

TABLE OF CONTENTS

1. General introduction and work hypothesis	3
1.1. General introduction.....	3
1.2. Work hypothesis.....	4
1.3. References	5
2. Effect of the desolventizing/toasting process on chemical composition and protein quality of rapeseed meal.....	9
2.1. Abstract	9
2.2. Background	9
2.3. Methods.....	11
2.3.1. Rapeseed selection.....	11
2.3.2. Rapeseed meal processing	11
2.3.2.1. Flaking	12
2.3.2.2. Cooking	12
2.3.2.3. Pressing.....	13
2.3.2.4. Solvent extraction process	14
2.3.2.5. Desolventizing/toasting process	15
2.3.3. Chemical analyses	18
2.3.4. Statistical analyses	19
2.4. Results	19
2.4.1. Chemical composition of rapeseed.....	19
2.4.2. Effect of processing conditions on contents of proximate nutrients, fiber fractions, amino acid composition, and protein quality of rapeseed products .	20
2.4.3. Effect of processing conditions on glucosinolate contents of rapeseed products	22
2.5. Discussion	24
2.5.1. Effect of processing conditions on contents of proximate nutrients, fiber fractions, amino acid composition, and protein quality of rapeseed products .	24
2.5.2. Effect of processing conditions on glucosinolate contents of rapeseed meals .	25
2.6. Conclusion.....	26
2.7. Acknowledgments	27
2.8. References	27



3. Chemical composition and standardized ileal amino acid digestibility in rapeseed meals sourced from German oil mills for growing pigs	35
3.1. Abstract	35
3.2. Introduction	35
3.3. Material and methods	36
3.3.1. Animals, housing and surgical procedures	36
3.3.2. Experimental design, diets and procedures	37
3.3.3. Chemical analyses	40
3.3.4. Calculations	42
3.3.5. Statistical analysis.....	43
3.4. Results	43
3.4.1. General observations	43
3.4.2. Chemical composition of rapeseed meals.....	44
3.4.3. Standardized ileal digestibility of crude protein and amino acids in rapeseed meals different in glucosinolate content	44
3.5. Discussion	46
3.6. Conclusion.....	49
3.7. Acknowledgments	49
3.8. References	49
4. Effect of particle size and heat treatment of soybean meal on standardized ileal digestibility of amino acids in growing pigs.....	59
4.1. Abstract	59
4.2. Introduction	59
4.3. Materials and methods	60
4.3.1. Experimental design, diets, animals, and analyses	60
4.4. Results and discussion.....	61
4.5. Acknowledgments	63
4.6. References	63
5. General discussion	67
5.1. Introduction	67
5.2. Oilseeds and their by-products in pig nutrition	67
5.3. Processing of oilseeds	68
5.3.1. Soybeans	68



5.3.2.	Rapeseeds	69
5.3.3.	Description of the desolventizing-toasting process	69
5.4.	Effect of hydrothermal treatment on anti-nutritional factors	70
5.4.1.	Soybean trypsin inhibitor.....	70
5.4.2.	Rapeseed glucosinolates	71
5.5.	Effects of hydrothermal treatment on protein quality and digestibility of oilseed meals	72
5.6.	Use of oilseeds and their by-products for other livestock species	75
5.6.1.	Oilseed meals in fish nutrition.....	75
5.6.2.	Oilseed meals in poultry nutrition	75
5.6.3.	Oilseed meals in ruminant nutrition	76
5.7.	Conclusion.....	77
5.8.	Suggestions and further research.....	77
5.9.	References	78
6.	Summary.....	89
7.	Zusammenfassung	93