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PROCESSING DEPT. LABORATORY.

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Use of the Marconi Moisture Meter for quick determination of moisture in rapeseed.

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## INTRODUCTION.

The quality and maturity of rapeseed can usually be determined from its moisture content and the acceptance or rejection of large batches of rapeseed reaching the factory are based on the moisture content. Though official methods of moisture determination using Infra-red and conventional oven-drying are available, it is necessary to obtain quick and handy methods by which the farmer can also check the moisture content of his produce before the despatch of large samples, in order to avoid unnecessary costs in cases of rejection.

The Marconi moisture meter, used mainly for wheat flour, which is also calibrated for rapeseed, promises to be such an instrument, easily handled and operated even by the least scientifically-biased farmers.

For large batches of rapeseed, though quantities used for Marconi determinations are small, it is recommended that determinations done on unground grain will encourage greater sampling and therefore better accuracy in overall moisture content of a batch. According to tests made by the National Institute of Agricultural Engineering (Report No. RT7/48071), it is recommended that grains should usually be ground, since unground fresh grains register moisture contents 5% lower than the true values on a really humid day.

This project is therefore concerned with the determination of the moisture contents of rape seed, both in the ground and unground forms by Marconi moisture meter, and comparing the results with standard methods to assess their validity.

## EXPERIMENT.

Samples of English grown and imported rapeseed were collected from the store where they had been stored in corked jars. These were read, in both the ground and unground forms, on the Marconi moisture meter, Type T.F.933.A, and using the calibration table for rapeseed, the corresponding moisture contents determined. The samples were then analysed for moisture using standard methods of Infra-red and oven-drying at 100°C. for 3 hours, as adopted by the International Seed Crushers' Association. One fresh sample of locally grown rapeseed was also taken off a truck and analysed for moisture by the methods described.



RESULTS.

Sample	Marconi Readings Converted to % Moisture (from calibration chart)		% Moisture By	
	Ground	Unground	*Infra-Red	**Oven-Dry
			Ground	Ground
4890	10.2	9.3	10.6	10.3
4990	9.7	9.2	9.6	9.7
4852	8.8	8.7	8.8	8.8
4916	12.3	11.0	13.2	13.1
4924	10.7	10.4	10.4	10.6
4997	9.1	8.8	9.1	9.1
5214	7.5	8.2	6.4	6.5
4880	7.5	7.9	8.0	7.8
20	6.6	7.7	6.0	6.1
4875	11.6	10.4	12.1	12.1
5350(2)	7.4	8.2	6.7	6.7
5016	7.8	8.0	7.6	7.7
4986	7.9	8.3	9.0	8.7
4961	9.1	9.4	8.8	8.9
5017	8.0	8.2	8.2	8.1
5350(1)	7.7	8.2	6.6	6.7
4971	8.1	8.5	8.1	8.1
4840	7.7	8.1	8.6	8.4
4955	8.6	8.9	8.6	8.4
5407	12.5	10.5	12.7	12.9
4940	8.9	9.2	10.2	10.3
Locally grown	10.4	10.2		10.7

\* 5 gm. sample dried @ 150°C. for 6½ mins.

\*\* Copy attached.

STUDENT'S t-TEST.

$$\sigma_{\Delta} = \sqrt{\frac{(\sum x_1^2 - n_1 \bar{x}_1^2) + (\sum x_2^2 - n_2 \bar{x}_2^2)}{n_1 + n_2 - 2}} \times \sqrt{\frac{n_1 + n_2}{n_1 n_2}}$$

$$\text{and } t = \frac{\Delta}{\sigma_{\Delta}}$$

t , for 40 degrees of freedom and 0.05 Confidence Limits  
= 2.02

Comparing the results of Infra-Red drying and Marconi readings on  
Unground samples:-

$$t = 0.11 \times 2.05 < 2.02$$

and therefore difference not significant.

Comparing the results of Infra-Red drying and Marconi readings on  
Ground samples:-

$$t = 0.08 \times 0.58 = 0.046$$

Difference is still not significant.

OBSERVATION & DISCUSSION.

From the statistical analysis, there is no significant difference in results between unground samples determined on the Marconi and the moisture as determined by official methods.

The use of ground samples on the Marconi, tends to make the cell messy, due to the high oil content of the seed, when the plunger is compressed.

The result of the fresh sample taken from an incoming truck, indicates that within less than 5% limits of accuracy, the Marconi instrument can be used provided this is kept in a constant temperature room, where the material under test can always reach equilibrium relative humidity shortly before the reading is taken.

It is assumed that on the farms, the Marconi instrument would be used on large batches of rapeseed stored in a silo and therefore will not be affected by temporal variations in atmospheric humidity.

CONCLUSION.

It has been found that within greater than 95% limit of accuracy, the Marconi moisture meter can be used to determine the moisture content of rapeseed, in the unground form. This is more recommended because it is quicker to perform and encourages greater sampling as well as causing less damage to the cells of the instrument. Limit values which may cause discrepancies as to rejection or acceptance, should always be checked by a more elaborate procedure such as the conventional oven-dry or Infra-Red oven method.