

## ABBREVIATION

|                  |                                       |
|------------------|---------------------------------------|
| FAO              | Food and Agriculture Organization     |
| UN               | United Nations                        |
| CO <sub>2</sub>  | Carbon dioxide                        |
| N <sub>2</sub> O | Nitrous oxide                         |
| NO <sub>3</sub>  | Nitrate                               |
| NO               | Nitric Oxide                          |
| PGP              | Plant Growth Promotion                |
| PGPM             | Plant Growth Promoting Microorganisms |
| PGPR             | Plant Growth Promoting Rhizobacteria  |
| PGPB             | Plant Growth Promoting Bacteria       |
| ISR              | Induced Systemic Resistance           |
| N <sub>2</sub>   | Nitrogen                              |
| P                | Phosphorous                           |
| PSM              | Phosphate Solubilizing Microorganisms |
| Pi               | Inorganic Phosphorous                 |
| Po               | Organic Phosphorous                   |
| mg               | Milligram                             |
| kg               | Kilogram                              |
| Ca <sup>+2</sup> | Calcium ion                           |
| Mg <sup>+2</sup> | Magnesium ion                         |
| pH               | Potential of Hydrogen                 |
| Al               | Aluminum                              |
| Fe               | Iron                                  |
| mM               | Millimolar                            |
| μM               | Micromolar                            |
| GA               | Gluconic Acid                         |
| MPS              | Mineral Phosphate Solubilization      |
| GDH              | Glucose Dehydrogenase                 |
| PQQ              | Pyrroloquinoline Quinone              |
| GADH             | Gluconate Dehydrogenase               |
| PSB              | Phosphate Solubilizing Bacteria       |
| KCl              | Potassium Chloride                    |
| SOP              | Sulfate of Potash                     |
| SOPM             | Potassium Magnesium Sulfate           |
| K                | Potassium                             |
| MT               | Metric Ton                            |
| MOP              | Muriate of Potash                     |
| KL               | Kiloliter                             |
| L                | Liter                                 |
| KSB              | Potassium Solubilizing Bacteria       |
| Si <sup>+4</sup> | Silicon ion                           |

|                 |                                                    |
|-----------------|----------------------------------------------------|
| Zn              | Zinc                                               |
| GAs             | Gibberellins                                       |
| ABA             | Absciscic acid                                     |
| ET              | Ethylene                                           |
| BRs             | Brassinosteroids                                   |
| JA              | Jasmonic Acid                                      |
| SA              | salicylic acid                                     |
| SLs             | Strigolactones                                     |
| ACC             | 1-Aminocyclopropane-1-Carboxylate                  |
| ROS             | Reactive Oxygen Species                            |
| PAHs            | Polycyclic Aromatic Hydrocarbons                   |
| PCBs            | Polychlorinated Biphenyls                          |
| PCTs            | Polychlorinated Terphenyls                         |
| PCE             | Perchloroethylene                                  |
| ME              | Metabolic engineering                              |
| DNA             | Deoxyribonucleic Acid                              |
| GRAS            | generally regarded as safe                         |
| CoA             | Coenzyme A                                         |
| NAD             | Nicotinamide Adenine Dinucleotide                  |
| NADH            | Nicotinamide Adenine Dinucleotide hydrogen         |
| PTS             | Phosphotransferase System                          |
| ATP             | Adenosine Triphosphate                             |
| TCA             | Tri Carboxylic Acid                                |
| CcpA            | Catabolite Control Protein A                       |
| Hpr             | Histidine containing Protein                       |
| Crh             | Catabolite repression Hpr                          |
| CCR             | Carbon Catabolite Repression                       |
| Cre             | Catabolite Responsive Elements                     |
| TSS             | Transcription Start Site                           |
| Ser             | Serine                                             |
| CcpC            | Catabolite Control Protein C                       |
| CitZ            | Citrate synthase 2                                 |
| CitB            | Aconitase                                          |
| CitC            | Isocitrate dehydrogenase                           |
| CitH            | Ca <sup>+2</sup> -citrate/H <sup>+</sup> symporter |
| BCAA            | Branch Chained Amino Acid                          |
| GTP             | Guanosine triphosphate                             |
| acsA            | Acetyl CoA synthetase                              |
| Ile             | Isoleucine                                         |
| Leu             | Leucine                                            |
| FBP             | Fructose – 1, 6- Bisphosphate                      |
| dctP            | C4-dicarboxylate transport Protein                 |
| Na <sup>+</sup> | Sodium ion                                         |

