# STUDY ON MAIN INDICATORS OF PANIFICATION OF AN ASSORTMENT OF COMMON WHEAT RECEIVED AND STORED AT BOROMIR - DEVA

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## ABSTRACT

*Suitability for bakery of wheat varieties from our country is different and is influenced both by genetic factors - variety, and climatic conditions, technological conditions where wheat production was obtained or how was preservedthe seeds lots to their recovery (M. DUDA, 2006, Gh. MATEI, 2010, 2013).*

*The various numbers of methods of analysis of the technological characteristics of flours from wheat is growing, due to the need to anticipate more striking as early as possible their technological behavior. Flours technological behavior is the result of subtle and highly complex interactions that we have to judge them usually based on highly specific quality parameters: protein content, wet gluten content, the "strength" of gluten, Zeleny index, the fall index, extensibility, dough strength (A. ROTARU 2010, Gabriela PĂUNESCU, 2012).Reality has shown that at least in the classical parameters of quality flour (protein content, gluten index, wet gluten content, falling number) values enshrined in the literature and does not always ensure optimum technological behavior*

*The study carried out we wanted to highlight the heterogeneity of wheat consignments received and stored at the mills Boromir - Deva and determining the quality of their use in bakery, by specific indices.*

## INTRODUCTION

To highlight the qualities of common wheat for bakery we initiated a comparative research between wheat and other cereals by showing that it has higher protein content than other grain, except triticale. Also, the content of protein substances, as well as the other cereals, varies within wide limits, giving higher values related the culture conditions and increased doses of nitrogen fertilization. But a very high content of protein not confers definite quality bread flour (Tripples et al., 1977).

Another important indicator of the quality of wheat is wet gluten content; values over 22% are associated with quality, and values above 24% indicating high quality. Perten gluten index value can give the true measure of quality gluten-generating protein, explaining why it sometimes wheat with good physicochemical characteristics (optimum content of protein and gluten) but with a lower gluten index misbehave in the process of making bread (Romanian Farmer Magazine, 2003).

## MATERIAL AND METHODS

Into the flow receiving of lots of winter wheat belonging to 2013 were recorded and monitored following groups, coded for ease of expressing the results as follows:

- BRMDV 01;
- BRMDV 02;
- BRMDV 03;
- BRMDV 04;
- BRMDV 05;
- BRMDV 06;
- BRMDV 07;

From the targeted assortment were taken for study laboratory samples in accordance with applicable standards of **STAS1633/2003** with other additional amendments additional (figure 1).

**Figure 1 – Laboratory samples of wheat and flour before analysis**

The samples extracted from the receiving stream have undergone general determinations, respectively:

- seed moisture - (U%);
- determination of foreign bodies (CS%);
- determining MH (hectoliter weight).

Subsequently, the same samples were milled and on the flour obtained from the samples were performed the following determinations

- wet gluten content;
- deformation index;
- alveograftest, which included:
  - the maximum height of the curve (H) multiplied by the coefficient standard (1.1) resulting dough resistance to extension – P;
  - dough extensibility (length of curve) – L;
  - report between and P/L

## RESULTS AND DISCUSSION

Seed's moisture – After the quantitative and qualitative receipt performed it is observed that in terms of natural moisture of the analyzed lots, with an exception of lots BRMDV01 and BRMDV06 whose moisture level exceeds the critical humidity (more than 14.5%), all other batches have values of moisture falling in standards, less than 14% (figure 2).

