

***In silico* Analysis of the Presence of Integrative and Conjugative Elements (ICEs) in Genomes of Rhizobiaceae Family Bacteria**

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Rhizobiaceae is a family of α -proteobacteria in the order Hyphomicrobiales. Species within this group can infect and establish a symbiotic relationship with leguminous plants. It is known that plant growth-promoting rhizobacteria (PGPRs) inhabiting the soil help enhance the availability of nutrients such as nitrogen, phosphorus, and iron while reducing the adverse effects of pathogens. Some of these beneficial plant traits may be encoded by genes located within mobile genetic elements (MGEs). ICEs (Integrative and Conjugative Elements) are MGEs integrated into the genomes of bacteria with the ability to spread via conjugation. Additionally, ICEs may carry accessory genes related to bacterial fitness. Therefore, this study aims to analyze ICEs present in the genomes of bacteria belonging to the Rhizobiaceae family, the potential cargo genes they carry, and their involvement in plant-microorganism interactions. To achieve this objective, 33 genomes from the genera *Allorhizobium*, *Pararhizobium*, *Ensifer*, *Mycoplana*, *Endobacterium*, and *Gellertiella* were analyzed *in silico*. The analysis utilized the following software tools: ICEfinder, OriTfinder, and antiSMASH. A total of 40 putative ICEs were found in 18 out of the 33 genomes analyzed. Up to three ICEs were found per genome, ranging in size from 37,072 to 242,249 base pairs, with GC content ranging from 55.43% to 64.50%. These elements were found integrated in different orientations within bacterial genomes. The oriT region, relaxase enzymes, T4SS, and T4CP proteins were found in the majority of putative ICEs. Furthermore, our searches for cargo genes indicated the presence of various secondary metabolites that may have implications and advantages for microorganisms. The main cargo genes identified were (I) Non-ribosomal peptide synthetase (NRPS) with a function related to plant development; (II) Type I PKS (Polyketide synthase), a biosynthetic metabolite that synthesizes polyketides and provides protection against pathogens, interaction with the environment, and competition with other microorganisms; (III) The NI-siderophore metabolite, related to iron uptake from the environment. These results indicate that ICEs with cargo genes promoting plant growth are widely distributed among genera of the Rhizobiaceae family, and the presence of these elements can impact the fitness of isolates and the plant-microorganism interaction, favoring plant growth promotion.

Keywords: Mobile genetic elements, Plant-microorganism interaction, Bioinformatics.

Análise *in silico* da presença de Elementos Integrativos e Conjugativos (ICEs) nos genomas de bactérias da família Rhizobiaceae

A família Rhizobiaceae abriga α -proteobactérias simbióticas com plantas leguminosas, cujas características benéficas, como promoção de crescimento e resistência a patógenos, podem ser mediadas por Elementos Integrativos e Conjugativos (ICEs) no genoma bacteriano. Este estudo *in silico* analisou 33 genomas de gêneros Rhizobiaceae, identificando 40 ICEs potenciais em 18 genomas. Os ICEs continham genes essenciais, incluindo relaxases e proteínas de conjugação, além de genes cargos relacionados ao desenvolvimento de plantas e resistência à patógenos. A presença generalizada de ICEs nessa família sugere importante papel na adaptação e interação planta-microrganismo.

Palavras-chave: Elementos genéticos móveis, Interação planta-microrganismo, Bioinformática.