

**Title** Differential expression of genes during banana fruit development, ripening and 1-MCP treatment: Presence of distinct fruit specific, ethylene induced and ethylene repressed expression

**Author** Sanjay Mohan Gupta, Sudhakar Srivastava, Aniruddha P. Sane and Pravendra Nath

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### **Abstract**

Fruit ripening in climacteric fruit is triggered by ethylene and associated with the expression of hundreds of genes that influence various ripening related changes. We have used mRNA differential display to identify 22 ripening related genes in banana of which only two have previously been characterized in banana. Transcript analyses show that six genes are down-regulated and 16 up-regulated during the course of ripening with varied patterns of transcript accumulation. Treatment with 1-methylcyclopropene inhibits ripening and represses the expression of most of the up-regulated genes indicating that their expression is directly or indirectly governed by ethylene. The expression of most of the up- and down-regulated genes is specific to fruit and not observed in other tissues. Short time ethylene treatment of banana fruit reveals the induction of four up-regulated genes within 10–30 min of ethylene treatment and the repression of two down-regulated genes within 30–60 min of ethylene treatment. Sequence analyses reveal homology to genes that are involved in diverse processes such as gene regulation/signaling, defense, softening and other unknown functions. The studies have identified several candidate genes whose promoters could be used for isolation of specific *cis* elements involved in fruit specific expression as well as those responsible for ethylene induction and repression.