

Title Biotechnological approaches to improving quality and safety of fresh-cut fruit and vegetable products

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Abstract

This paper reviews various biotechnological approaches applicable to fresh-cut produce industry, including “traditional” biotechnologies using no recombinant DNA methods, and “modern biotechnologies”, based on molecular biology principles. Enzymatic peeling is one of the oldest biotechnological approaches widely used commercially for preparing ready-to-eat citrus fruit products. Biological control is another “traditional” biotechnological approach using microbial species in order to inhibit the development of unwanted pathogenic or spoilage microorganisms on the product. Among biocontrol agents successfully tested on fresh-cut produce are lactic acid bacteria, yeasts and bacteriophage viruses. Modern biotechnological approaches for rapid and efficient detection of microbial foodborne pathogens in minimally processed foods include immunoassay methods, nucleic acid techniques such as polymerase chain reaction (PCR), flow cytometry and nanotechnology. Genetic transformation may create fruits or vegetables best suitable for fresh-cut processing. Desirable traits for such genotypes would include inhibited enzymatic browning, firm texture, slow tissue degradation, inhibited senescence and protection against microbial proliferation. However, prospects of practical implementation of these genotypes depend on their acceptance by consumers. To the author's opinion, two major factors are critical for the acceptance of transgenic horticultural crops: (a) providing convincing answers as concerning their safety for human health and for the environment, and (b) addressing real and acute problems having no easy “traditional” solutions, and bringing tangible benefits to public. According to this analysis, the sphere of food safety of fresh-cut products seems to be a worthwhile subject of applying biotechnological efforts.