

Table of Contents

List of Tables.....	I
List of Figures	III
List of Abbreviations.....	V
ZUSAMMENFASSUNG.....	1
SUMMARY	5
CHAPTER 1	9
General Introduction	9
1.1 Importance of bovine milk	10
1.1.1 Milk and dairy products for human nutrition	10
1.1.1.1 Economic importance	10
1.1.1.2 Dietary Importance	11
1.1.2 Milk feeding and suckling period of pre-weaned calves.....	12
1.1.2.1 Milk feeding of dairy calves	13
1.1.2.2 Suckling period of beef calves	14
1.2 Genetic and environmental influences on milk composition	14
1.3 Milk proteins	15
1.3.1 Caseins	16
1.3.1.1 Casein genes and their polymorphisms.....	16
1.3.1.2 α_{s1} -casein.....	18
1.3.1.3 β -casein	18
1.3.1.4 α_{s2} -casein.....	18
1.3.1.5 κ -casein	19
1.3.2 Impact of milk protein variants	19
1.3.2.1 Milk protein variants as a tool for phylogenetic studies	19
1.3.2.2 Influences on milk production traits	20
1.3.2.3 Influences on the release of bioactive peptides.....	21
Aims of the study	22
References	23

CHAPTER 2	37
Genetic diversity and population structure in divergent German cattle selection lines on the basis of milk protein polymorphisms	37
Abstract	38
Introduction	38
Materials and methods	40
Results	43
Discussion	48
Conclusions	53
References	54
CHAPTER 3	60
Associations between maternal milk protein genotypes with pre-weaning calf growth traits in beef cattle	60
Abstract	61
Introduction	61
Materials and Methods	63
Results and Discussion	66
References	77
CHAPTER 4	82
Comparative effects of milk containing A1 versus A2 β-casein on health, growth and β-casomorphin-7 level in plasma of neonatal dairy calves	82
Abstract	83
Introduction	83
Materials and Methods	85
Results and Discussion	89
Conclusions	98
References	100

CHAPTER 5	106
General Discussion	106
5.1 Maintaining genetic diversity and mitigating inbreeding for sustainable livestock breeding	107
5.2 Recommendation for uniform screening methods	110
5.3 Economic importance of the inclusion of A2-milk in the dairy sector	111
5.4 Potential usage of milk protein genotypes in beef cattle.....	114
5.5 Challenges of the use of casein genotypes in marker-assisted selection.....	114
5.6 Concluding remarks and recommendations	117
References	118
Acknowledgement	127
Curriculum Vitae	129
Formal Declaration	130