

Application of Bioinformatics in Agricultural field

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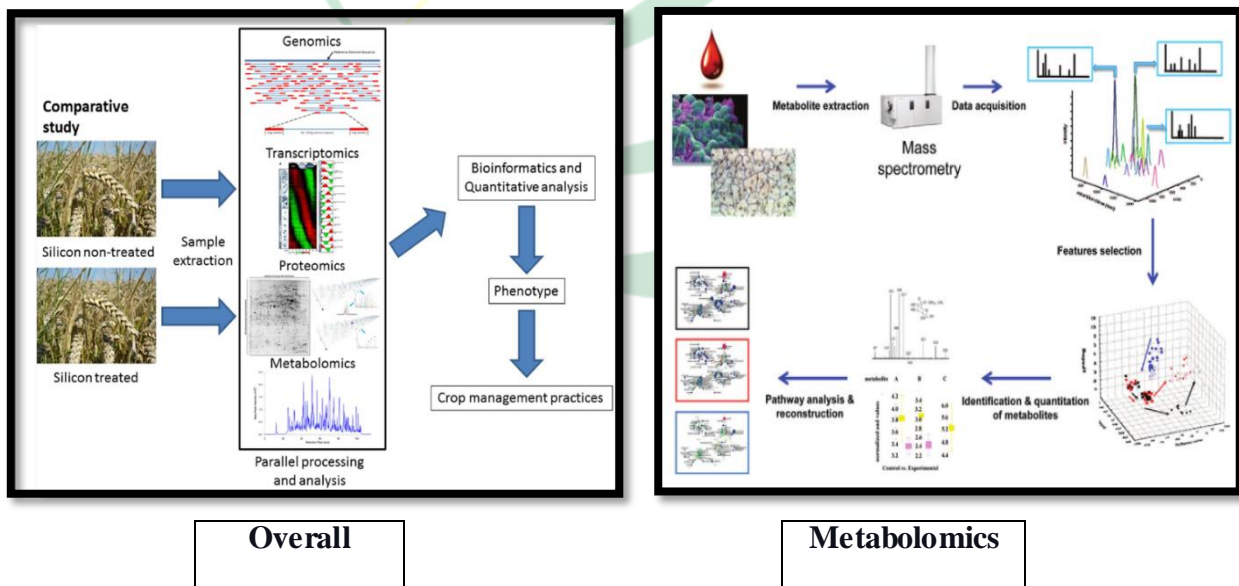
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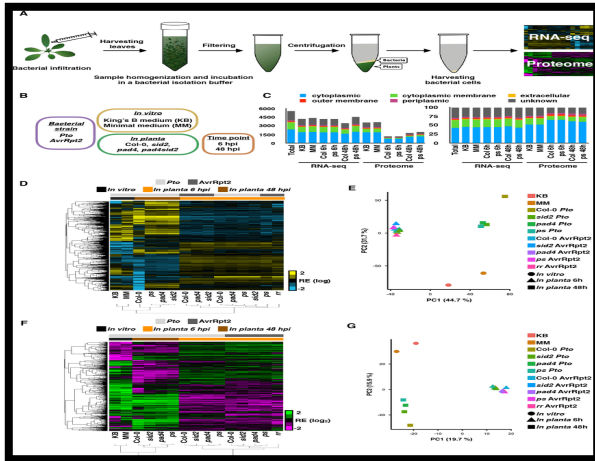
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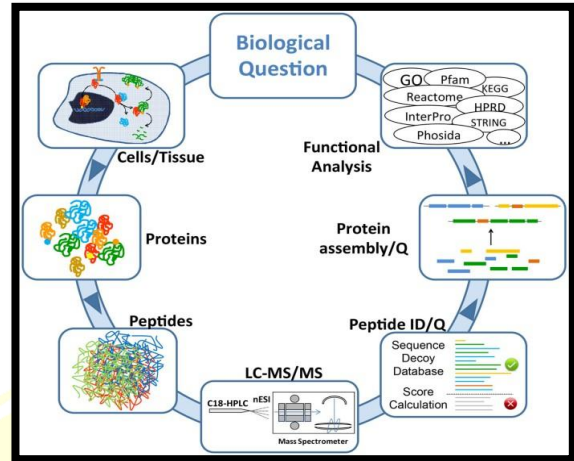
Bioinformatics is an inter-discipline that deals with the development of methodology packages for understanding and utilizing biological data in a large amount. Bioinformatics use in silico technique that can fasten the analysis of any field trial using mathematical and statistical techniques. The fast development of omics (transcriptomics, proteomics, genomics, and metabolomics) data helps the agricultural scientist to breed the varieties quicker by selecting the desire genes, genetic alteration for HYVs, and finding a solution for pests and diseases by identifying the gene, proteins that can resist these. A basic workflow of omics data analysis shown below:

Figure: Basic steps of omic data analysis in agriculture (a) Overall (b) metabolomics (c) Trnascriptomics (d) proteomic analysis





Transcriptomics



Proteomic analysis

In in-silico analysis, firstly extract the plant sample of interest, then process for DNA extraction. Once DNA is extracted, it is sheared and send for sequencing. These sequences are obtained in SRA, fasta, fastq, etc. file format. These data then processed using different tools for getting quality data, removing adapters, and identify the desire information, and visualized using various available free and commercial bioinformatics tools (Giri *et al.*, 2006).

Some other studies in agricultural fields are improvement of plant resistance crops against biotic and abiotic stress, nutritional quality enhancement, soil fertility increases, etc. Also, it aims to the developed methodology for sees quality improvement, identifying the different diseases, pests using mobile applications (Reynolds *et al.*, 2016). Currently, bioinformatics is a most emerging field in the agricultural sector that can reduce time, money, and manpower for finding the requirement of one's desire of research.