# CHANGES IN MECHANICAL PROPERTIES OF DRIED RAPESEED

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## ABSTRACT

The present study was made in order to check the influence of different drying conditions on strength features of rapeseed as well as technological value.
Seed was drying in differentiated conditions, from very mild to very violent. Different initial moisture content was also used. Strength of seeds and their technological value was estimated at oil-point compression test.
Decrease of strength features of seeds was observed with the increase of drying temperature and higher initial moisture content. The oil-point of dried seed depended of drying temperature and initial moisture content.

## INTRODUCTION

Physical state of rapeseed influence oil quality produced from these seeds. It can also play important part in the increase of number of broken seeds when they undergo various external loads. The mechanical properties of rapeseed, especially its strength, change with the decrease of moisture content. This play a considerable part in arising of seed damage. Drying conditions can also affect seed mechanical properties. Extremely bad conditions can affect even oil quality. Stępniewski et al. reported decrease of seeds quality during post harvest handling. The sources of damage are harvest operation as well as postharvest operation. Damaged seeds and preheated seeds contain less oil of worse quality. Fornal et al. also reported their bad processing quality.

Estimation of the influence of different drying conditions on strength features of rapeseed as well as technological value was the aim of the present study.

## MATERIAL AND METHOD

Rapeseed of Ceres variety was the material for the investigation. Three levels of initial moisture content (14, 20 and 25% w.b.) were chosen. The levels of moisture were obtained by moistening of air-dry (7% m.c.) seeds and than conditioning for 24 hours.

Drying was conducted in laboratory dryer with circulation of drying air, type KC 100/200. Temperatures of drying were chosen in order to distinct differentiation of drying conditions. Therefore the following three temperatures 100, 150 and 200°C were selected. Samples were dried till the air dry moisture, what was verified by weighing during drying (some changes resulted from evaporation of hot seeds short after removing them from dryer). Drying time varied from 16 minutes (200°C and 14% m.c.) till 70 minutes (100°C and 25% m.c.) and final moisture content varied from 3.7% till 4.9% w.b. during testing.

Samples of three initial moisture content were exposure on the open air in laboratory at the same time, in order to check changes of mechanical strength comparing to dried seeds. The same, the control sample (untreated seeds of 7% m.c.) was tested, too.

Compression till oil point was performed according to Fornal et al..

## RESULTS

Both initial moisture content of seeds and drying temperature had considerable influence on all investigated parameters measured at oil-point.

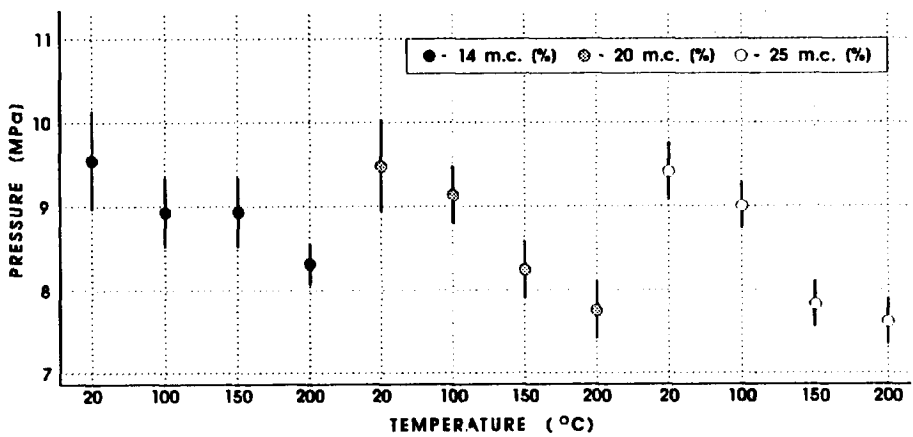


Fig.1. Dependence of oil-point pressure of rapeseed dried at different temperatures from different initial moisture content

Pressure at oil-point decreased considerably with the increase of drying temperature (Fig. 1). Especially the decrease was noticed between 100°C and 150°C. The higher initial moisture content the bigger decrease of oil-point pressure between mentioned temperatures. Mean pressure value of untreated seed was 9.52 MPa.

