing bacterial wilt, a devastating disease that can lead to substantial yield losses and economic hardship for chilli growers. *Ralstonia solanacearum* is a formidable foe in the world of agriculture due to its broad host range and persistence in soil, making it particularly difficult to manage once established in a field. Its ability to colonize the vascular system of chili plants results in wilting, stunted growth, and eventual death of infected plants. The economic consequences of *Ralstonia solanacearum* are not confined solely to the loss of chilli yields but also include increased production costs associated with disease management and control measures. As the demand for chilli peppers continues to grow in the global market, the need for effective and sustainable methods to combat *Ralstonia solanacearum* becomes increasingly urgent. Traditional control methods such as crop rotation and soil fumigation have limitations and may not provide adequate protection against this resilient pathogen. Therefore, the development of novel strategies for managing bacterial wilt in chilli plants is of paramount importance. One promising avenue for addressing this challenge is the evaluation of bactericides, which are chemical compounds with the potential to inhibit or eradicate *Ralstonia solanacearum*. *In vitro* studies play a crucial role in assessing the efficacy of such bactericides by providing controlled environments for initial screening, determining minimum inhibitory concentrations, and evaluating their impact on the pathogen's virulence. Furthermore, understanding the influence of these bactericides on the overall health and growth of chilli plants is essential for developing sustainable disease management strategies that minimize adverse effects on the crop itself. This study aims to contribute to the ongoing efforts to combat bacterial wilt in chilli plants by conducting an in-depth *in vitro* evaluation of various bactericides against *Ralstonia solanacearum*. The findings from this research hold the potential to provide chili growers with effective tools for disease control, reduce production costs, and ensure the stability of chilli production in the face of this formidable pathogen.

Material and Methods
In vitro evaluation of bactericides
Sensitivity of the isolate was tested by paper disc assay method.

1. Recommended dose of bactericides *viz*., Validamycin 3%, Streptomycin sulphate, Streptocycyclin, Copper oxychloride, Kasugamycin 5% + Copper oxychloride 45%, WP, Streptocyclin sulphate + Streptocyclin, Hexaconazole + Validamycin 2.5% SC was freshly prepared in sterile nucleus free water and stored in vials.
2. Small paper discs punched out from autoclaved filter paper (Whatman no. 42) measuring 5mm in diameter were inserted in the respective vials containing bactericides of different concentrations and allowed to soak for 2 hours.
3. The bacterium culture of *Ralstonia solanacearum* was freshly inoculated in tubes containing autoclaved nutrient broath medium and inoculated at 28+2 °C for 72 hours.
4. Around 200 µL bacterial suspension taken from tubes after growth was spread on plates containing nutrient agar with help of spreader and the paper discs were placed at appropriated positions.
5. The plates were incubated at 28+2 °C for 72 hours and observed for the production of inhibition zone around the filter paper discs. Muhammad Rafi Bawari and T Narendrappa (2019) [7].

The results obtained were analysed statistically. The paper disc soaked in sterile distilled water served as control.

Result and Discussion

The 7 bactericides (Table 1) tested against *Ralstonia solanacearum* isolate proved to be effective of all bactericides, Streptomycin sulphate with Streptocycline exhibited highest inhibitory activity of 02.10 mm at 500 ppm concentration followed by Streptocycline at 500 ppm, exhibited activity of 02.00 mm. Contrastingly, Copper oxychloride recorded the lowest zone 00.50 mm at 100 ppm amongst all.

Table 1: Efficacy of bactericides at different concentrations on 48 hrs

Treatment	Bactericides	Concentrations		
		100 ppm	300 ppm	500 ppm
	Zone of inhibition in 'mm'			
T_1	Copper oxychloride	00.50	01.30	01.10
T_2	Copper oxychloride + Kasugamycin	00.70	01.10	01.00
T_3	Streptocycline	01.70	01.50	02.00
T_4	Streptomycin sulphate	01.30	01.20	01.30
T_5	Streptomycin sulphate + Streptocycline	01.10	01.40	02.10
T_6	Validamycin	01.00	01.10	01.10
T_7	Hexaconazole + Validamycin	01.10	00.90	01.00
T_8	Control	00.00	00.00	00.00
SE ± (mean)		0.02	0.03	0.04
CD (P=0.01)		0.10	0.12	0.20

Conclusion

The purpose of the research was to evaluate efficacy of various bactericides against *Ralstonia solanacearum in-vitro*. Thus, various bactericides at different concentrations evaluated and Streptomycin sulphate with Streptocycline proved to be more efficient at 500 ppm concentration by forming inhibition zone of 02.10 mm followed by Streptocycline at 500 ppm, exhibited activity of 02.00 mm.

References

1. Agrios GN. Plant pathology. Elsevier; c1997.
2. García RO, Kerns JP, Thiessen L. *Ralstonia solanacearum* species complex: A quick diagnostic guide. Plant Health Progress. 2019;20(1):7-13.
3. Gomez KA, Gomez AA. Statistical procedures for agricultural research. John wiley & sons; c1984.
4. Muthoni J, Shimelis H, Melis R. Management of bacterial wilt [*Ralstonia solanacearum* Yabuuchi *et al*., 1995] of Potatoes: Opportunity for host resistance in Kenya. Journal of Agricultural Science. 2012;4(9):64-78.
5. Nion YA, Toyota K. Recent trends in control methods for bacterial wilt diseases caused by *Ralstonia solanacearum*. Microbes and environments. 2015;30(1):1-11.
6. Raghu S. Studies on management of rhizome wilt of ginger with special reference to *Ralstonia solanacearum* (EF Smith) Yabuuchi, *et al*. Master of Science (Agriculture) in Plant Pathology. University of Agricultural Sciences, Dharwad, Karnataka, India; c2011.
7. Bawari MR, Narendrappa T. *In vitro* evaluation of bioagents and antibiotics against *Ralstonia solanacearum* causing brinjal wilt. Journal of Pharmacognosy and Phytochemistry. 2019;8(5):2038-2041.