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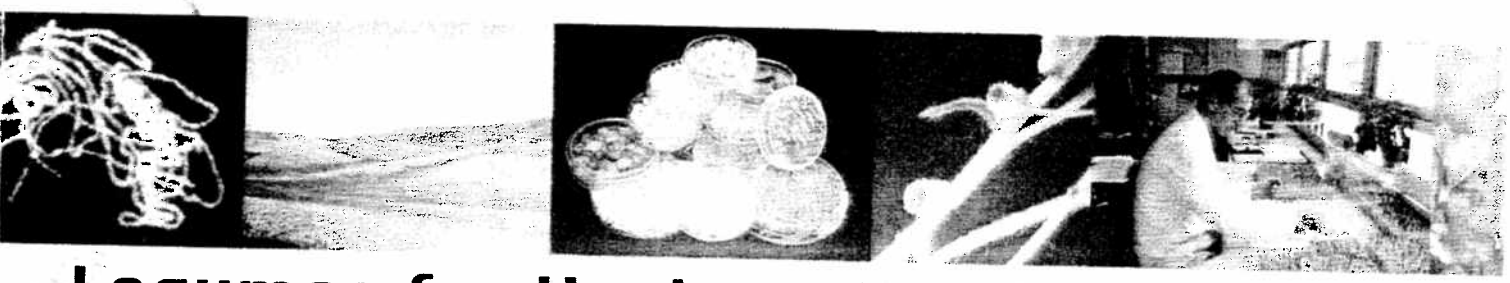

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Texturometer measurements as a tool in breeding for organoleptic quality in dry beans (*Phaseolus vulgaris* L.)

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Softness and creaminess of the embryo are considered desirable by most dry bean consumers. At the beginning of a breeding programme, when many entries are handled, it is advisable to record easily measured traits. Thus, from a practical point of view, the use of sensory panels is unrealistic. In order to find physical-chemical indicators related with softness and creaminess, the resistance to penetration measured using a Texture Analyzer (XT.RA, Stable Micro Systems, U.K.), equipped with a 2-mm-diameter probe and working at a speed of 1 mm/sec, was correlated with the evaluation by 14 panellists on a sample of 13 entries (1,2). Panellists grouped the entries in two significantly different sets for hardness (p=0.05): softer (Ganxet, Castellfollit del Boix, Canela, Andecha, Genoll de Crist, Navy and Tavella Brisa)(3,4) or harder (Tolosa, Planchada and White Kidney)(3,4). Similarly, entries were grouped for creaminess: creamier (Ganxet, Genoll de Crist, Tavella Brisa and Canela) or more floury (Planchada and Tolosa). ANOVA performed on texturometer measurements grouped the entries (p=0.05) in a similar way to ANOVA done on the basis of panellists' evaluations for hardness. A strong correlation was found between hardness evaluated by the panellists and the texturometer measurements on cooked seeds (r=0.83; p=0.00 in coated seeds and r=0.66; p=0.02 in uncoated seeds). A significant correlation was also found between texturometer measurements and granularity (r=0.56; p=0,06 in coated seeds). Contrarily, no correlation was detected between sensory analysis of hardness in cooked beans and texturometer measurements of soaked (uncooked) beans, whether coated (r=-0.03; p=0.93) or uncoated (r=-0.18; p=0.56). Other traits evaluated by panellists, such as creaminess and adhesiveness, showed no significant correlation with texturometer measurements in either soaked or in cooked beans. The lack of correlation between texturometer values for soaked (uncooked) beans and cooked beans (with or without seed coat) shows that cooking does not effect a linear transformation in this trait. We conclude that, in breeding programmes for organoleptic quality, texturometer measurements of penetration on cooked dry beans are an efficient tool to discard entries before sensory analysis. Texturometer measurements made on uncoated seeds after soaking or cooking yielded worse correlation with sensory results, so measurements on coated-cooked seeds are the most useful.

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No. 397

Creaminess and chemical composition in dry beans (*Phaseolus vulgaris* L.): the roles of protein and starch.

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Creaminess is a desired characteristic in dry beans and some traditional landraces are outstanding for this trait. Understanding the chemical basis of this trait is essential for its improvement in commercial materials as the elimination of sensory panels in the first steps of selection would allow a large number of entries to be handled. No conclusive studies on this topic have been performed in common beans and legumes, where the main interest has been generally devoted to nutritional aspects. Fortunately, chemical-organoleptic approaches have been developed in other grains, such as rice, in which proteins and starch are considered to account for creaminess (1,2). The protein and starch contents, as well as amylose and amylopectine contents, have been recorded for the following entries of common beans: L23, L27, L67 and Montcau (four pure lines derived from the Ganxet landrace, and thus closely related to one other genetically) (3), Fava, Planchada, White Kidney, Canela, Pinta, Caparrón and Tolosa (4,5). According to previous sensory analyses, these entries span a wide range of creaminess. All traits showed wide variability: protein ranged from 317 $g.Kg^{-1}$ (L27) to 188 $g.Kg^{-1}$ (Tolosa); starch from 269 $g.Kg^{-1}$ (Caparron) to 83 $g.Kg^{-1}$ (L23); amylose from 149 $g.Kg^{-1}$ (White Kidney) to 52 $g.Kg^{-1}$ (L23); amylopectine from 173 $g.Kg^{-1}$ (Caparron) to 27 $g.Kg^{-1}$ (Pinta); and amylose/amylopectine from 5.4 (Planchada) to 0.3 (Montcau). Creaminess evaluated by panellists showed a coefficient of correlation of -0.68 ($p=0.04$) with the ratio amylose/amylopectine, and 0.59 ($p=0.10$) with protein content. Correlations between chemical traits, and the variability found, suggest that selection could be performed for low amylose/amylopectine ratio to improve creaminess in beans. As no correlation was found between amylopectine and protein ($r=-0.10$, $p=0.79$), a simultaneous selection for high protein content is advisable.

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