

# MonICA – a model project for einkorn reintroduction

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## INTRODUCTION

Einkorn (*Triticum monococcum* L. subsp. *monococcum*) was a major contributor to the development of agriculture and to the diet of our ancestors, but since the bronze age its fortunes declined and nowadays it is cropped and eaten only in limited and scattered spots within its original distribution area. After millennia of neglect, recent researches rediscovered the outstanding nutritional characteristics of this crop and suggested that einkorn can still play a relevant role in modern agriculture and food industry.

As a primer for future developments, within its “2006 Plan for Research and Development” Regione Lombardia (Italy) fostered a two-years research project titled “Monococco per l’Innovazione Cerealicola ed Alimentare” (i.e. Einkorn for Cereals and Food Innovation), whose acronym is MonICA. Partners in the project were the “Fondazione Pianura Bresciana”, the “Consiglio per la Ricerca e la Sperimentazione in Agricoltura”, with the two research units QCE and SCV, the University of Milan, with the DiSTAM department (now DeFENS), and the private Cooperative “L’Antica Terra”.

## OBJECTIVES

**General objective** of the project was the development of a regional production chain for the transformation of einkorn and the manufacturing of foods (bread and other oven products, pasta, etc.) with high nutritional value. To this end, it was necessary to perform a detailed analysis of the agronomic, nutritional and technologic characteristics of *T. monococcum*, to identify lines suitable for modern agriculture and with good attitude for food production.

**Specific objectives** were the agronomic and compositional characterisation of four einkorn advanced lines cropped in four different environments over two years, the definition of specific manufacturing processes for parboiled seeds as well as for bread, pasta and bakery products, the analysis of the evolution of antioxidant compounds and of heat damage indices during manufacturing and on the end products, the *in vitro* evaluation of coeliac sensitivity and the transfer of such know-how to farmers and food industries in a Lombardy core-area (Brescia plain).

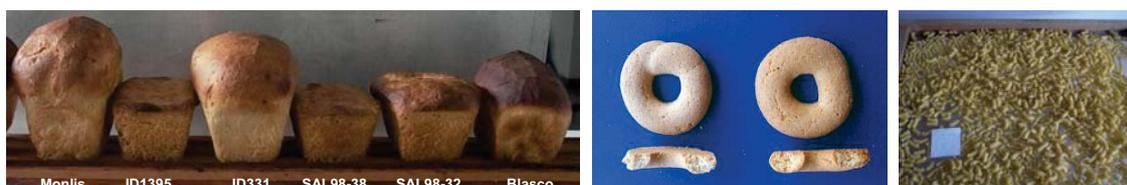
## MATERIALS AND METHODS

Five einkorn lines (Monlis, ID331, ID1395 and the free-threshing SAL98-32 and SAL98-38) and one bread wheat control (cv Blasco) were cropped for two years in four different environments. Several morpho-physiological, qualitative and technological parameters of plants, kernels and flours were recorded. Additionally, the possible einkorn use by coeliac people was preliminary tested by measuring the *in vitro* cytotoxicity of its flour.



## EXPERIMENTAL RESULTS

All the einkorns were taller and later-maturing than the bread wheat control; their yield (threshed kernels) was about 30% that of Blasco. All the einkorns had higher protein, ash, lipids, fructan, zinc, iron, carotenoids and tocopherols content than the control. The baking attitude of the different einkorn lines varied from very good (Monlis) to poor (ID1395); their biscuit and pasta making attitude, on the other hand, was very good. *In vitro* cytotoxicity of einkorn flours was absent or very low; however, more tests are needed.



## DIFFUSION RESULTS

For the diffusion of einkorn cultivation and utilisation, four different oven products were created and sensorially evaluated: biscuits (frollini), bread (polish method), bread (biga method) and breadsticks (grissini). All the products received higher marks than the bread wheat controls. As a result of the project, a core area of einkorn cultivation was set up in the area of Cigole (Po plain, province of Brescia); at present the local farmers crop about 80 ha of einkorn (variety Monlis).

A booklet reporting the aims and the results of the project, printed under the aegis of Regione Lombardia, is freely downloadable from:

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/988/315/AL\\_20090412\\_4095\\_libro\\_monica\\_AGR\\_MS.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/988/315/AL_20090412_4095_libro_monica_AGR_MS.pdf)

