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CLASSICAL AND BIOTECHNOLOGICAL APPROACHES TO IMPROVE HEALTHINESS IN DURUM WHEAT

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When the stomach is full, it is possible to think about quality, this latter term referring mostly to health related aspects. This is what it is occurring in most Western Countries, where hunger is no longer a problem and actually there are troubles with diet-related pathologies.
Although wheat is a staple food worldwide, it is in the crosshairs of public opinion because it also causes several pathologies in predisposed individuals, such as true allergies, intolerances (among which celiac disease is the most known), wheat sensitivity and irritable bowel syndrome. With the exception of celiac disease and some types of allergy, the real culprit of some pathologies is still a matter of debate. There are differences between durum and bread wheat at this regard, with the former showing a lower amount of celiac disease-related epitopes, and a higher content in carotenoids, these latter conferring a protective role because of the antioxidant effect and because some of them are precursors of vitamin A.
Classical and biotechnological procedures can help both in unravelling the molecular mechanisms underlying health-related properties of wheat, and in the development of new genotypes with improved characteristics, such as the increase of the amount of compounds exerting health positive effects, or, at the opposite, the decrease of components triggering specific pathologies.
We will present current research carried out by our group in regard to the increase of the amount of resistant starch, or the decrease of specific proteins involved in adverse reaction to wheats, or the possibility to increase the amount of healthy compounds, obtained either by exploiting the natural variation present in wheat collections, or induced variation obtained by mutagenesis, or RNAi, or, finally, by using the most update method of genome editing by means of the Crispr/Cas9 system.