ABSTRACT

Rhizobacteria can stimulate plant development through a number of methods, including improved plant nutrition, the generation and control of phytohormones, and the inhibition of disease-causing organisms. The immediate need to feed the world's growing population has produced a desire for increased food production that must be affordable while meeting high-quality requirements. Flavor, appearance, consistency, and microbiological safety must all be retained within a product for the longest duration of time. More than 2,500 additives are purposely added to food nowadays in order to maintain particular qualities or to increase shelf life.

This study aimed the molecular chain of plant-growth-promoting rhizobacteria (PGPR) that are capable to promote plant growth and their genotoxic potential against food additives.

Thirty bacterial isolates were studied for their PGP traits and resistance for food additives. Three selected potential PGPR were identified by using 16S rRNA sequencing and tested for their PGP traits in the presence of 0.0125mg/mL to1.5mg/mL dilutions of food additives. Food additives used in this study were Sunset Yellow FCF, Fast Green, Brilliant Blue, Benzoic acid, Sorbic acid and Citric acid. Their effect on bacteria was determined using comet assay technique.

The three selected potential PGPR strains were identified as *Bacillus thuringiensis, Enterobacter cloacae,* and *Enterobacter hormaechei.* As the concentration of food additives increased the potential of PGPR against these food additives decreased.

The aim of this research is to describe the PGPR modes of action and potential against food additives. Besides, the strains had a positive effect on soil and promote plant growth. Selected isolates have an interesting result against food additives. Despite knowing the harmful effects of food additives, these are the need of the emerging world.

Keywords

Rhizosphere, PGPR, Food additives, Dilutions, Morphological and biochemical characterization, COMET assay.