



De Cecco Wholegrain Pasta and the University of Milan



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As confirmed by research studies carried out at the University of Milan, this is pasta made of wholegrain semolina with wheat germ and dried at a low temperature, with specific characteristics identified by chemical and sensorial tests.

In addition to the ongoing and in-depth quality controls at its own laboratories, De Cecco decided to ascertain the quality of its pasta with one of the most prestigious external authorities, the University of Milan - Department of Food, Environmental and Nutritional Sciences (DeFENS). The company commissioned a research study to define some qualitative aspects of wholegrain durum wheat semolina pasta.

The study was carried out on samples from ten pasta brands, representing around 80% of the Italian whole-grain pasta market. The research project took place in 2015 and 2017. In 2019, the tests were repeated using the indicators for heat damage (furosine and pyrraline) on the same pasta brands, essentially confirming the previous results.

Here are some of the key features of the research study, aimed at clearly and precisely informing customers:

1 - "wholegrain semolina containing wheat germ"

2) Identification and quantification of a protein marker for the presence of wheat germ (Tables 4 and 5)

Firstly, a procedure was devised for detecting the presence of wheat germ, based on the Western Blotting technique of the protein "Wheat Germ Agglutinin" (WGA). Specifically, the protein is identifiable in samples of wholegrain semolina and wholegrain semolina enriched with wheat germ supplied by the buyer.

This test for WGA presence was carried out on three samples of wholegrain pasta with varying levels of heat damage (high, medium, low), selected from the products analysed in the overall characterisation process of commercial wholegrain pasta. The investigation allowed for the identification of the protein from a solely qualitative point of view. Specifically, the Western Blot WGA appears to be linked to the intensity of the drying treatment, although being able to accurately quantify this is very difficult. This approach demonstrated the presence of wheat germ in the De Cecco pasta samples.

2 - "dried at a low temperature"

A - heat damage. Table 2

The findings show that only the De Cecco pasta samples have low values in the two indicators of heat damage. As this is wholegrain pasta, which is highly sensitive to temperature, the company has clearly used low-temperature drying cycles (for wholegrain long pasta, lower than 60°C).

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The data for all other samples (of which half are organic, and one pasta is supplied by a small-scale producer) highlight products with much higher levels of heat damage than existing semolina pasta, with pyrrolysine levels up to 15 times higher than those of De Cecco pasta. Those companies probably dry the wholegrain pasta in the same way as semolina pasta, leading to significant alterations in the final product.

The intensity of heat damage cannot be noted from the label information. For example, Xxxxxx pasta and De Cecco pasta both have similar composition values, but their levels of furosine and pyrroline differ greatly. The high loss of lysine, a significant amount of AGEs and the lower protein solubility (with a probable reduced digestibility) are all factors that contribute to Xxxxxx pasta being of lower quality than De Cecco pasta. Finally, it should be noted that heat

3 - "with specific characteristics identified by chemical and sensorial tests"

solvents is higher than that of the samples that were subjected to high-temperature drying.

Lower protein solubility could also affect the digestion of proteins.

C. sensorial tool tests. Fig. 1 and 2

The De Cecco sample is clearly recognisable for the absence of any bitter or astringent taste,

which is a typical characteristic of pasta subjected to a high-temperature drying treatment.

Identification of this characteristic is possible thanks to specific sensors: e-tongue and e-nose systems. The results of the sensorial tool test prove that pasta dried at low temperatures, such as De Cecco pasta, can easily be distinguished from pasta dried at high temperatures. In

The aforementioned study was published in a national journal in 2016 (Tecnica Molitoria) under the title "*Indagine sul DANNO TERMICO della PASTA INTEGRALE presente sul mercato italiano (Investigation into the HEAT DAMAGE to WHOLEGRAIN PASTA in the Italian food market)*" (by Alessandra Marti, Stefano Cattaneo, Fabio Masotti and Maria Ambrogina Pagani), and in 2017 in an international publication (Journal of Food Science no. 82) as "*Characterization of WHOLE GRAIN PASTA: Integrating Physical, Chemical, Molecular, and Instrumental Sensory Approaches*"² by Alessandra Marti, Stefano Cattaneo, Simona Benedetti, Susanna Buratti, Parisa Abbasi Parizad, Fabio Masotti, Stefania Iametti and Maria Ambrogina Pagani.

A summary of the aforesaid studies was included in the presentation poster for the AISTEC 2017 conference "*CHARACTERISATION OF COMMERCIAL WHOLEGRAIN PASTA USING MULTIDISCIPLINARY APPROACHES TO MEASURE ITS QUALITY*"³ which we provide for further information (by Maria Ambrogina Pagani, Parisa Abbasi Parizad, Simona Benedetti, Susanna Buratti, Stefania Iametti, Fabio Masotti, Stefano Cattaneo, Alessandra Marti).

¹ https://www.dececco.com/TM_67-12_2016.pdf

² [https://www.dececco.com/Rivista di Nutrizione Pratica 32-33 2018.pdf](https://www.dececco.com/Rivista_di_Nutrizione_Pratica_32-33_2018.pdf)

³ [https://www.dececco.com/Poster Convegno AISTEC Nov 2017.pdf](https://www.dececco.com/Poster_Convegno_AISTEC_Nov_2017.pdf)