

**OIL CROPS:
BRASSICA
SUBNETWORK**

PROCEEDINGS OF THE
THIRD WORKSHOP, QUALITY
TRAINING, AND CHINESE
PROJECT REPORTS,
HELD IN SHANGHAI,
PEOPLE'S REPUBLIC OF CHINA,
21-24 APRIL 1990

ABBAS OMRAN

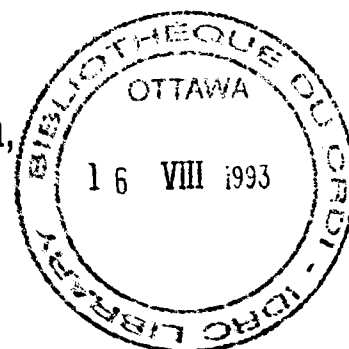
**ARCHIV
95664**

95664

July 1993

Oil Crops: Brassica Subnetwork

Proceedings of the
Third Workshop, Quality Training,
and Chinese Project Reports,
held in
Shanghai, People's Republic of China,
21-24 April 1990



Edited by
Abbas Omran
Technical Advisor, Oilcrops Network

Organized by
Ministry of Agriculture, Beijing, China
and
International Development Research Centre, Ottawa, Canada

ARCHIV

16 VIII 1993

44

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
Ottawa • Cairo • Dakar • Johannesburg • Montevideo • Nairobi • New Delhi • Singapore

Material contained in this report is produced as submitted and has not been subjected to peer review or editing by IDRC Public Information Program staff. Unless otherwise stated, copyright for material in this report is held by the authors. Mention of a proprietary name does not constitute endorsement of the product and is given only for information.

ISBN 0-88936-670-5



Printed on recycled paper

TABLE OF CONTENTS

Table of Contents	iii
Participants	v
Introduction . ABBAS OMRAN.....	1

PART I QUALITY TRAINING

SECTION 1. Manual of Selected Methods for Glucosinolate Analysis. D.I. MCGREGOR	6
- Analysis of Glucosinolate in Canola and Rapeseed: Determination of Glucosinolates by Gas Liquid Chromatography of the Trimethylsilylethers. J.K. DAUN, D.R. DECLERCQ AND D.I. MCGREGOR.....	8
- Determination of Glucosinolate Content by Gas Liquid Chromatography of Trimethylsilyl Derivatives of Desulfated Glucosinolates. J. P. RANEY AND D.I.MCGREGOR.....	14
- Determination of Glucosinolate Content by Gas Chromatography of Trimethylsilyl Derivatives of Glucose. D.I.MCGREGOR.....	20
- Determination of Total Glucosinolate and Total Indole Glucosinolate Content of Rapeseed/Canola Using Glucose Oxidase to Measure Glucose and Ferric nitrate to Measure Free Thiocyanate Ion. D. I. MCGREGOR.....	24
- Determination of Total Glucosinolate Content of Rapeseed/ Canola Using Immobilized Myrosinase and Glucose Oxidase. S. WANG, Z.Y. YUAN AND D.I. MCGREGOR.....	33
SECTION 2. Manual of Additional Training Lectures and Papers..	41
- Total Glucosinolate Content In Rapeseed Using Reflectance. R.J.W. TRUSCOTT AND J.T. THOLEN.....	41
- A Simple Method for Identifying the Low-Erucic Acid and Low-Glucosinolate Rapeseed-Turbidity Titration-Colorimetry. WU MOUCHENG AND YUAN JUNHUA.....	45
- An Outline of Research On Rapeseed Quality Analysis. WU XINGYONG.....	48
- New Methods of Myrosinase Bioreactor and Glucose Sensor for Rapid and Accurate Assay of Glucosinolates in Rapeseeds. ZHONG YI YUAN, XIAO JUN WANG, TIAN MIN ZHU, PEI YING CHEN AND XIN SONG JI.....	50

