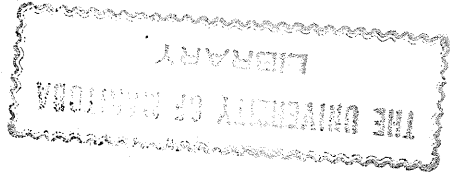


April, 1933.

Winnipeg, Manitoba.



Master of Science.

for the degree of

in partial fulfillment of the requirements

submitted to the University of Manitoba

by

Licensee as follows, 1933, (Bismarck)

WALTER EDWARD THOMAS,

OF THE UNIVERSITY OF MANITOBA

THE UNIVERSITY OF MANITOBA

the Grain Research Laboratory.

Thanks for the privilege of conducting this study in

acting chemist in charge, Division Grain Research Laboratory,

formerly chemist in charge, and to Mr. T. K. Allison,

the statistical estimations, and to both Dr. W. L. Gaddes,

research, for his valuable assistance in carrying out

statistical assistant, Associate Committee on Grain

The writer is indebted to Miss Nancy Hilton,

criticisms during the progress of this investigation.

has been omitted out, for his helpful suggestions and

Dr. T. D. Robinson, under whose direction this work

The writer wishes to express his thanks to

ACKNOWLEDGMENTS

## TABLE OF CONTENTS

	Page
INTRODUCTION	1
REVIEW OF THE LITERATURE:	
(a) Composition of Linseed Oil	2
(b) Mechanism of the Drying of Linseed Oil	3
(c) Determination of Drying Behaviour	6
OUTLINE OF PROBLEM	7
MATERIALS AND METHODS:	
Samples Employed	8
Preparation of Oil Samples	8
Estimation of Drying Time	9
Method of preparing Suitable Films	10
Determination of Physical and Chemical Characteristics	11
Construction of Drying Cabinet	12
EXPERIMENTAL:	
Preliminary Drying Tests	13
Physical and Chemical Characteristics as Related to Drying Time	16
ESTIMATION OF FATTY ACID COMPOSITION:	
(a) Total Saturated Fatty Acids	18
(b) Total Unsaturated Fatty Acids	22
Preparation of Mixed Fatty Acids	23
WEIGHT BEHAVIOUR DURING DRYING OF LINSEED OIL FILMS	31
PEROXIDE FORMATION AS A MEASURE OF INDUCTION DRYING	32
POLYMERIZATION BEHAVIOUR	42
OIL VANISH TESTS	43
INFLUENCE OF NATURAL PIGMENTS ON DRYING TIME	51
PHOTOMICROGRAPHIC REPRESENTATION OF OIL FILMS	52
SUMMARY	54
CONCLUSIONS	56
REFERENCES	57

linoleic and linolenic; it would follow that the latter oil would be the equal to that of an oil composed of different proportions of oleic, percentage of oleic acid, and yet possess an iodine value approximately could contain a high percentage of linolenic acid, coupled with a high it may not be always the most reliable index of quality. Thus, an oil oil and does not distinguish between the unsaturated fatty acids present, since the iodine value measures only total unsaturation of an

oil.

a variable and fairly reliable index of the drying quality of linseed degree of unsaturation, as measured by iodine value, is taken as being the relative proportions of these acids present as glycerides; the total acids decrease in the order named, and hence is influenced in part by of unsaturation. The rate of oxidation of linoleic, linolenic and oleic oxygen absorption, both of which are associated with the total degree The drying properties depend upon the extent and rate of

on the drying properties of the extracted linseed oil. value of linseed depends primarily on the quantity of oil yielded and protective coatings, linoleum, patent leather, etc. The commercial oil which is one of the principal components in the manufacture of linseed is produced primarily for the manufacture of linseed

### INTRODUCTION

---

OF LINSEED OIL IN RELATION TO DRYING BEHAVIOR  
THE SIGNIFICANCE OF THE CHEMICAL COMPOSITION AND CHARACTERISTICS