

# In Vitro Cellular & Developmental Biology — Plant

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### Aims and scope

*In Vitro Cellular & Developmental Biology — Plant* publishes peer-reviewed original research and reviews concerned with the latest developments and state-of-the-art research in plant cell and tissue culture and biotechnology from around the globe. Four issues are published by the SIVB Editorial Board and two issues are published by the IAPB Editorial Board. The two societies maintain independent Editorial Boards for review of submitted manuscripts. All articles are peer reviewed and should follow the format for regular original articles. Brief articles will be considered. Articles must have significant original content including: • Experimental design and data analysis procedures, • Understanding of a scientific problem, • Identification of gene(s), physiology or biochemistry with measurable impact on agriculture or the environment, • Broad applicability of knowledge to multiple species and environments.

Topics covered by the Journal include:

- biotechnology genetic transformation
- functional genomics
- metabolic engineering
- molecular biology
- molecular farming
- Invited Reviews and Feature Articles
- somatic cell genetics
- developmental biology/morphogenesis
- cell biology
- cell physiology
- SIVB, IAPB, other Symposium Proceedings

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# ABSTRACT

# IN VITRO Cellular & Developmental Biology

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nitrogen and carbon source. When amygdalin is hydrolyzed by specific enzymes within  $\beta$ -glucosidases family, glucose, benzaldehyde (the bitter flavor) and hydrogen cyanide are released. Due to human domestication, nowadays most of the cultivated almonds are sweet. Bitterness is inherited as a single recessive gene. The selection of sweet cultivars is the first objective in almond breeding programs, which due to the long juvenile stage of fruit tree species, it may take up to four years. The early selection of sweet almonds in the seedling stage can save time and costs to the breeders. Moreover, at industry, the presence of bitter almonds within the sweet harvest is discrediting the almond sector *versus* other nuts. Despite the economic and healthy impact that this trait has in the society, the gene responsible for the bitter taste in almond is still unknown. Out of the four genes involved in the amygdalin biosynthetic pathway, which consist of two cytochromes P450 and two UDP-glucosyltransferases, only one has been characterised in almond, the UGT85A19. In the present work we elucidated the three remaining genes of the amygdalin pathway: CYP79D16, CYP71AN24 and UGT94AF2. qRT-PCR analysis of the characterised genes in sweet and bitter seeds demonstrated, for the first time, a correlation between bitterness and the expression of the first two genes in the pathway. The regulation of the expression of these two P450 by the same transcription factor is discussed and could explain almond domestication.

#### O - 190

Food and Nutritional Security in India

**Dr. Amita Agarwal<sup>1</sup>**

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Food security is basically three dimensional; production, quality and judicious distribution of food. India is grappling with the problem at all three levels. Nutritional value of the available food is another important dimension. When questions regarding food and nutritional security are raised in an agrarian country like India it is anybody's guess that something is seriously amiss. Normally food security is associated with non-availability of food in required quantity. While the population of India is rising continuously, the percentage of people below the poverty line remains almost constant. Unfortunately part of the problem is that whatever is produced and available to the people is below required standards. Use of greater quantities of fertilisers than required and other malpractices is endangering public health. Such practices despite public knowledge remain unchecked and uncontrolled. Whatever high quality food is produced does not reach poor people in time. Though, Public Distribution Schemes (PDS) are in force, corruption takes its toll. Another dimension of the problem is nutritional value of the food available. In our land of dichotomies while many remain deprived of food and proper nutrition due to poverty there is a growing number of people

consuming fast food, depriving them of proper nutrition. The proposed paper, divided into two parts discusses three dimensions of the problem of food security in India in one part, (*i.e.* 1. Availability of food in required quantity for all, 2. Maintaining minimum standards of food or quality control 3. Proper distribution of available food) and nutritional security in the second part (*i.e.* 1. Nutritional value of the available food, 2. Reasons of the sub-standard quality of available food, 3. Nutritional value of fast food and its growing consumption).

#### O - 203

How TaCKX family genes cooperate in regulation of growth and productivity of common wheat?

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Multigene family of CKX genes encode cytokinin dehydrogenase proteins (CKX), which regulate cytokinin content in developing plants and substantially influence their development. The detailed biological function of most of the *TaCKX* genes in wheat is not known. The goal of this research is to select those, which might regulate yield-related traits in wheat. In our earlier research we showed that the expression level of *HvCKX* genes in developing kernels and seedling roots of barley may indicated their role in growth and productivity. Therefore the first step was to analyze expression pattern of 10 *TaCKX* genes in these organs collected from 50 diverse genotypes. There were 30 lines from two mapping populations as well as 20 breeding lines and cultivars of wheat. Correlation coefficients between expression level of *TaCKX* genes and activity of CKX enzyme with phenotypic traits were calculated by the analysis of variance. The expression levels of *HvCKX6*, *HvCKX9* and *HvCKX10* genes in roots significantly correlated with the number of grains, plant height and the number of spikes respectively. Negative, significant correlation was also observed between levels of expression of several *TaCKX* genes in developing kernels and selected phenotypic traits. The expression of *TaCKX9* and *TaCKX10* negatively correlated with the number of spikes. The expression of *TaCKX3* and *TaCKX6* negatively correlated with the spike length. Strong (0, 87), positive correlation of activity of the CKX enzyme with expression level was only observed for *TaCKX2*. The possible mechanism of cooperation of *TaCKX* genes in regulation of growth and productivity of common wheat will be discussed.

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Effect of the addition of inulin and oligofructose on bread quality from white wheat flour

**Assoc. Prof. Georgiana Gabriela Codină<sup>1</sup>**, Mr Dumitru Zaharia<sup>2</sup>, Silviu Gabriel Stroe<sup>1</sup>