



Relationship between specific weight and starch content, and others analyses, in different oat samples

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In the milling industry, a certain quality of oats is necessary for using it in the food intended for human consumption. There are several factors taken into account such as color, protein level, *etc.* But the key factor to determine the quality is the specific weight (SW). Indeed, it is considered that the specific weight influences the starch content and the heavier the cereal is, the higher starch content should be. This study aims to verify this assertion. Other analyzes were also carried out such as protein level, humidity level, colorimetry, *etc.*

Seventeen samples were tested: 5 were provided by Gembloux Agro-Bio Tech University and 12 from a grain company. These samples have a SW below standards. Currently the standards in effect for SW range from 50 to 54 kg/hL. Additional samples will be used as a control being well in the standards ranges.

All the results presented come from samples that have been sorted. The analyzes showed that the lighter samples have specific weight values varying between 40.3 and 48.8 kg/hL. The average of the starch content results is then 44.5% with a minimum value of 42.4% and a maximum of 48.1 %, the controls sample having an average starch content of 44.3%.

In conclusion, despite a specific weight below the standards, the so-called lighter samples do not necessarily have lower starch contents than the controls, majority having a higher rate. The results of the others analyses will also be showed on the poster.

Keywords: Oat, specific weight, starch content, milling industry

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Introduction

Color, protein content, humidity, etc. as many factors are analyzed and taken into account in order to guarantee the quality of oats intended for human consumption according to the standards of the milling industry. However, the specific weight (SW) remains the key factor in supposedly influencing the starch content. The objective of this study is to verify the link between the weight of the cereal and its starch content.

Materials and methods

Seventeen samples were tested: 12 were provided by Gembloux Agro-Bio tech university and 5 from a grain company. Sample numbering is following the rules, a letter G (Gembloux) or X (Company X) indicates the origin, a number indicates the order and another letter indicates the color (W = white; Y = yellow; B = black). These samples have a SW below standards. Currently, the standards in effect for SW ranges from 50 to 54 kg/hL.

The method used to measure the starch content was polarimetry. After hydrolyzing the bonds between the starch molecules, the polarimeter measured the rotation of polarized light in the solution. An equation was then used to calculate the starch content.