|                |                                                      |
|----------------|------------------------------------------------------|
| PEP            | Phosphoenol pyruvate                                 |
| Mdh            | Malate dehydrogenase                                 |
| pckA           | Phosphoenol pyruvate carboxykinase                   |
| NADPH          | Nicotinamide Adenine Dinucleotide Hydrogen Phosphate |
| <i>pycA</i>    | pyruvate carboxylase                                 |
| <i>fla/che</i> | Flagella/Chemotaxis                                  |
| RecA           | Recombinase A                                        |
| ComK           | Competence Factor K                                  |
| EPS            | Exopolysaccharides                                   |
| ECM            | Extracellular Matrix                                 |
| SkfA           | Sporulation Killing Factor A                         |
| SdpC           | Sporulation-Delaying Protein C                       |
| WT             | Wild Type                                            |
| BGSC           | <i>Bacillus subtilis</i> Genetic Stock Center        |
| VHb            | <i>Vitreoscilla</i> Hemoglobin protein               |
| <i>vgb</i>     | <i>Vitreoscilla</i> hemoglobin gene                  |
| NIH            | National Institute of Health                         |
| Amp            | Ampicillin                                           |
| Km             | Kanamycin                                            |
| Gm             | Gentamycin                                           |
| Str            | Streptomycin                                         |
| Neo            | Neomycin                                             |
| r              | Resistant                                            |
| <i>oah</i>     | oxaloacetate acetyl hydrolase                        |
| <i>FpOAR</i>   | <i>Formitopsis palustris</i> Oxalic Acid Resistance  |
| GFP            | Green Fluorescent Protein                            |
| LA             | Luria Agar                                           |
| rpm            | rotation per minute                                  |
| g              | gram                                                 |
| RP             | Rock Phosphate                                       |
| LB             | Lysogeny Broth                                       |
| LBGM           | Lysogeny Broth containing Glycerol and Manganese     |
| Msgg           | Minimal Salt Glycerol Glutamate                      |
| mm             | Millimeter                                           |
| amy            | amylase                                              |
| WS             | Wash Solution                                        |
| PCR            | Polymerase Chain Reaction                            |
| pmol           | Picomolar                                            |
| ng             | nanogram                                             |
| EDTA           | Ethylene diamine tetra acetic acid                   |
| TAE            | Tris-acetate-EDTA                                    |
| UV             | Ultra Violet                                         |
| RE             | Restriction Endonuclease                             |

|                |                                        |
|----------------|----------------------------------------|
| h              | Hour                                   |
| RNA            | Ribonucleic Acid                       |
| TE             | Tris-EDTA                              |
| MDB            | Membrane Desalting Buffer              |
| cDNA           | Complementary deoxyribonucleic acid    |
| gDNA           | Genomic DNA                            |
| C <sub>T</sub> | Cycle Threshold                        |
| OD             | Optical Density                        |
| HPLC           | High Performance Liquid Chromatography |
| PGA            | Poly- $\gamma$ -Glutamic Acid          |
| RBS            | Ribosome Binding Site                  |
| PHB            | Polyhydroxybutyrate                    |
| Bp             | Base pair                              |
| MKS            | Mineral Potassium Solubilization       |
| AU             | Absorbance Unit                        |
| AAT            | Aspartate Amino Transferase            |