Preliminary results on triticale recovery in bakery

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Abstract

The goal research is to highlight the quality of autumn triticale variety Titan and a variety of wheat Turda 2000 found in an polifactorial experience to S.C.D.A. Turda, in order to recovery in bakery.

The cereal varieties under study are taken from the 2008/2009 harvest. From combination of factors for every variety resulting in eight versions four were treated with N\textsubscript{50}P\textsubscript{50}K\textsubscript{50} kg/ha at sowing and the next four with N\textsubscript{50}P\textsubscript{30}K\textsubscript{50} kg/ha at sowing + N\textsubscript{50}P\textsubscript{30} kg/ha the resumption of vegetation in spring. The blank sample was considered each variety the unfertilized sample. The samples were collected by standard collection and the quality parameters followed were: moisture (%), test weight (Kg/hl) protein content (%), wet gluten(%), falling number (sec), foreign bodies(%); Zelleny (ml).

Due to low gluten content and higher nutritional value for Titan variety compared with wheat, it can be combined in different proportions with variety Turda 2000 to obtain a high quality flour for bread.

Keywords: wheat, quality, triticale

1. Introduction

Triticale (trit-ih-KAY-lee) is a crop species resulting from a plant breeder’s cross between wheat (Triticum) and rye (Secale). The name triticale (Triticale hexaploid Lart.) combines the scientific names of the two genera involved. It is produced by doubling the chromosomes of the sterile hybrid that results when crossing wheat and rye[1-5]. This doubling produces what is called a polyploid. Rye and wheat are the major cereals consumed by people of northern and eastern Europe. The nutritional value of products produced from triticale is given in most high content of protein substances, sometimes exceeding that of wheat and the structure of amino acids and complex proteins, especially for high lysine content.

Although it is high content in protein and amino acids, the triticale have qualities of milling and baking wheat considerably lower.

By appropriate modification of manufacturing bread processes, particularly those related to the period of fermentation, can produce a higher quality bread of triticale beans.

2. Materials and methods

Were analyzed the samples from wheat Turda 2000 variety and triticale as Titan variety of 2009 harvest from S.C.D.A. Turda.(Institute of Research and Agriculture Development from Turda) These wheat varieties were subjected to an polifactoriale experience that the following factors and dosing.

A Factor - base fertilization with macroelements following dosing:

\[ A1 \] N\textsubscript{50}P\textsubscript{50}K\textsubscript{50} kg/ha at sowing

\[ A2 \] N\textsubscript{50}P\textsubscript{30}K\textsubscript{50} kg/ha at sowing + N\textsubscript{50}P\textsubscript{30} kg/ha at the resumption of vegetation in spring

B Factor – variety of wheat which was treated with insecto-fungicide (Yunta) following dosing:

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Determination of quality traits in cereal varieties studied was done by methods acceptable by the quality standards and provided for milling wheat ISO 7970/2001 standard. With regard to impurities and moisture content as we can see in Tables 1 and 2 in the varieties studied, all variants are included in the experimental values for bread wheat.

The hectoliter mass of varieties studied show that they have in this regard a very good baking quality with few exceptions the experimental variants with higher values compared to blank samples (unfertilized-unherbicides) which registered about 78,6 % at Turda 2000 variety and 74,1 % at triticale Titan variety.

Analyzing the values of quality wet gluten, Zeleny index and protein content are increasing fertilized variants (A1 factor) and higher values and additional experimental variants fertilized and the resumption of vegetation in spring (A2 factor) against blank sample (unfertilized-unherbicides)

The crude protein value for wheat is 11.5 % and for triticale is 8,9 % at blank sample reaching up to values between 13 % -16,3 % for wheat respectively 11,7 % -13,9 % for triticale at variants in which applied N50P50K50 kg / ha at sowing and N50P30K50 kg/ha at the resumption of vegetation in spring.

