

QUALITY OF SEEDS OBTAINED IN A COMPANY WITH AGRICULTURAL PROFILE IN CALARASI COUNTY. CASE STUDY

Cecilia NEAGU, Elena LASCĂR, Nicoleta OLTENACU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, Călărași Faculty Branch, 1 Nicolae Titulescu, Călărași, Romania, Emails: cecilianeagu2005@yahoo.com, elenalascar@yahoo.co.uk, nicoleta_oltenacu@yahoo.com

Corresponding author: cecilianeagu2005@yahoo.com

Abstract

In this paper, the quality of the seeds obtained in a company with an agricultural profile, as well as the main factors that can lead to the deterioration of the quality of the seeds, is shown. The company's headquarter is in Ștefan Vodă commune, Călărași county and owns an area of 1494.43 ha. The period analyzed was 2016-2018. From the crops practiced by the company, we analyzed the qualitative parameters of wheat, rapeseed and sunflower, following the quality of the resulting seeds. Most of the qualitative parameters were within the norms stipulated by STAS. There was exceeding in the case of the hectolitre mass parameter in the wheat crop, but this meant a better quality of the wheat analyzed.

Key words: cereals, quality, qualitative indicators, parameters, seeds

INTRODUCTION

The qualitative indicators of cereals have been, since ancient times, the basic element in establishing their price. The quality of the seeds is a relative notion, due in particular to the fact that the seeds of some species may have different destinations such as seeding, food or feed consumption and industrialization. Even if certain quality indices are common, their appreciation may be different, as the criterion of appreciation of a component is subordinate to its theological or agronomic importance [3]. The quality mainly ensures product competitiveness. This is the cumulative fruit of the following objectives of the company, carefully aimed: quality products and services; low cost of the production process; contractual punctuality [11].

The seed is the basic exponent of the qualities, capacities and qualities of the plants of high crop [4]. The determination of the quality of the seeds that are delivered for sowing is established in two distinct stages: one of these would be the establishment of the biological value, which is achieved by the recognition in the field, and the second is the cultural value, established by laboratory analyzes [1]. The qualitative indices that express the physical and germinal properties of the seeds are

determined by laboratory analyzes for each lot of seeds [9]. The physical properties of the seeds are brought by the individual characteristics of the seeds and the foreign components (impurities) remaining in the seed mass despite the cleaning operations. Even if they come from the same source, the seeds are differentiated by shape, size, weight, water content, etc. [10]. The presence of certain pests or items of phytosanitary quarantine in the chain or in the seed lot, or the presence of certain diseases leading to the productivity of crops destined for seed production are strictly forbidden [8]. For some varieties, the standards provide for the proper treatment of the seeds before sowing. So, in order to meet the normative requirements and standards regarding the material used for sowing, the cereals have to go through the conditioning process. The conditioning operations are: drying, cleaning, sorting, treating, packaging and storage. These operations aim to increase the purity of the product. Therefore, determining the quality of the seeds helps to obtain a good price when selling, but also to know in which category they fit, or what is their destination [2]. In order to obtain a higher quality, only certified seed from the zoned varieties, with biological and physical purity

and adequate germination capacity are used at the sowing, and the seed treatment is mandatory [7].

MATERIALS AND METHODS

The activity of the company in the present case study is carried out within the area of Ștefan Vodă commune, Călărași County, by exploiting an area of agricultural land of 1,494.43 ha, of which a part is in the property, and the rest in the form of rent.

The main field of activity is the production to which CAEN Group 011 corresponds: Growing of non-permanent plants. Main activity 0111 - Growing of cereals (excluding rice), leguminous plants and oilseed plants.

The company is located in the South-East Plain area, predominantly the soil type is the chernozem, a very fertile soil, of a brown to black color, contains 3% - 6% humus, a small percentage compared to other soil types, having a pH with a value of 7-7.8% [6]. The temperatures, specific to the temperate-continental climate conditions, are 10.5-11.5°C without frost days, precipitation of 470-560 mm/year with a hydrothermal index for unirrigated areas of 5.3 [5].