Results

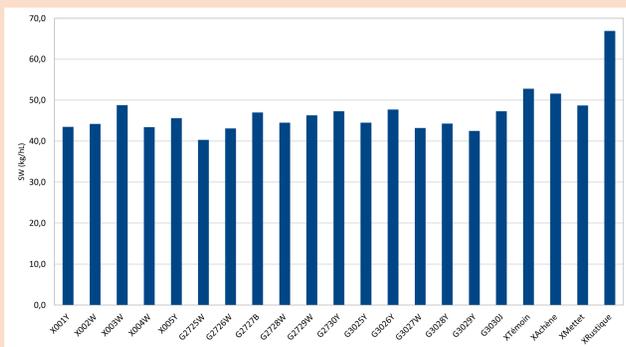


Figure 1: Specific weight of oat grains samples from different varieties

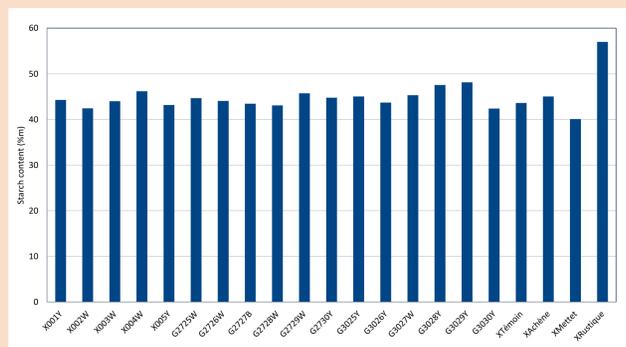


Figure 2: Starch content of oat flour samples from different varieties

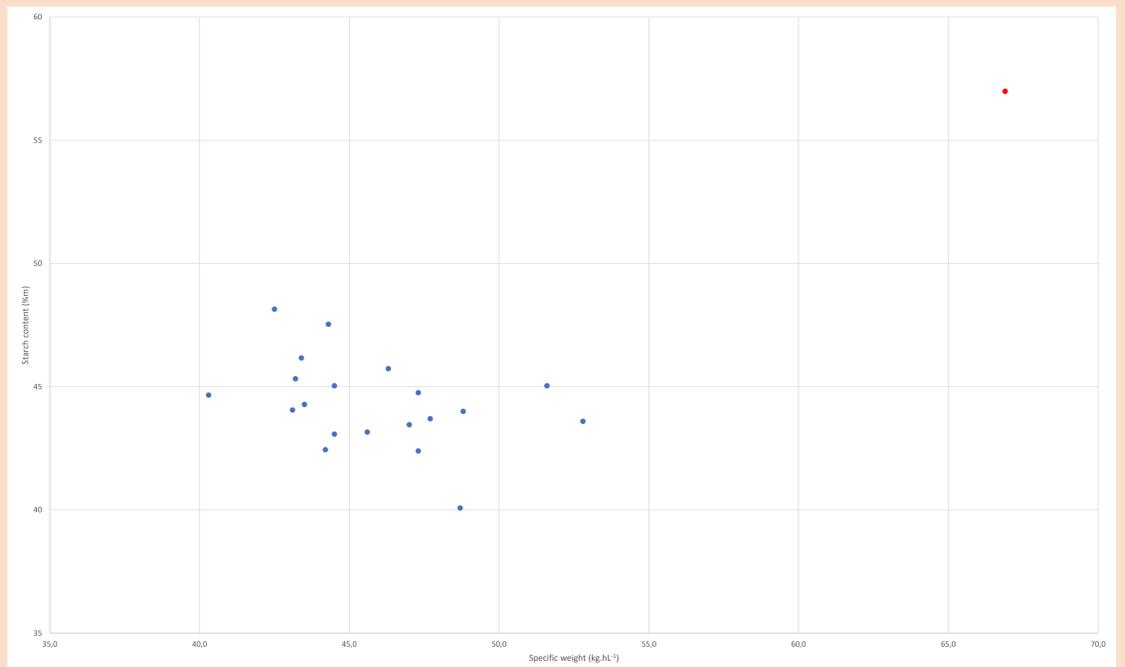


Figure 3: Plot of the starch content as a function of the specific weight

XTémoin and XAchène were used as controls, being well in the standards ranges. All samples had a specific weight around 45 kg.hL⁻¹ except XRustique (Figure 1) who was considered upside the norm in the other analysis as well. The analyzes showed that the lighter samples have specific weight values varying between 40.3 and 48.8 kg.hL⁻¹. The average of the starch content results was then 44.5% with a minimum value of 42.4 % and a maximum of 48.1%, the controls sample having an average starch content of 44.3 % (Figure 2). The plot of the starch content as a function of the specific weight (Figure 3) showed that no matter the specific weight, the starch content stayed in the same ranges of values. The protein level (Figure 4) varied but from the origin rather than the specific weight. There was only 1.5 % difference between the maximum value (13 %) and the minimum value (11.5 %) of the humidity level (Figure 5). XRustique's humidity level could not be measured. Color of the samples did not affect the various analysis (Tableau 1).

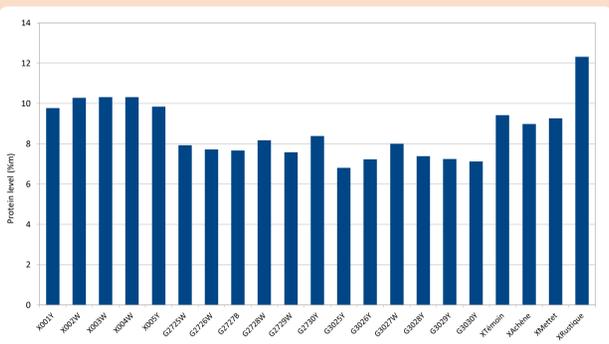


Figure 4: Protein level of oat flour samples from different varieties

Tableau 1: Average of the colorimetric coordinates of the different samples classified by color

Color	Colorimetric coordinates		
	L	a	b
White	59,0	5,5	24,6
Yellow	58,1	5,8	30,6
Black	36,5	7,3	16,1

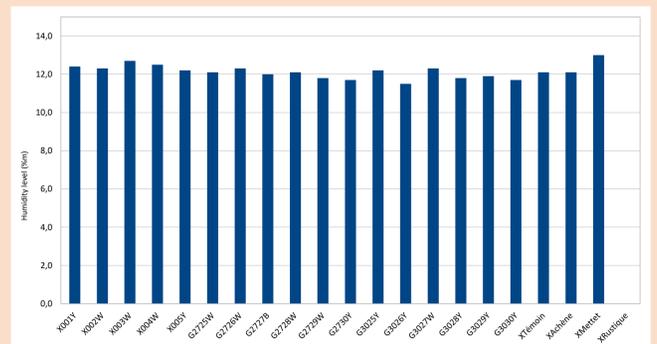


Figure 5: Humidity level of oat grain samples from different varieties

Conclusion

Despite a specific weight below the standards, the lighter samples did not necessarily have lower starch contents than the controls, the majority having a higher rate. The other analyzes did not show any correlation with the starch level either.