Analyzing the wet gluten content in the varieties studied notice that they have a good baking quality. If we take the lower wet gluten content in bakery accepted (22%) found that all the studied experimental variants, in terms of S.C.D.A. Turda, fit in very good bakery, except triticale blank sample whose value is 15.7 % (unfertilized-unherbicides)

### Table 1. The parameters quality of wheat Turda 2000 variety

<table>
<thead>
<tr>
<th>Nr. crt.</th>
<th>Varianta</th>
<th>CS %</th>
<th>UR %</th>
<th>MH Kg/hl</th>
<th>GU %</th>
<th>P (%)</th>
<th>Zll ml</th>
<th>FN sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MARTOR</td>
<td>0.9</td>
<td>12.1</td>
<td>78.6</td>
<td>24.4</td>
<td>11.5</td>
<td>34.6</td>
<td>186</td>
</tr>
<tr>
<td>2</td>
<td>A1B1C1</td>
<td>1.60</td>
<td>14.1</td>
<td>77</td>
<td>33.5</td>
<td>13.9</td>
<td>56</td>
<td>219</td>
</tr>
<tr>
<td>3</td>
<td>A1B1C2</td>
<td>1.20</td>
<td>13.4</td>
<td>76.3</td>
<td>31.7</td>
<td>13.7</td>
<td>55.6</td>
<td>266</td>
</tr>
<tr>
<td>4</td>
<td>A1B1C3</td>
<td>1.52</td>
<td>13.8</td>
<td>78.1</td>
<td>31.9</td>
<td>13.4</td>
<td>55.2</td>
<td>84</td>
</tr>
<tr>
<td>5</td>
<td>A1B1C4</td>
<td>1.98</td>
<td>14.0</td>
<td>78.5</td>
<td>31.7</td>
<td>13.0</td>
<td>53.5</td>
<td>265</td>
</tr>
<tr>
<td>6</td>
<td>A2B1C1</td>
<td>1.68</td>
<td>14.2</td>
<td>77.1</td>
<td>39.7</td>
<td>15.7</td>
<td>65.3</td>
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</tr>
<tr>
<td>7</td>
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<td>1.91</td>
<td>13.8</td>
<td>74.4</td>
<td>40.9</td>
<td>16.2</td>
<td>66.7</td>
<td>66</td>
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<tr>
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<td>14.1</td>
<td>77.4</td>
<td>36.5</td>
<td>14.9</td>
<td>63.4</td>
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<tr>
<td>9</td>
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<td>1.61</td>
<td>13.6</td>
<td>77.0</td>
<td>37.7</td>
<td>15.3</td>
<td>62.6</td>
<td>271</td>
</tr>
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</table>
Concerning on the Zelleny index values remarked of 34.6 ml. for wheat and 15.2 ml. for triticale at the control samples (unfertilized-unherbicides) and higher values for ferritized variants as we can see in the wheat table 66.7 ml. for A2B1C2 variant and as we can see in the triticale table 63.1 ml. for A2B2C2 variant.

The Falling number index (FN) characterizing the activity of starch from wheat, given by the alpha-amylase activity, which affect the quality of wheat used for bread. Optimal value for bakery of wheat falls is between 180 - 260 sec.

Grain with FN values over 300 sec. are satisfactory, while those with values below 160 sec. have an unsatisfactory bakery value. In terms of falling number index values triticale variety is not good for bakery and wheat variant A1B1C1 is considered optimal for bakery.

As can be seen from tables with increasing protein content increases the wet gluten and zelleny index content.

4. Conclusion

The research conducting at the Turda 2000 wheat and Titan triticale in 2009 harvest and obtained results allow us to draw these conclusions:

- Quality indices: wet gluten, zelleny index and crude protein are strongly influenced by experimental factors especially the agrofond.
- It should be noted that nitrogen fertilization leads to increased values of wet gluten, with superior value compared to the blank (unfertilized-unherbicides)
- By increasing the dose of nitrogen increases the protein content in wheat variety Turda 2000 being 13.9 % on A1 agrofond și 17.3 % on A2 agrofond the variety of Titan triticale the protein content being 12.6 % on A1 agrofond and 13.9 % on A2 agrofond.
- In the Zelleny index we notice that the values increase with increasing nitrogen dose.
- The values achieved in the main indices of quality: hectoliter mass, wet gluten, protein content, zelleny index. both varieties of wheat and triticale Turda 2000 and Titan is suitable mixed in the aim bakery.

References