The company has its own analysis laboratory to determine the quality of the obtained seeds. The period studied was 2016-2018, and from the grown crops, quality indices of wheat, rapeseed and sunflower were interpreted. The determination of the quality of seeds for consumption is carried out by the laboratories of the selling units of agricultural products: the analysis at the reception of the products, the analysis during the preservation and conditioning and the analysis regarding the quality of the seeds. State standards regarding the analytical method are: STAS 1069-67, determination of foreign bodies, STAS 2522-66, defect terminology, STAS 6280-66, grain size determination, STAS 6124-66, humidity determination [1].

RESULTS AND DISCUSSIONS

As we know, seeds are the most important and essential step in getting a good crop per hectare. Agronomic practices can only

improve the genetic potential of the sown seeds. These are really the foundation of the success or failure of any crop, and in order to obtain harvests with maximum efficiency and quality, it is needed to sow seeds of the highest quality. The structure of the crops practiced by the agricultural company during the analyzed period, respectively 2016-2018 is shown in Table 1.

Table 1. Structure of crops practiced in the company in the period 2016-2018

| Crop | Year/Area -ha | | |
|-------------------|---------------|----------------|-------------|
| | 2016 | 2017 | 2018 |
| Wheat | 521.81 | 600.10 | 685.39 |
| Barley | 94.47 | 61.40 | 195.56 |
| Maize | 332.12 | 332.35 | 311.45 |
| Sunflower | - | 134.96 | 163.59 |
| Soybean | - | - | 138.44 |
| Rapeseed | 352.12 | 227.52 | - |
| Green peas | 189.48 | 138.10 | - |
| Total | 1490 | 1494.43 | 1493 |

Source: Internal documents of the agricultural company

During the analyzed period, the company recorded various crops from cereals such as wheat, barley, maize, to oilseed plants: sunflower, rapeseed, soybean and even vegetables, peas. Regarding the structure of the crops within the agricultural company we can see the oscillations regarding the grown areas from year to year. The crops of rapeseed and peas were in the attention of the farmers in the first two years of activity, and in 2018 they turned to other crops, more qualitatively and at a better price, such as soybean, sunflower, wheat, maize.

For each of the three crops selected in the study (wheat, rapeseed and sunflower), we will analyze the main quality parameters/indices, to find out the causes that led to their final quality.

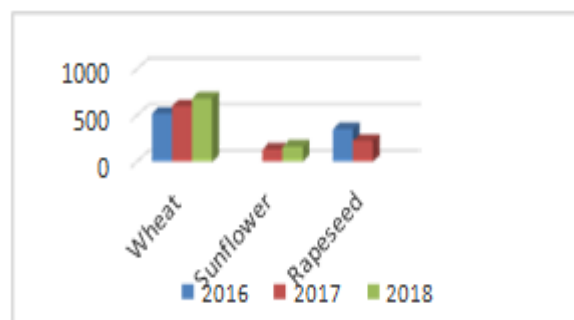


Fig.1. Dynamics of the three crops in the period 2016-2018

Source: Own design.

The wheat crop is in continuous growth, from 521.81 ha as it was in 2016, reaching 685.39 ha in the agricultural year 2018, with a difference of 163.58 ha. The other two analyzed crops were practiced only for 2 years out of the three

studied.

The quality parameters for wheat crop in the company over the three years of activity are as follows in Table 2.

Table 2. Analysis of qualitative parameters of wheat crop in the period 2016-2018

