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Genotypic Variation For Carotenoids Content And Chemometric Model Development For Seed Quality Parameters In Wheat

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Abstract

Among the groups of naturally occurring pigments, carotenoids serve numerous purposes in plants, including antioxidant activity and protection of the photosynthetic apparatus from the excess of light. Alongside with essential mineral elements, these pigments are well known to have high impact on human health. Therefore, accumulation of carotenoids in wheat grain is an important trait in view to improving nutritional value of cereals. Wheat is one of the major staple foods in Portugal because of its agronomical adaptability and the usage of its flour into various traditional products. In the present investigation, the seeds of ninety-four Old Portuguese wheat cultivars grown over two years were analysed. Significant genetic variability for content of carotenoids was observed in the studied lines. Within the 47 bread wheat genotypes the Yellow Pigment Content (YPC) values varied from 2.7 - 5.8 $\mu\text{g/g}$ and 3.0 - 8.0 $\mu\text{g/g}$ for 2004/2005 and 2009/2010, respectively. On the other hand, during 2004/2005 and 2009/2010, the 47 durum wheat cultivars exhibited the YPC values from 1.1 - 8.0 $\mu\text{g/g}$ and 3.4 - 8.3 $\mu\text{g/g}$, respectively. In addition, multivariate methods were also explored to assess the wheat grains quality, resorting to FTIR spectroscopy (Figure 1).

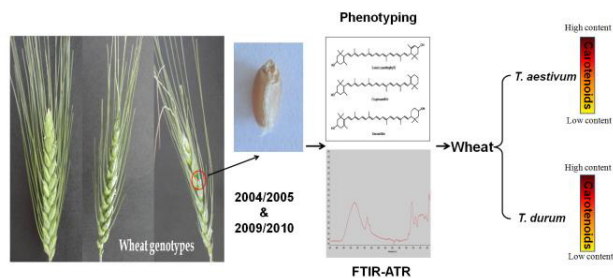


Figure 1 – Genotypic variation for carotenoids content and chemometric model development for seed quality parameters in wheat

Preliminary analyses of FTIR spectra clearly revealed differences among the distinct studied genotypes. Thus, in order to find spectroscopical patterns related to carotenoids accumulation and antioxidant activity, efforts are being made to develop a model that will allow the assessment of these parameters through FTIR, in the near-future.

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