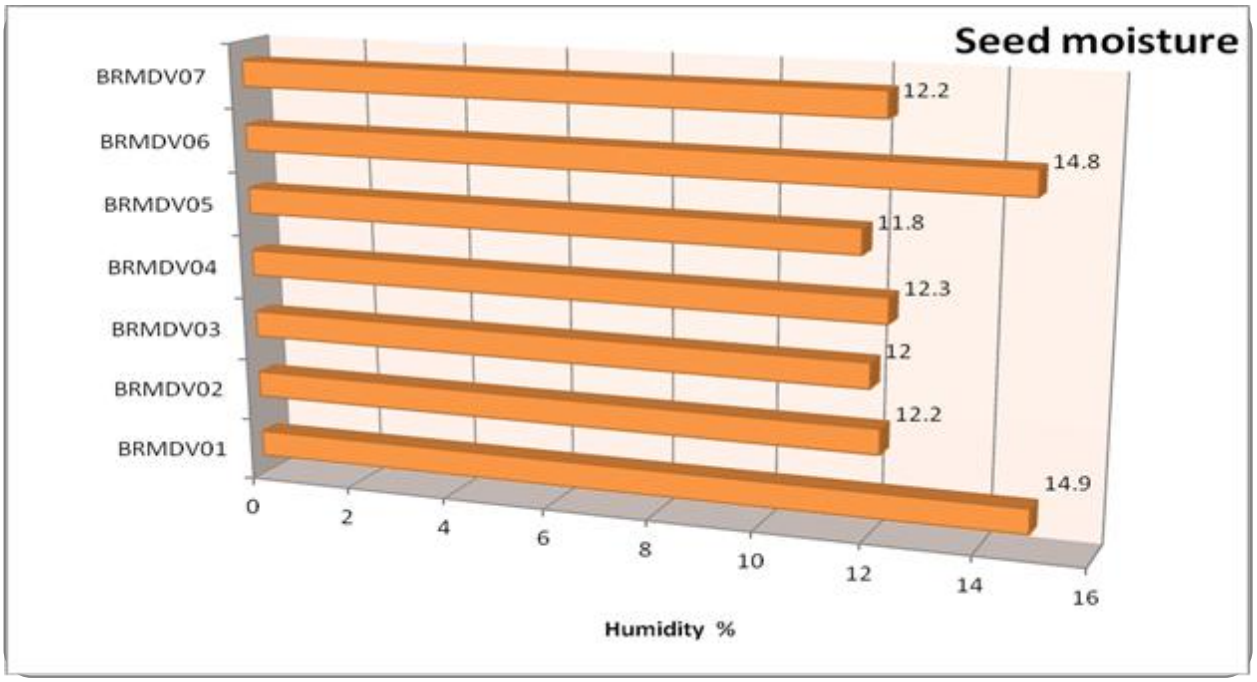



**Figure 2 – The percentage of moisture on wheat lots**

The mentioned lots listed were highlighted in the diagram of conditioning reception station and transferred to achieve integration into storage parameters, storing it temporarily in transit cells. In these cells was applied to a dry "cold" when in the seed mass was introduced with ventilators natural air, unheated. In silo cell was blown air, the drying temperature 30-35$^{o}$C and was passed through the seed mass, reducing at a rate of 1-1.5% moisture for each seed passage through the dryer.

**Foreign bodies** – In the milling and baking industry, as in units specialized in long term storage of grain, foreign bodies content in seed mass is a factor which establishes the cost per kilo wheat upon receipt of lots, and subsequently on applied technology storage process.

Lots under surveyed process had different values from this point of view, the percentage of foreign matters (CS%) varied between 2% in group BRMDV06 and 5% of wheat lot of BRMDV05 (figure 3).

