
Table of contents

List of figures	VII
List of tables	IX
Abbreviations, acronyms and symbols	XI
1 Introduction	1
1.1 Bioenergy production as an alternative utilization for semi-natural grassland biomass	1
1.2 Potential conversion technologies for semi-natural grassland biomass	3
1.3 Combustion technology for semi-natural grassland biomass	4
1.4 Challenges for grassland biomass combustion related to fuel chemical composition	6
1.4.1 <i>Emissions</i>	6
1.4.2 <i>Ash high-temperature behaviour</i>	8
1.4.3 <i>Fuel composition of semi-natural grassland biomass</i>	10
1.5 Research focus and objectives	10
2 Publications	13
3 Paper I: Life-cycle analysis of heat generation using biomass from semi-natural grasslands in Central Europe	15
4 Paper II: Semi-natural grassland biomass for combustion: influence of botanical composition, harvest date and site conditions on fuel composition	35
5 Paper III: Influence of leaching on the chemical composition of grassland biomass for combustion	65
6 Paper IV: Leaching of biomass from semi-natural grasslands – effects on chemical composition and ash high-temperature behaviour	87
7 General discussion	117
7.1 Combustion of semi-natural grassland biomass: biodiversity and bioenergy	117
7.2 Fuel composition of semi-natural grassland biomass and suitability for combustion	119
7.2.1 <i>Variability of fuel composition and optimization by on-field leaching</i>	119

Table of contents

7.2.2	<i>Fuel quality requirements of different combustion systems</i>	121
7.2.3	<i>Potential conflicts with nature conservation</i>	123
7.3	Further perspectives	124
7.3.1	<i>Other strategies for the optimization of fuel composition</i>	124
7.3.2	<i>Alternative conversion technologies</i>	127
7.4	Economic framework	130
8	Conclusions and outlook	133
9	Summary	137
10	Zusammenfassung	141
11	References	145
	Appendix	157
	Acknowledgements	165