



Nurtjahjo Dwi Sasongko (Autor)
**Increase of erucic acid content in oilseed rape
(*Brassica napus* L.) through the combination with
genes for high oleic acid**

Nurtjahjo Dwi Sasongko

**Increase of erucic acid content in oilseed rape
(*Brassica napus* L.) through the combination
with genes for high oleic acid**



Cuvillier Verlag Göttingen

<https://cuvillier.de/de/shop/publications/3260>

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

	Page
List of Abbreviations	iv
1 Introduction	1
1.1 Importance of rapeseed oils	1
1.2 Biosynthesis of fatty acids in <i>Brassica napus</i> L.	3
1.3 Genetic approaches to modify fatty acid content in rapeseed oil	6
1.4 Development of rapeseed cultivars with increased erucic acid content	10
1.5 Utilisation of near infrared reflectance spectroscopy (NIRS) in breeding for quality traits	12
1.6 Aims of the study	13
2 Material and Methods	15
2.1 Plant material	15
2.2 Methodology	16
2.2.1 Crossing of the parental plants	16
2.2.2 Analysis for fatty acid content in F ₁ seeds and preparation for F ₁ plants	16
2.2.3 Selection of F ₂ seeds for the field experiment	17
2.2.4 Field experiment with selected F ₂ seeds	18
2.2.5 Development of NIRS calibrations for the determination of the fatty acid content in single seeds	18
2.2.6 Gas liquid chromatography (GLC)	21
2.2.7 Data analysis	23

3	Results	25
3.1	Analysis of fatty acids segregation	25
3.1.1	Fatty acid content of parental and F ₁ seeds of the cross HOAR DH's x cv. Maplus	25
3.1.2	Fatty acid content of F ₂ seeds of the cross HOAR DH's x cv. Maplus	27
3.1.3	Fatty acid content of parental and F ₁ seeds of the cross R239 x #3411	34
3.1.4	Fatty acid content of F ₂ seeds of the cross R239 x #3411	35
3.2	Development of NIRS calibrations for fatty acid content in singleseed rape seeds	38
3.2.1	Development of NIRS calibrations for fatty acid content in F ₂ seeds of the cross HOAR DH's x cv. Maplus	38
3.2.2	Prediction of fatty acid content in F ₂ seeds of the cross HOAR DH's x cv. Maplus	41
3.2.3	Development of NIRS calibration for fatty acid content in F ₂ seeds of the cross R239 x #3411	44
3.2.4	Prediction of fatty acid content in F ₂ seeds of the cross R239 x #3411	45
3.3	Fatty acid content of F₃ seeds of the cross HOAR DH's x cv. Maplus	46
3.3.1	Fatty acid content in EEEE class of the cross HOAR DH's x cv. Maplus	49
4	Discussion	57
4.1	Segregation of fatty acid content in F₂ seeds	57
4.2	Development of singleseeds NIRS calibrations for fatty acids	60

4.3	Prediction of erucic acid content in F ₂ seeds by NIRS	62
4.4	Fatty acid content in F ₃ seeds obtained from the selected F ₂ plants	63
4.5	High Erucic High Oleic (HEHO) - a new type of oil?	68
4.6	Further attempts to increase C22:1 content in <i>Brassica napus</i> L.	70
5	Summary	71
6	References	74
7	Acknowledgements	88
8	Appendix	90