| Wheat crop | | | | | | | | |
|--------------------------|-----------|---------|--------------------------|-----------|---------|--------------------------|-----------|--------|
| Parameters | Year 2016 | | Parameters | Year 2017 | | Parameters | Year 2018 | |
| | Value | STAS | | Value | STAS | | Value | STAS |
| Hectolitre mass | 74.8% | Min 73% | Hectolitre mass | 78.6% | Min 73% | Hectolitre mass | 74.8% | Min73% |
| Humidity | 12% | 14.5% | Humidity | 12.6% | 14.5% | Humidity | 11.3% | 14.5% |
| Impurities | 0.7 % | 3% | Impurities | 0 | 3% | Impurities | 0.1% | 3% |
| Broken grains | 0.1% | 5% | Broke grains | 0 | 5% | Broken grains | 0.1% | 5% |
| Defective grains | 0.1% | 5% | Defective grains | 0 | 5% | Defective grains | 0.1% | 5% |
| Germinated grains | 0.1% | 2% | Germinated grains | 0 | 2% | Germinated grains | 0 | 2% |
| Damaged grains | 0 | Max 1% | Damaged grains | 0 | Max 1% | Damaged grains | 0.1% | Max 1% |
| Foreign bodies | 0 | Max 2% | Foreign bodies | 0 | Max 2% | Foreign grains | 0 | Max 2% |
| Protein | 7.5% | 10% | Protein | 9% | 10 % | Protein | 7.5 % | 10 % |
| Wet Gluten | 23% | Min 22% | Wet Gluten | 29.15% | Min 22% | Wet Gluten | 24% | Min22% |

Source: Documents of quality of the agricultural company.

The values corresponding to the three years analyzed regarding the *hectolitre mass*, exceed the value of STAS. In 2016, there was a value of 74.8%, which means an increase from the STAS value of 2.46%. The year 2017, records a value of 78.6%, with 7.67% more than the minimum value allowed, but this aspect is a positive one, because the wheat has a better quality as the hectolitre mass has a higher value, this fact due to the high content of healthy grains, well developed and with the whole shell, which are not attacked by various mites. The hectolitre mass can be influenced by the impurities in the seed table, according to their nature: the sand and dust increase it, while the straw, the hay and the edges reduce it.

Humidity, as can be seen, in the period 2016-2018, was within the optimum values, not exceeding the value of STAS, that of 14.5%. In the years 2016 and 2018, the humidity value is 12%, except for the year 2017, in which the value is 12.6%, which means an increase of 0.3% compared to 2016.

The *impurity* parameter, records the normal values, often seen after the analyzes performed. The value of STAS is 3% admitted

impurities, and the company recorded in 2016, 0.7% and in 2018, 0.1% impurities. The year 2017 is a favorable year, as well as 2018, from the point of view of this parameter, because 0.1% impurities were recorded. Thus, the company avoided the selection process, a process that requires time, money, equipment and labor.

In the case of *broken grains, defective grains and germinated grains*, we observe that they do not exceed the STAS value provided by 5% and 2% respectively. These have an equal value in both 2016 and 2018 of only 0.1%, which is due to efficient harvesting operations. *Foreign bodies* did not exist during the analyzed period.

Wet gluten is determined because it provides information about the bread baking properties. The STAS value is at least 22%, and from the laboratory analyzes it can be seen that it can be used in a bakery.

Regarding rapeseed crop (grown within the company only in 2016 and 2017), the quality indices are presented in Table 3.

Table 3. Quality parameters of rapeseed crop in the period 2016-2017

| Rapeseed culture | | | |
|------------------|-------|-----------|--------|
| Year 2016 | | Year 2017 | |
| Parameters | Value | Value | STAS |
| Humidity | 6.9% | 7% | 9-10% |
| Impurities | 0 | 0.1% | 2-4% |
| Seed pest | 0 | 0 | 2-5% |
| Oil content | 43.3% | 51.28% | 42-52% |

Source: Documents of quality of the company.

According to Table 3, quality indices: *humidity, seed that have pests and the oil content* had normal limits, they did not exceed STAS, thus we can say that in both agricultural years, the rapeseed was qualitative. However, in 2017, both the humidity and the percentage of impurities recorded higher values than in 2016.

The seed for the two agricultural years for the rapeseed crop was treated with ROYALFLO. Regarding the sunflower crop (grown in the company in 2017 and 2018), the quality indices are presented in Table 4.