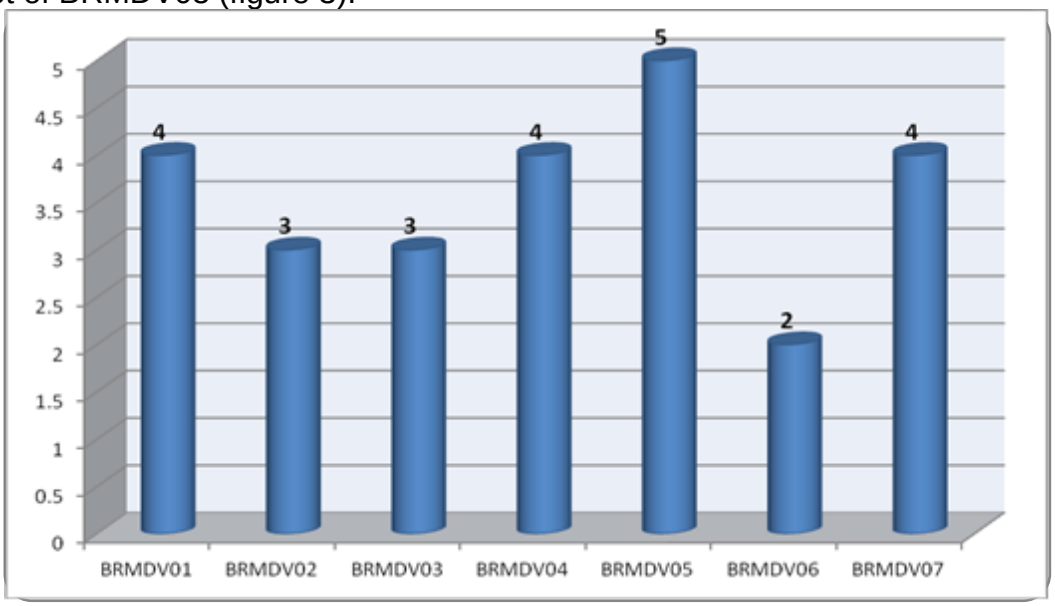



**Figure 3 – The percentage of foreign bodies on wheat lots**

Different values of these plots indicates their origin from different farms and entail additional cleaning measures applied before grinding batches that have value greater than 3%, according to standards.

On lots BRMDV01, BRMDV04, BRMDV05 and BRMDV07 were required pre cleaning or basic cleaning to be brought to the national quality standardsor internal standards of BOROMIR IND. DEVA.

**Hectoliter weight** - Typically, drying and conditioning lots of wheat seed site grow MH, this being a secondary criterion for assessing quality (products that do not include MH on delivery standards and it is not taken into account).The minimum level acceptable for common wheat in industry of making bread is 75 kg/hl and for durum wheat for pasta, MH minimum value is de77 kg/hl (Roman, Gh.,et al., 2012).

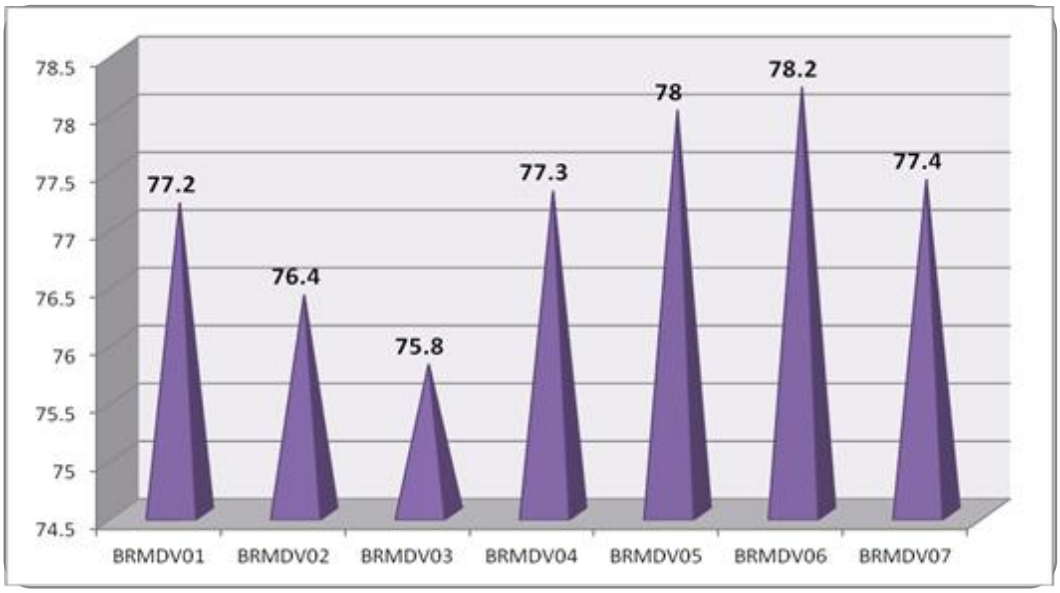



**Figure 4 – The level of hectoliter weight on wheat lots**

Hectoliter mass is instead the most important criterion for storage of agricultural products, it directly influences the space (volume) occupied by a seed lot. From this point of view, analyzed lots showed values that ranged from 75.8 kg/hl at BRMDV03 lot and 78.2 kg/hl at lot BRMDV06. This can easily see in figure 4 for all lots analyzed had values of this index over 75 kg/hl, something that makes them suitable for use in bakery to get bread or other adjacent types.

