IDENTIFICATION OF RAPD MARKERS ASSOCIATED TO COOKING QUALITY IN COMMON BEAN (*Phaseolus vulgaris* L.)

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Cooking time is an important trait in the breeding of common beans, especially in Mexico, where 96 % of the bean production is consumed through home made preparations. Therefore, developing cultivars that exhibit rapid preparation is a challenge for the plant breeder. Because the characteristics of the cooking time trait, a method of indirect selection would increase selection efficiency. The objective of this study was to identify RAPDS- MARKERS associated to cooking time trait.

A population of 108 F7 Recombinant Inbred Lines (RILs) developed from the cross of Bayo Mecentral x Bayo Victoria made by the Breeding Program of INIFAP in 1994 was used in this study. Bean cooking time was estimated with a 25-seed Mattson cooker (Mattson, 1946), and it was recorded when 80 % of the pins had dropped and penetrated the seeds in the cooker. Only 34 RILs whose cooking time was among the most extreme phenotypes (17 RILs high and seventeen RILs low cooking time) were scored with RAPDs and were utilized in DNA analyses (Lander & Botstein, 1989).

Association between the RAPD markers and the phenotype of the RILs was established using the multiple regression approach. Cooking time was treated as a dependent variable and the RAPD marker genotypes (scored as 1 for presence and 0 for absence) as independent variables.

For the RAPD analyses genomic DNA was extracted from young leaves using a modification of the method reported by Llaca (1993). RAPD reactions were performed in a Techne PHC-2 thermocycler using a PCR cycling program reported by Halley *et al.*, (1993) using 86 primers, some of them from Operon Technologies and others synthesized at the Universidad Nacional Autónoma de México (UNAM).

Of the 86 primers screened, 80 generated DNA fragments (bands). Fourteen of these primers (17.5 % of total) detected polymorphism between cultivars Bayo Mecentral and Bayo Victoria and this resulted in the amplification of 23 discernible DNA fragments ranging from 310 to 2320 bp (Figure 1). These RAPDs were scored against the 34 RILs showing extreme phenotypes. Three of the RAPDs markers were associated with cooking time. Marker UNAM 37 (1940 bp), associated to long cooking time, showed a 0.45 coefficient of determination (r^2), therefore this marker explained about 45 per cent of the variation in cooking time. Marker UNAM-40 (1570 bp), with a r^2=0.28 accounted for 28 per cent of the variation and was associated to short cooking time. Marker UNAM-16 generated two bands, one associated to short and other to long cooking time (310 and

2320 bp), and explained 23 and 21 % respectively. The three markers together explained 60 % of the variation in cooking time.

Taken into consideration the high values of the obtained coefficients of determination (r^2), the RAPD markers identified in this first stage of the study have high possibilities of being useful for marker assisted selection of high cooking quality genotypes.

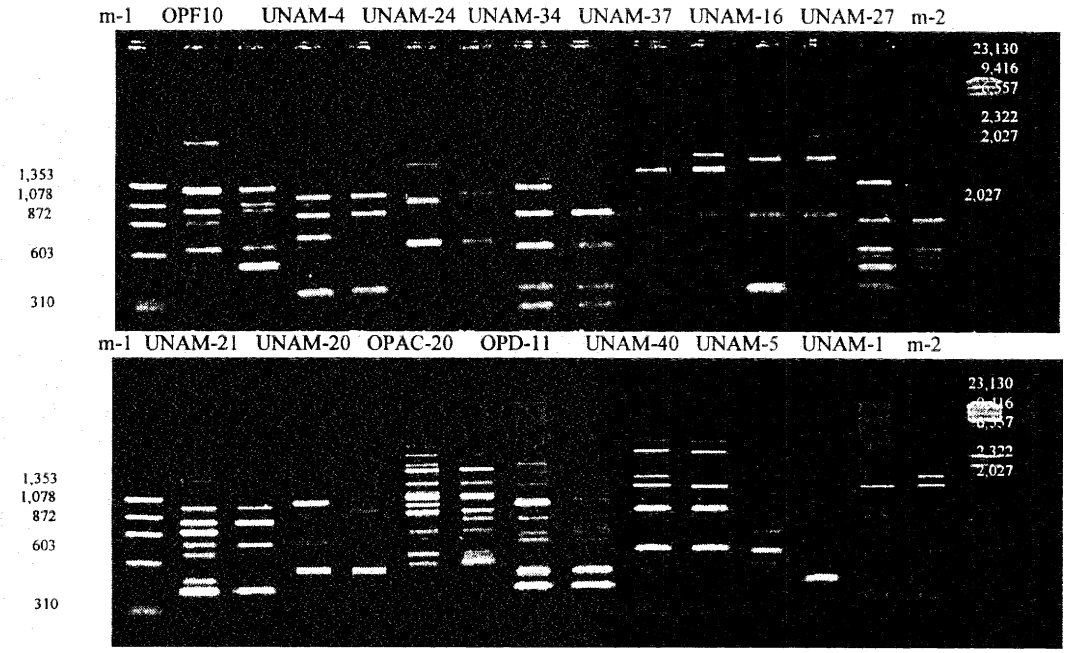

Figure 1. RAPD profiles generated by different primers, which detected polymorphic DNA fragments. Lane m-1: DNA size standard, φX174; lane m-2: λ HindIII. Following lanes contains RAPD products of Bayo Mecentral and Bayo Victoria amplified with primers enlisted above figure.

References

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