PART II A FINAL SUMMARY REPORT OF SINO-CANADIAN RAPESEED BREEDING PROJECT. QU NINGKANG

1. Shanghai Academy of Agricultural Sciences(SAAS), Shanghai, China. YAN ZHANG, GUANGHUA FANG	57
2. Institute of Oilcrops Chinese Academy of Agricultural Sciences, Wuhan, China. CHENGQING LIU	61

3. Qinghai Academy of Agriculture and Forestry. ZENG KE TIAN.. 67
 4. Xinjiang Academy of Agricultural Sciences. ZHAOMU WANG..... 74

PART III
BRASSICA SUB-NETWORK COUNTRY PRESENTATIONS

- The Fast Developing Oilcrops Network - A Summary Report.
 ABBAS OMRAN. 78
- A Brief Report on the Brassica Sub-Network. BASUDEO SINGH.. 83
- Research Progress on Rapeseed in Egypt. BADR A. EL-AHMAR... 85
- Quality Breeding in Brassica carinata A. Braun in Ethiopia.
 GETINET ALEMAW AND HIRUY BELAYNEH..... 90
- Some of the contributions of Dr. Hiruy Belayneh to Oilseed
 Brassica Research in Ethiopia. GETINET ALEMAW..... 92
- Strategies in Rapeseed and Mustard Development in Kenya.
 M.J. MAHASI..... 95
- Status of Brassica Crops in Pakistan. MOHAMMED HANIF QAZI
 AND PARVEZ KHALIQ. 98
- National Uniform Rapeseed-Mustard Yield Trials and Their
 Role in Variety Selection. MOHAMMED HANIF QAZI AND MASOOD
 A. RANA. 108
- Present Status and Future Strategies of Oilseed Brassica
 Research in India. P.R. KUMAR AND P.S. BHATNAGAR..... 112
- Rapeseed-Mustard in Nepal. B. MISHRA. 117
- Constraints and Opportunities of Brassica Oilseed
 Production in Bangladesh. M.A. ISLAM, M.A. KHALEQUE,
 K.P. BISWAS AND M.R.I. MONDAL..... 120
- Progress in Rapeseed-Mustard Research in Bhutan. TAYAN
 RAJ GURUNG. 125
- Overview of Rapeseed Production and Research in China.
 YAN ZHANG. 130
- Analysis of Eight High-Quality Rapeseed (Brassica napus L.)
 Strains for - High and Stable Seed Yield. CHAOCAI SUN,
 GUANGHUA FANG AND HUA ZHAO..... 134
- Canola Research in Australia. GREGORY BUZZA. 136
- Goals for 1989 - 1991 and Progress of the Barani
 Agricultural Research and Development Project (BARD) in
 Pakistan, Pertaining to Brassica. HANS HENNING MUENDEL..... 137

PART IV
BRASSICA SUB-NETWORK:
DISCUSSIONS / RECOMMENDATION

- Collaborative Programmes - Minutes of Meeting for
 Scientific Exchange and Institutional Collaborative
 Programmes among Member Countries of Brassica Sub-Network. 140
- India/China Collaboration - Minutes of Meeting of
 Counterpart Scientists for International Collaborative
 Research Between China and India..... 143
- General Discussions and Recommendations..... 147

SECTION 1

MANUAL OF

SELECTED METHODS FOR

GLUCOSINOLATE ANALYSIS

By

D.I. McGregor

Agriculture Canada Research Station, 107 Science Crescent,
Saskatoon, Saskatchewan, S7N 0X2, Canada

These notes include procedures for five methods for glucosinolate analysis presented at this workshop. The procedures are for methods as developed, or adapted, and currently used at the Agriculture Canada Research Station, Saskatoon. Table 1 shows the comparison of all seven procedures (five presented in this workshop and two published somewhere else as mentioned under the Table.

Table 1. Comparison of seven methods for determining the total glucosinolate content of rapeseed.