**Wet gluten content** - In lots of common wheat monitored, wet gluten content was between 25.8% and BRMDV07 BRMDV03 lots and 28% in group BRMDV06 (figure 5). Lots BRMDV06, BRMDV01 and BRMDV02 because high values of this index can be used in the development of blends (mixtures) with other groups whose wet gluten content is less than 22% and the limit of this value, in order to improve the quality of flours thus obtained.

**Deformation index** – Related to this index for high-quality flour, it will have a value as small as possible.The flours obtained from lots monitored present deformation index values varied between 3 and 6 mm, classifying potential in strong flours for lots BRMDV01 and BRMDV06 and great for baking the other groups, respectively BRMDV02, BRMDV03, BRMDV04, BRMDV05 and BRMDV07 (figure 5)

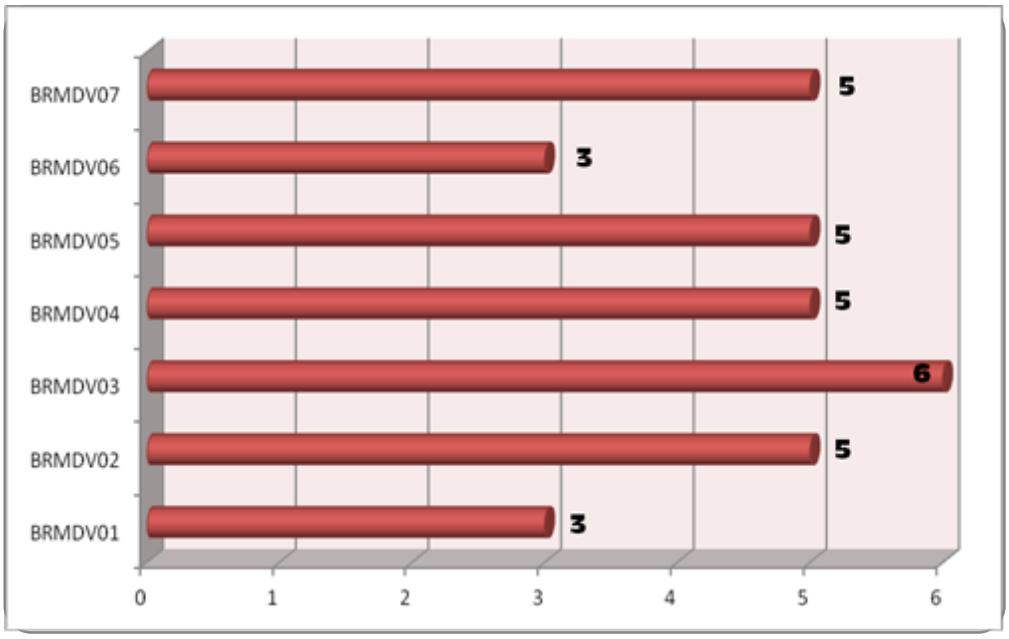



**Figure 5 – Deformation index on wheat lots**

**Alveograf test** - establishing quality for bakery of lots monitored using ALVEOGRAF TEST supposed pursuit of parameters determined by device named ALVEOLINK (CHOPIN) - figures 6 - were determinate the following indices:

P - resistance to extension of dough;
L - dough extensibility curve length;
P/R – ratio between P and L;
W – flours power.

