

CONTENT

Kurzfassung	I
Summary.....	II
Content.....	III
List of figures.....	VI
List of tables	VIII
List of abbreviations	XI
1 General Introduction	1
1.1 Rationale.....	2
1.2 State of the art	4
1.2.1 Nitrogen.....	4
1.2.2 Soil organic nitrogen.....	5
1.2.3 Fertilizer dependency of the nitrogen circle	5
1.2.4 Nitrogen-Biomarker	6
1.2.5 Stable isotope tracing Experiments or turn over time assessment	8
1.2.6 Natural abundance	8
1.2.7 Nitrogen and climate.....	9
1.3 Objectives	11
2 Fate of fertilizer and mushroom compost in soil microbial residues (Germany)..	13
2.1 Introduction	14
2.2 Material and Methods.....	17

2.2.1	Experimental layout	17
2.2.2	Analyses	19
2.2.3	Calculation of microbial residue increase and fertilizer cycling through amino sugars	20
2.3	Results	22
2.3.1	Microbial control on N immobilization	23
2.3.2	Fungal and bacterial contribution to N immobilization	27
2.4	Discussion.....	30
2.5	Conclusion	34
3	Microbial sequestration of excess nitrogen in arctic-alpine ecosystems (Vágå, Norway).....	35
3.1	Introduction	36
3.2	Materials and Methods.....	38
3.2.1	Sample Site	38
3.2.2	Fertilizing	40
3.2.3	Soil Sampling.....	40
3.2.4	Analysis	41
3.2.5	Data Analysis.....	43
3.3	Results & Discussion	44
3.4	Conclusion	55
4	Compound-specific $\delta^{15}\text{N}$ analyses in soil microbial residues – a preparative LC approach tested for galactosamine	56

4.1	Introduction	57
4.2	Materials and Methods.....	59
4.2.1	Prep-LC-program of pretesting method	60
4.2.2	Method description for $\delta^{15}\text{N}$ -analysis in soil ASu	61
4.3	Results and Discussion.....	63
4.4	Conclusion	67
4.5	Table and Figure captions.....	69
5	Synopsis	75
5.1	Rational.....	76
5.2	Summary of the Results.....	78
5.3	General conclusions and Synthesis	82
5.4	Outlook.....	88
6	References	90
7	Appendix.....	108
7.1	Appendix: Sequestration of ^{15}N -labeled mineral fertilizer and mushroom compost in soil microbial residues (Germany)	109
7.2	Appendix: Microbial sequestration of excess nitrogen in arctic-alpine alpine ecosystems (Vágå, Norway)	116
8	Lebenslauf	125
9	Danksagung	126