Sample	M E T H O D S *						HPLC ⁷⁾
	Canadian Grain Commission GLC-TMS ¹⁾	Agriculture Canada Saskatoon GLC-TMS ²⁾	TMS glucose ³⁾	Glucose Analyzer ⁴⁾	Glucose oxidase/ion exchange ⁵⁾	Thymol ⁶⁾	
BC86-18	4.70	5.30	5.50	4.80	7.40	4.20	5.10
Tobin (S)	14.10	14.80	15.80	13.40	18.00	14.70	14.00
Westar	28.20	28.50	28.10	25.30	31.50	25.20	24.20
Tobin (Cert.)	25.30	25.50	27.50	23.40	30.10	27.60	23.10
BL802	47.90	47.50	51.50	42.20	54.10	51.20	42.40
226-1	16.00	16.20	14.30	13.90	19.90	14.10	14.50
226-2	34.50	36.50	31.40	32.40	39.80	34.50	31.90
BC:BL 3:1	14.70	15.00	16.40	15.00	20.00	14.90	14.20
BC:BL 1:1	26.10	30.00	26.50	24.40	31.40	28.20	23.50
BC:BL 1:3	36.70	37.50	39.90	33.60	42.80	39.60	33.00
S.E. **	0.34	0.48	0.33	0.45	0.84	0.49	0.67
Overall mean	24.80	25.40	25.70	22.80	29.50	25.40	22.60

*1) Daun, DeClerq and McGregor. 1989. (page 8 of this proceedings).

2) Raney and McGregor. 1990. (page 14 of this proceedings).

3) McGregor. 1990a. (page 20 of this proceedings).

4) McGregor. 1990b. (page 24 of this proceedings).

5) Wang, Yuan and McGregor. 1990. (page 33 of this proceedings).

6) McGregor, D.I. and R.K. Downey. 1986. Determination of total glucosinolate content in seed meal of rapeseed using thymol. In: Proceedings of the Third Oil Crops Network Workshop held in Addis Ababa, Ethiopia, October 6-10 (A. Omran, Editor) :242-250.

7) McGregor, D.I. 1985. Determination of glucosinolates in Brassica seed. In: Cruciferae Eucarpia Newsletter No. 10. :132-136.

** Pooled standard error of the means of three determinations.

Samples were selected to bracket the canola range of glucosinolate content (<30 micromoles glucosinolate excluding the indole glucosinolates per gram oil-extracted air-dried meal). All methods had good precision. The somewhat higher values obtained with the glucose oxidase/ion exchange method are under investigation. Somewhat lower values for the glucose analyzer methods are also being further investigated. Studies to date indicate that reducing the sample size from 250 mg of gram oil-extracted air-dried meal, as originally called for in the procedure of the glucose analyzer method, to 100 mg yields means comparable with the other methods of analysis.

The details of the five methods presented today are included in the next five papers:

- Daun, J.K., D.R. DeClerq and D.I. McGregor. 1989. Analysis of Glucosinolates in canola and rapeseed, Method of the Canadian Grain Commission Grain Research Laboratory. December 15, 1981, revised September 30, 1983, September 1, 1989.
(pp. 8-13 of this proceedings).
- Raney, J.P. and D.I. McGregor. 1990. Determination of glucosinolate content by gas chromatography of trimethylsilyl derivatives of desulfated glucosinolates.
(pp. 14-19 of this proceedings).
- McGregor, D.I. 1990. Determination of glucosinolate content by gas chromatography of trimethylsilyl derivatives of glucose.
(pp. 20-23 of this proceedings).
- McGregor, D.I. 1990. Determination of total glucosinolate and total indole glucosinolate content of rapeseed/canola using glucose oxidase to measure glucose and ferric nitrate to measure free thiocyanate ion.
(pp. 24-32 of this proceedings).
- Wang, X., Z.Y. Yuan and D.I. McGregor. 1990. Determination of total glucosinolate content of rapeseed/canola using immobilized myrosinase and glucose oxidase.
(pp. 33-39 of this proceedings).