



Comparative Performance of Megazyme & SDmatic on Durum Wheat Semolina Starch Damage Analysis

APPLICATION BRIEF



KPM CHOPIN SDmatic 2 Automated Starch Damage Analyzer

INTRODUCTION & OBJECTIVE:

The AACC 76-31.01 (known as Megazyme) and AACC 76-33.01 (known as SDmatic) methods are the two most commonly used methods for determining the level of damaged starch in flour. Although based on very different measurement principles (see **Table 1**), the results obtained by each of these two methods are generally highly correlated for white wheat flours, allowing them to be used interchangeably (it is possible to convert results from one method to the other using simple mathematical equations).

Initially developed to analyze white wheat flours, these methods are sometimes also used to determine the damaged starch content of durum wheat semolina; however, no comparative data were available until now.

A study was therefore launched to assess the precision and relevance of both methods (Megazyme & SDmatic) when analyzing durum wheat semolina.

Analyzer	Megazyme (AACC 76-31.01)	SDmatic (AACC 76-33.01)
Method Type	Enzymatic	Amperometric
Area of Operation	This method is applicable to wheat flour and starch	This method is specific to white flour obtained from <i>Triticum aestivum</i> coming from either laboratory or industrial miller. It can also be used on wholemeal flour.
Measuring Principle	Selective hydrolysis of damaged starch, followed by spectrophotometric measurement of the glucose released. The higher the amount of glucose measured, the more damaged starch there is in the sample.	Iodine absorption measured by amperometry. The greater the amount of iodine absorbed, the more damaged starch there is in the sample.
Expression of Results	SD%	Ai% (main unit)/ UCD /UCDc / AACC 76-31.01 eq. / Farrand eq.
Automation	None	Complete
Analysis duration (per sample)	50 minutes	10 minutes
Operator Impact on Results	Strong	Very weak
Complexity of Implementation	High; Control of temperatures, pH levels, and incubation times; homogeneity of enzyme batches, etc.).	Low; Control over sample and reagent weighing

Table 1: Comparison of the SDmatic Method VS Megazyme Method

RESULTS:

Result #1: Repeatability / reproducibility study

The tests carried out (5 semolina samples, analyzed in duplicate using methods AACC 76-31.01 and AACC 76-33.01) show that results dispersion is smaller with SDmatic than with the Megazyme method: the coefficient of variation (repeatability) is 0.06% for the former method compared to 4.45% for the latter.

Additional tests, conducted on a same set of samples by two separate laboratories, both using the Megazyme method, also show that the reproducibility coefficient of this method on semolina reached 10% (for comparison, this coefficient is equal to 0.7% for SDmatic on white wheat flour).

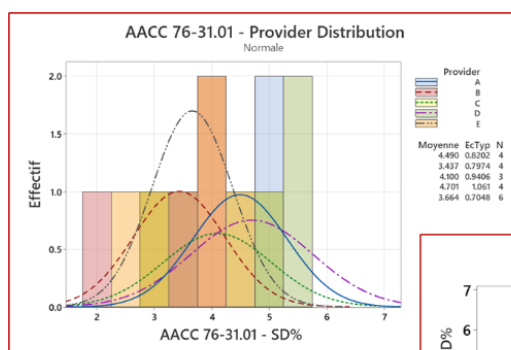
Method	Range	Average	Repeatability C.V _r	Reproducibility C.V _R
Megazyme (AACC 76-31.01 (SD%))	3.2 - 4.3	3.98	4.45	10.1
SDmatic (AACC 76-33.01 (Ai%))	80.2 - 85.0	82.42	0.06	n.d.

Table 2: Summary of results. *n.d. = non determined (the second laboratory participating in the study did not have an SDmatic).

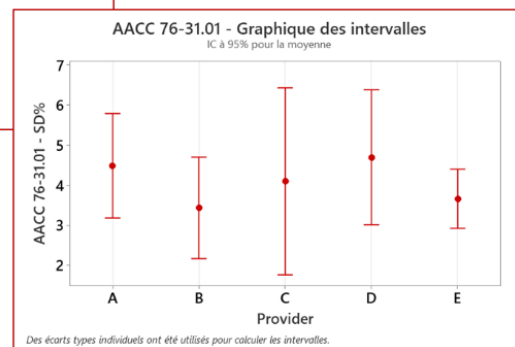
Result #2: Study of discrimination abilities

Twenty-one samples of durum wheat semolina, from five different suppliers, were analyzed by the same laboratory using both the AACC 76-31.01 and AACC 76-33.01 methods. In view of the obtained results, no supplier impact was observed using the Megazyme method.

In other words, in terms of damaged starch content, the five selected suppliers produce, on average, the same semolina according to the Megazyme method.

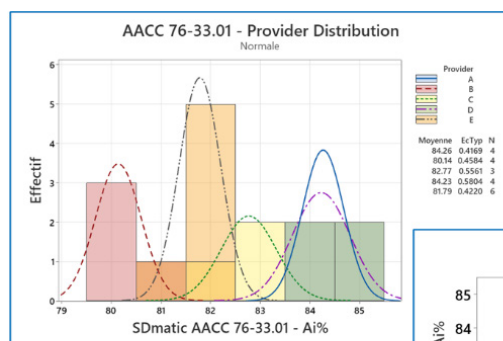


Megazyme results
Average and standard deviation by supplier

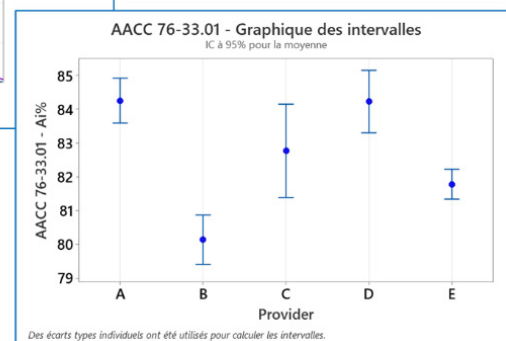


Inversely, the SDmatic results clearly highlight the impact of suppliers on the quality of the produced semolina.

Semolina from producer B absorbs less iodine than that from producer E, which in turn absorbs less than semolina from producers A and D.



SDmatic results
Average and standard deviation by supplier



CONCLUSION:

The results obtained during this study show that at low levels of damaged starch, as is the case with semolina, the analytical sensitivity and repeatability of the enzymatic method become more difficult to control, resulting in lower repeatability and lower discrimination capacity than the SDmatic method.

Therefore, this study shows that the **SDmatic method has much greater potential for the selection and quality control of durum wheat semolina** than the Megazyme method.



ABOUT THE SDMATIC 2 AUTOMATED STARCH DAMAGE ANALYZER



The SDmatic 2 utilizes the enzyme-free, amperometric Medcalf & Gilles method to measure iodine absorption in diluted flour samples. After following a few simple test prompts on the touchscreen, the SDmatic 2 delivers reliable results in under 10 minutes using just 1 gram of flour.

- Fully automated and enzyme-free testing
- Guarantees reproducibility and repeatability of the results
- Provides exceptional accuracy compared to other methods
- Standard and Calibration protocol already installed
- Customized protocols possible
- Export data to LIMS (using a script), either on a USB or via network (using Wi-Fi, or Ethernet cable)
- Only device compliant with international standards: NF EN ISO 17715:2015, ICC 172, AACC 76-33.01

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