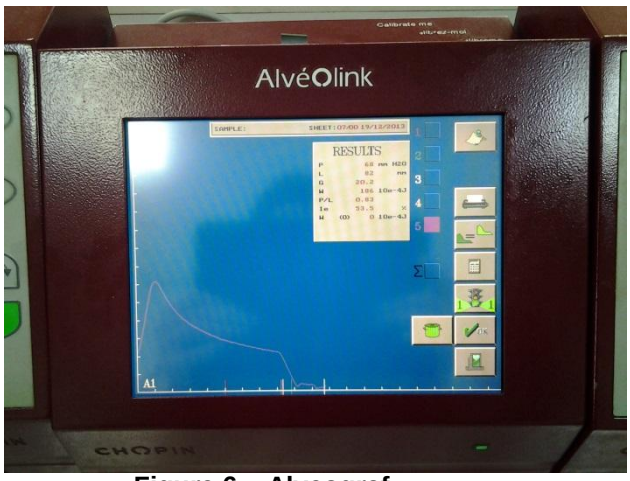



**Figure 6 – Alveograf**

The most important indexes determinate with Alveograf test are presented in table 1 and figures 7, 8, 9, 10, 11, 12 and 13. Among these indices, the most relevant in the bakery field seems to be flour power index (W), which is expressed in Joules and whose values were between 182 J and 263 J in lots BRMDV02 and respectively BRMDV06.

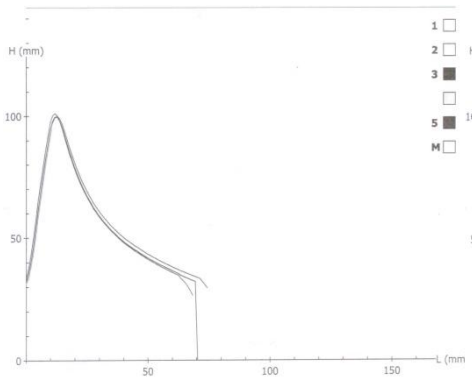
*Table 1*

***Values of main indexes determinate with Alveograf test***

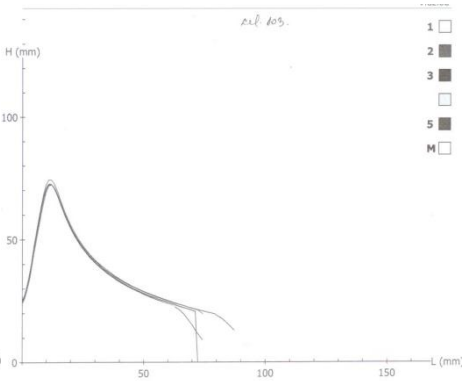
| Lot/index | P (mm $H_2O$) | L (mm) | P/L | W (J) |
|---|---|---|---|---|
| **BRMDV01** | 110 | 69 | 1,59 | 256 |
| **BRMDV02** | 80 | 72 | 1,11 | 182 |
| **BRMDV03** | 77 | 88 | 0,88 | 187 |
| **BRMDV04** | 94 | 91 | 1,03 | 247 |
| **BRMDV05** | 75 | 85 | 0,88 | 191 |
| **BRMDV06** | 101 | 75 | 1,35 | 263 |
| **BRMDV07** | 98 | 86 | 1,14 | 259 |

Analyzing the values obtained in accordance with the classification of bread flour, relative to W, we can say that:

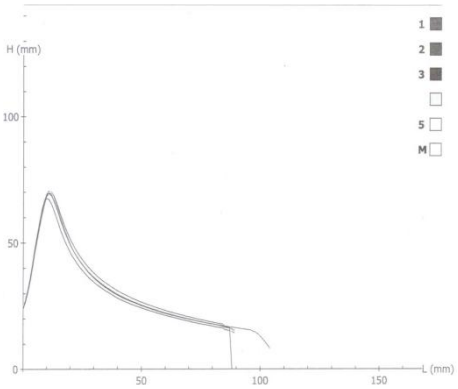
- lots with values between 180J and 220 J give poor quality meals that need to be improved in the manufacturing process: BRMDV02, BRMDV03 and BRMDV05;
- lots with values between 230 and 290 J give good quality flours: BRMDV04, BRMDV01, BRMDV07 and BRMDV06



