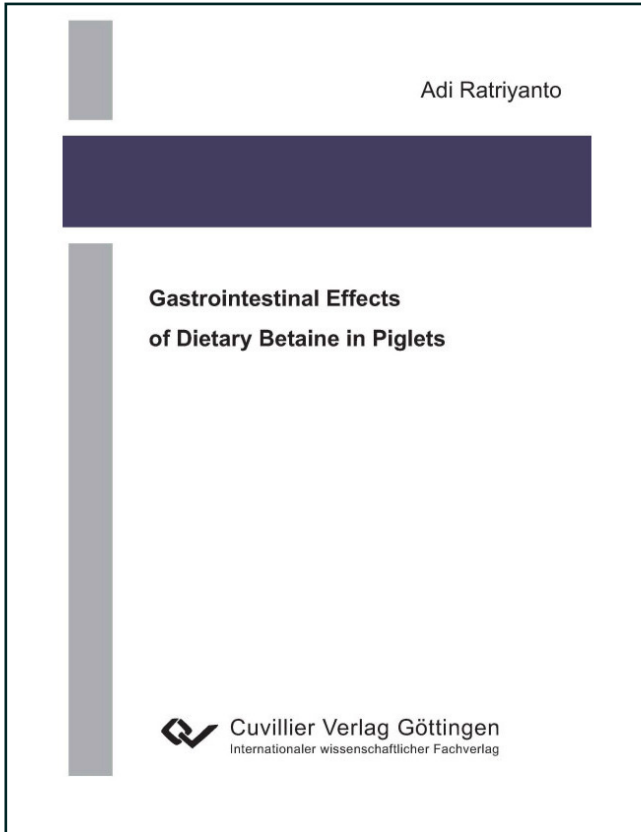




Adi Ratriyanto (Autor)

Gastrointestinal Effects of Dietary Betaine in Piglets



<https://cuvillier.de/de/shop/publications/1171>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

 TABLE OF CONTENTS

1	General Introduction	5
1.1	Metabolic, Osmoregulatory and Nutritional Functions of Betaine in Monogastric Animals.....	5
1.1.1	Abstract	5
1.1.2	Introduction	5
1.1.3	Effects of Betaine on Animal Performance and Carcass Characteristics.....	7
1.1.4	Metabolic Effects of Betaine	13
1.1.4.1	Betaine as a Methyl Group Donor	13
1.1.4.2	Methionine Sparing Effect of Betaine	15
1.1.4.3	Choline Sparing Effect of Betaine.....	17
1.1.5	Betaine as an Osmoprotectant	18
1.1.5.1	Osmoregulation	18
1.1.5.2	Betaine as an Osmoprotectant for the Intestinal Cell	19
1.1.5.3	Betaine as an Osmoprotectant for Intestinal Microbes	20
1.1.5.4	Effect of Betaine on Nutrient Digestibility and Intestinal Microbial Fermentation.....	21
1.1.6	Conclusion	24
1.1.7	References	26
1.2	Organic Acids	37
1.2.1	Mode of Action of Organic Acids in the Gastrointestinal Tract of Pigs.....	38
1.2.2	Effect of Organic Acids on Nutrient Digestibility.....	39
1.2.3	Effect of Organic Acids on Gastrointestinal Microbiota.....	40
1.2.4	Effect of Organic Acids on Microbial Metabolites.....	41
1.2.5	References	43
1.3	Inulin.....	49
1.3.1	Fermentation of Inulin	49
1.3.2	Effect of Inulin on Intestinal Bacterial Populations	50
1.3.3	Effect of Inulin on Microbial Metabolites	51
1.3.4	Effect of Inulin on Nutrient Digestibility	52
1.3.5	References	54
1.4	Scope and Objectives of the Thesis	58
2	Effect of Graded Levels of Dietary Betaine on Ileal and Total Tract Nutrient Digestibilities and Intestinal Bacterial Fermentation of Nutrients in Piglets.....	63

2.1	Abstract	63
2.2	Introduction.....	63
2.3	Materials and Methods	64
2.3.1	Animals and Housing.....	64
2.3.2	Surgical Procedure	64
2.3.3	Dietary Treatments and Experimental Design	65
2.3.4	Sample Collection.....	66
2.3.5	Chemical Analyses	66
2.3.6	Statistical Analyses.....	67
2.4	Results and Discussion	67
2.4.1	General Observations.....	67
2.4.2	Ileal and Total Tract Digestibility of Dry Matter, Neutral Detergent Fiber and Acid Detergent Fiber.....	68
2.4.3	Concentrations of Diaminopimelic Acid, Ornithine, Lactic Acid and Short-Chain Fatty Acids in Ileal Digesta and Feces.....	70
2.4.4	Ileal and Total Tract Digestibility of Crude Ash, Ether Extract, Protein and Amino Acids.....	72
2.5	Conclusions	74
2.6	Acknowledgments	74
2.7	References	75
3	Betaine, Organic Acids and Inulin Fed alone or in Combinations Do Not Affect Ileal and Total Tract Nutrient Digestibility and Microbial Fermentation Characteristics in Piglets.....	81
3.1	Abstract	81
3.2	Introduction.....	81
3.3	Materials and Methods	82
3.3.1	Animals and Housing.....	82
3.3.2	Surgical Procedure	83
3.3.3	Diets and Feeding.....	83
3.3.4	Experimental Procedure	83
3.3.5	Analytical Procedure.....	84
3.3.6	Statistical Analyses.....	84
3.4	Results and Discussion	85
3.5	Conclusion.....	91
3.6	Acknowledgments	91

3.7	References	92
4	General Discussion	97
4.1	Introduction.....	97
4.2	Effect of Betaine Alone or Combined with Organic Acids and (or) Inulin on Nutrient Digestibilities and Microbial Fermentation of Nutrients	98
4.3	Effect of Betaine Alone or Combined with Organic Acids and (or) Inulin on Composition and Activity of Microflora.....	100
4.4	Factors Affecting the Efficacy of Betaine, Organic Acids and Inulin	102
4.5	Conclusion.....	104
4.6	References	105
5	Summary	113
6	Zusammenfassung.....	117