Table 4. Quality parameters of sunflower crop in the period 2017-2018

| Sunflower crop | | | |
|-----------------|-------|-----------|------|
| Year 2017 | | Year 2018 | |
| Parameters | Value | Value | STAS |
| Humidity | 6.8% | 7.3% | 14% |
| Impurities | 0.1% | 0.1% | 5.6% |
| Defective seeds | 0 | 0 | 5% |
| Broken seeds | 0 | 0 | 2% |

Source: Documents of quality of the company.

Humidity analyzed in the sunflower crop in the two years, falls in the value of STAS, in 2017 being 6.8%, while in 2018, it recorded an increase compared to the previous year, with 7.35%. From the point of view of impurities and defective seeds, both crops presented a good quality in both years.

The seed from the sunflower crop was treated with: MAXIM XL 035 FS and APRON XL 350 ES.

CONCLUSIONS

Regarding the quality of the seeds followed in this paper, it can be seen that the values fit into STAS values and do not present a threat. Owning an analysis laboratory is a strong point for the activity field, because they can very easily monitor the parameters of the quality indices.

Following the analysis of the wheat crop quality indices, it was found that in 2017, the hectolitre mass recorded a value of 78.6%, with 7.67% more than the minimum value provided by STAS. But for a very good quality wheat the hectolitre mass must be over 80. In general, the hectolitre mass is higher for small grains and smaller for large grains, because the space between grains differs. In wheat, smaller grains have a smaller hectolitre mass, due to the higher percentage of shells. An increased humidity of cereals also causes an increase in the hectolitre mass. For all 3 years, the wheat had the optimum humidity, which means it was harvested in time, the grain was not unripe to retain humidity. Wheat was within STAS, and humidity was not an impediment to obtain a good price or to have to go through the drying process.

Regarding the other two crops analyzed from a qualitative point of view, rapeseed and sunflower, all the analyzed parameters were within the limits stipulated by STAS. Following the analysis we found that the seeds produced by the company are original, of high quality, because they do not show parasites, unusual smells, impurities and have a normal color specific to each type, but also because during the analyzed period, high average products were obtained per hectare (wheat - 6,914 kg/ha, rapeseed - 4,220 kg/ha, sunflower - 3,546 kg/ha).

REFERENCES

- [1]Chira, A., Nicolae, D., 2007, Quality of agricultural and food products, Bucharest, 20.
- [2]Cretu, D., Iova R. A., 2015, The casual relation between the crop management optimization and profit: A case study. Proceedings of 25th IBIMA Conference - Innovation Vision 2020: From Regional Development Sustainability to Global Economic Growth 7-8 May, Amsterdam, Olanda, Vol. I-VI, no.327.
- [3]Cretu, D., Iova R. A., 2015, The influence of the agricultural technology on the economic efficiency of the crop. Case study. Proceedings of 25th IBIMA Conference - Innovation Vision 2020: From Regional Development Sustainability to Global Economic Growth 7-8 May, Amsterdam, Olanda, Vol. I-VI, 654.
- [4]Gherghiev, N., Starodub, V., 2010, Study of field crops and seeds, Chişinău, 25.
- [5]Guță, B. A., Marin, D. I., Carriera, P.L., 2015, Comparative research on several wheat (*Triticum aestivum* L.) genotypes grown under the conditions of

Dâlga-Călărași, AgroLife Scientific Journal - Vol. 4(2)
18.

[6]Neagu, C. V., 2013, Sources of eutrophication of the waters in Calarasi County, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 13(1): 260.

[7]Sin, G., 2005, Technological management of field crops, Ceres Publishing House, 43.

[8]Tinmar, A., V., Imbrea, F., Matei, G., Roman, G. V., Duda, M. M., 2012, Agricultural products conditioning and preservation, University Publishing House, 38.

[9]Toader, M., Roman, G. V., 2012 – General agriculture, University Publishing House, 27.

[10]Vătămanu, V., 2012, Quality indices of seeds Agrimedia Magazine, 15/02/2012.

[11]Wigmore, A., 2016, Book of germinated seeds - how to grow and use germinated seeds in order to have optimal health and vitality, Adevăr Divin Publishing House, 33.

[12]***Internal documents of the agricultural company