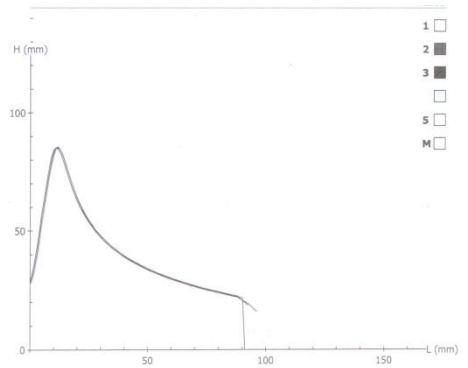

Quality parameters BRMDV01



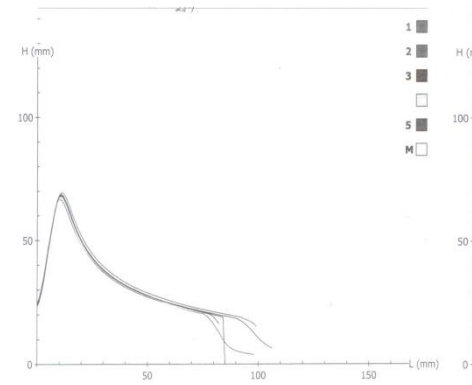

Quality parameters BRMDV02



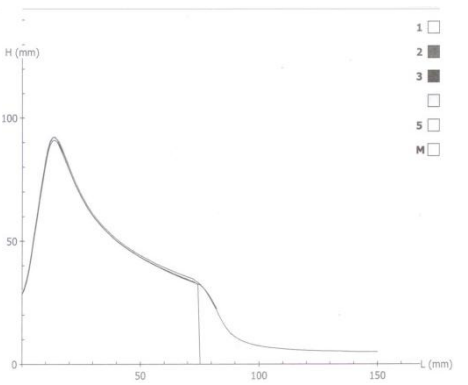

Quality parameters BRMDV03




Quality parameters BRMDV04




Quality parameters BRMDV05




Quality parameters BRMDV06

**Figures 7-12 – Quality parameters on lots BRMDV 01 – 06**

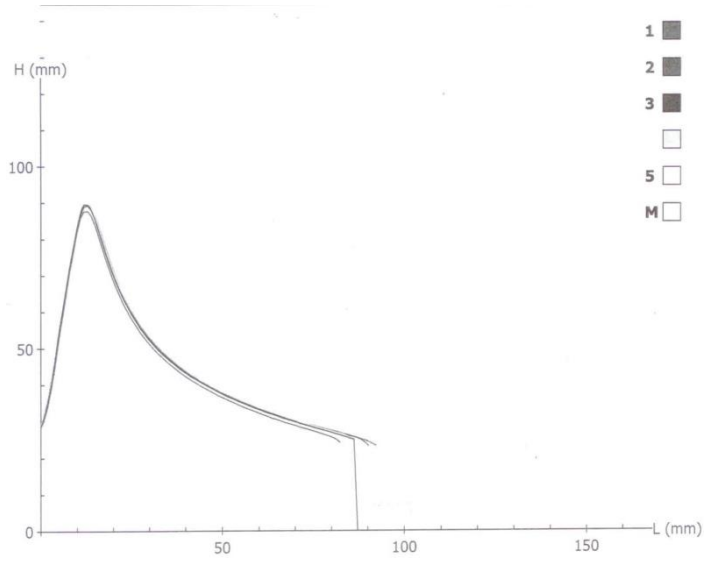



**Figure 13 – Quality parameters on lot BRMDV 07**

## CONCLUSIONS

From the presented data, we can say the follow:

- Grain moisture is an important indicator in assessing wheat quality. Optimum harvest ripeness is characterized by water content of the grains, which should not exceed 15%, and the preservation is not performed under optimum conditions until a moisture content below 14%;
- Wheat grain moisture plays an important role in the process of grinding, it influences the yield of the flour and the losses in the mill process;
- Impurities affect the quality of wheat flour technology, therefore, it is necessary to remove them from the bulk of the grains. Determination of impurities is performed according to SR ISO 7970: 2001;
- Indices on traits of a bakery flours can be obtained by examining its gluten quality. A good quality gluten should be well crowded, quite durable and elastic;
- Gluten deformation index indicates the proteolytic activity of flours, loads monitored from this point of view achieving higher values as quality classifications;
- Flour power tends to become one of the most frequently resorted indices used in milling and baking quality. They are appreciated flours that this indicator has higher average values of 200 Joules.
- Analyzing the quality of the lots monitored by quality indicators presented, it appears that they have complementary qualities of bread and to obtain high quality products recommended the development of "blending" between lots before grinding.

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