

Title Ethylene-induced ripening in banana evokes expression of defense and stress related genes in fruit tissue

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Abstract

Ripening marks several changes in physiological and biochemical attributes of fruit. Several hundred genes are recruited to express differentially during this process and their cumulative effect brings about ripening and softening in the fruit. Using suppression subtractive hybridization (SSH), we have been able to identify 37 EST-unigenes from banana which are expressed differentially during ripening. About 50% of these belong to processes such as stress, defense and detoxification. Besides these, we have also identified genes which are known to involve regulation of gene expression and other processes, although their expression has not been reported during fruit ripening. Expression of some of these genes was studied during ethylene-induced ripening with or without the ethylene action inhibitor, 1-methylcyclopropene (1-MCP), in fruit pulp and other tissues. Expression studies clearly suggest that most of these genes are ethylene-regulated and related to banana fruit ripening. It is concluded that ethylene-induced banana ripening evokes a stress-like response and several genes belonging to stress/defense are expressed in addition to genes related to ethylene biosynthesis, cell wall hydrolysis, secondary plant product biosynthesis, fatty acid biosynthesis, metabolite transport and transcription/translation machinery.