The deformation causing oil-point increased with the increase of drying temperature, however the influence of initial moisture content wasn't noticed for that parameter. Statistically significant differences were observed between drying temperatures of 20°C and 200°C (Fig. 2). The mean value of oil-point deformation of untreated seed was 0.41 mm.

The decrease of work required to oil-point was noticed with the increase of seed

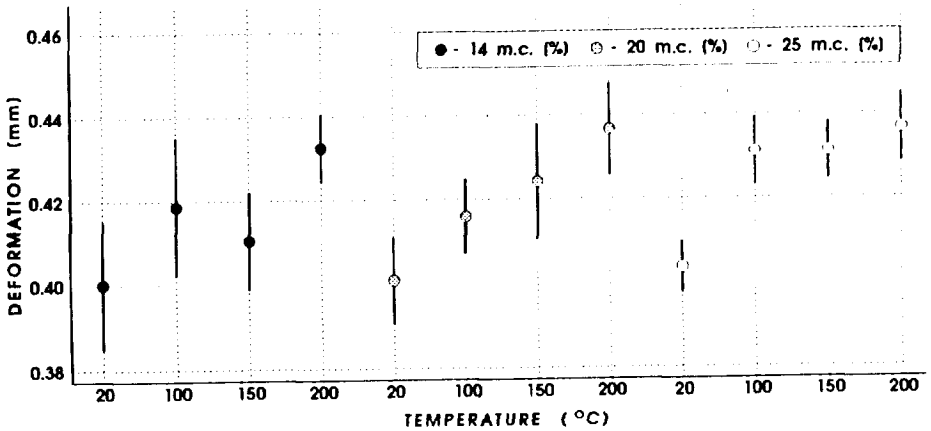


Fig.2. The dependence of oil-point deformation of rapeseed dried at different temperatures from different initial moisture content

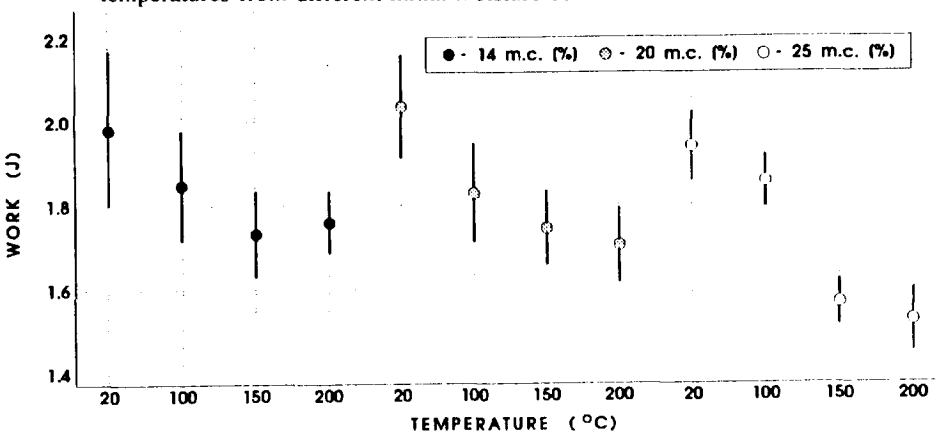


Fig.3. The dependence of oil-point work of rapeseed dried at different temperatures from different initial moisture content

drying temperature (Fig. 3). The higher initial moisture content the bigger decrease. Higher initial moisture content, more statistically significant differences. The mean work at oil-point of untreated seed was 1.99J.

ACKNOWLEDGEMENTS

The authors thank State Committee for Scientific Research for the sponsorships within grant No. 5 S306 001 07

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