

CONTENTS

	Page
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	3
2.1 Behaviour of added nitrogen in soil:	3
2.2 Improving the efficiency of nitrogen fertilizers and reducing nitrogen loss in soils:	4
2.3 Nitrification inhibitor and their mode of action:	5
2.3.1 Effect of nitrification inhibitors on nitrification:	5
2.3.1.1 Effect of N - Serve on nitrification:	6
2.3.1.2 Effect of DCD on nitrification:	9
2.3.2 Mode of action of nitrification inhibitors:	10
2.4. Factors influencing the efficiency of nitrification inhibitors	11
2.4.1. Organic matter	11
2.4.2. Temperature:	11
2.4.3 Soil pH	12
2.4.4. Moisture content:	13
2.5. Effect of nitrification inhibitors on yield of crops.	13
2.5.1. Effect of nitrification inhibitor (N = Serve)on yield of crops.	13
2.5.2. Effect of nitrification inhibitor (DCD)on yield of crops:	17
2.6 Effect of non - symbiotic N₂ - fixation on nitrogen fertilizer and dry matter yield of plant.	19

3. MATERIALS AND METHODS	22
3.1. Materials:	22
3.1.1. Growth medium:	22
3.1.2. Indicator plant seeds:	22
3.1.3. Biofertilizer	22
3.1.4. ¹⁵ N Source	22
3.2. Methods	24
3.2.1. Experimental work:	24
3.2.1.1. Soil sampling and preparation for experimental:	24
3.2.1.2. Greenhouse experiments	24
3.2.1.3. Experimental techniques	25
3.2.2. Analytical Procedures:	27
3.2.2.1. Soil Analysis	27
3.2.2.2. Plant Analysis	27
3.2.2.3. Isotope Dilution	27
3.3. Statistical Analysis:	30
 4. RESULTS AND DISCUSSIONS	 31
 4.1. Response of wheat plants to mineral N fertilization as affected by bacterial inoculation and or nitrification inhibition:	 31
4.1.1. Dry matter yield:	31
4.1.2. N - uptake by wheat plants as influenced by N- sources, nitrification inhibitors and inoculation with Azotobacter	37

4.1.3	Nitrogen derived from fertilizer , Soil , air and fertilizer use efficiency as influenced by nitrification inhibitors and inoculation with Azotobacter.	40
4.1.4	Plant and soil recovery of applied ¹⁵ N :-	47
4.2.	Effect of sources and placement of N fertilizer and nitrification inhibition on wheat productivity	51
4.2.1	Dry matter yield	51
4.2.2	N - uptake	56
4.2.3	Nitrogen derived from fertilizer , soil and fertilizer use efficiency	60
4.2.4	¹⁵ N - balance as affected by N - source , N - placement and nitrification inhibition	66
4.3.	Effect of N source , time of application and nitrification inhibition on yield and N - uptake and recovery by wheat:	
	69
4.3.1.	Straw and grain yield:	70
4.3.2.	N - uptake	74
4.3.3.	Nitrogen derived from fertilizer or soil and fertilizer use efficiency :	77
4.3.4.	Nitrogen balance.	82

5. SUMMARY AND CONCLUSION 87

6. REFERENCES

ARABIC SUMMARY