

Applications of AFLP Marker

AFLP is primarily used in genetic mapping. Several economically important cereal crops such as rice, barley and wheat have been mapped by AFLP. The AFLP markers, which are produced by different combinations of restriction enzymes, are distributed throughout the genome. Evidence shows that AFLP marker lie outside regions that are occupied with RFLP. In barley, AFLP markers are located on the long and short arm of all seven chromosomes.

These AFLP markers exhibit strong relation between the number of markers per chromosome and length of the chromosome. Similarly, in rice, cross between Indica X Japonica revealed that 50 AFLP markers were located on every chromosome except in small chromosome 12. These polymorphic loci distributed throughout the genome of this species can be illustrated by AFLP technique.

The existing barley map developed by RFLP comprises of 157 RFLP loci has been increased by adding 118 AFLP markers. The total map length was increased by 71% mainly attributed to gap filling, terminal extension and general expansion.

The level of polymorphism detected in barley by AFLP can range from 12.2% (between procter × Ny dinka) to 29.0% (between L94 × voda). However, detection level of this polymorphic range is comparatively less than that of used by other mapping technique like RFLP.

Increasing AFLP is used for several applications to assist the rapid isolation and characterization of target genes.

Breeding for resistance is an important programme in cereal research. AFLP technique identified several markers closely linked to barley Mlo resistance gene. AFLP based fine mapping of the resistance gene locus to be delimited to 30 kb.

i. AFLP is used to screen large number of polymorphism. It is possible to saturate specific regions of the genome for map-based cloning of target genes.

ii. AFLP has also been used in phylogenetic studies and distinguishing feature between varieties. In case of barley studies, varieties are grouped according to their salt tolerance and area of origin by genotyping with AFLP. Determination of ancestral origin of wheat variety using number of AFLP analysis which had previously not been possible using other molecular techniques due to the low genetic diversity of races.

iii. AFLP is also used to screen pools of plasmid DNA from several clones, enabling rapid isolation of genes tightly linked to markers.

iv. AFLP has recently been applied to the analysis of quantitative traits in barley and rice.

v. RFLP can be used to score semi-dominant markers. This was possible due to development of new software for image analysis of fluorescent PCR products developed by key gene. This was probably developed for use with AFLP and enable AFLP to score semi-dominant marker.

vi. AFLP is rapidly becomes preferred molecular technique for several different investigation particularly in many areas of research.

Demerits of AFLP:

i. Not reliable to convert AFLP into SCAR

i. Null allele cannot be detected

iii. Proprietary technique

iv. Require high amount of DNA than required in RAPD.

v. Relatively expensive technique owing to requirement of silver staining and radio or non-radiolabelling.