



Table of contents

1. Introduction	1
1.1. Negative energy balance and insulin sensitivity during early lactation	1
1.1.1. Homeorhetic adaptations around parturition	2
1.1.2. Lipid metabolism during the transition period	3
1.2. Regulators of insulin sensitivity	4
1.2.1. <i>ADIPOQ</i> system	4
1.2.2. <i>LEP</i> system	5
1.2.3. <i>PPAR</i> γ and <i>PPAR</i> γ 2	7
1.2.3.1. <i>PPAR</i> γ 2 in AT	8
1.2.3.2. <i>PPAR</i> γ 2 in the mammary gland	9
1.2.3.3. <i>PPAR</i> γ 2 in liver	9
1.2.3.4. <i>PPAR</i> γ 2 in muscle and pancreas	10
1.2.3.5. Conflicting information available about <i>PPAR</i> γ isoforms	10
1.2.4. <i>TNF-α</i> and <i>IL-6</i>	12
1.2.4.1. <i>IL-6</i> and <i>TNF-α</i> in bovine AT	13
1.2.4.2. <i>IL-6</i> and <i>TNF-α</i> in bovine liver	13
1.3. Acute phase proteins	14
1.3.1. Haptoglobin	14
1.3.2. Serum amyloid A	15
1.4. Conjugated linoleic acids	16
1.4.1. Use of supplement containing conjugated linoleic acids	16
1.4.2. CLA supplementation and alteration of gene expression	18
1.4.3. CLA supplementation and insulin sensitivity	19



1.4.4. CLA supplementation and APP	20
2. Objectives	22
3. Manuscript 1: <i>Technical note:</i> Identification of reference genes for gene expression studies in different bovine tissues focusing on different fat depots.	23
4. Manuscript 2: Bovine haptoglobin as an adipokine: Serum concentrations and tissue expression in dairy cows receiving a conjugated linoleic acids supplement throughout lactation	37
5. Manuscript 3: Hepatic and extrahepatic expression of serum amyloid A3 during lactation in dairy cows treated with or without conjugated linoleic acids	64
6. Manuscript 4: Physiological and conjugated linoleic acids induced changes in the expression of genes related to insulin sensitivity and fat metabolism in different tissues of dairy cows during lactation	86
7. General discussion and conclusions	119
8. Summary	124
9. Zusammenfassung (Summary in German language)	128
10. References	132
11. Acknowledgments	146
12. Publications derived from this doctorate thesis	148
12.1. Papers and manuscripts	148
12.2. Abstracts in conferences	148