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Predicting pod quality of green beans for processing

M.E. Ferreira [a,*], A. de Varennes [b], J.P. de Melo-Abreu [c], M.I. Vieira [a]

[a] *Department of Crop Production, Estação Agronómica Nacional, Av. da República s/n, Nova Oeiras, 2784-505 Oeiras, Portugal*
[b] *Department of Agricultural and Environmental Chemistry, Instituto Superior de Agronomia, Tapada da Ajuda, 1349-017 Lisboa, Portugal*
[c] *Department of Environmental Sciences, Instituto Superior de Agronomia, Tapada da Ajuda, 1349-017 Lisboa, Portugal*

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Abstract

Two field experiments with green bean cultivars (*Phaseolus vulgaris* L. cv. Alcade, Carlo, Cleo and Mutin) were carried out. In Experiment 1, different plant populations of the Alcade cultivar were used, whereas in Experiment 2, there were different sowing dates with the Carlo, Cleo and Mutin cultivars. Several harvest dates were considered in both experiments. Yield and quality variables of pods that can be used to evaluate quality and maturity were determined (alcohol-insoluble solids, dry matter content, seed: pod ratio, fibre content, length of 10 seeds, Kramer shear press, colour, lipid content and mineral composition). The alcohol-insoluble solids content, dry matter content, seeds: pod ratio, fibre content, and shear press were linearly correlated. Alcohol-insoluble solids content was related with thermal time by exponential equations provided thermal time was calculated from the beginning of flowering and the effect of high temperature on the rate of development was taken into account. The alcohol-insoluble solids content was correlated to the length of 10 seeds by exponential equations, with different parameters for different cultivars. The optimum harvest date, which corresponds to 10% dry matter content and 6.6% of alcohol-insoluble solids, could be set at thermal times after first flowering of 356, 384, 429 and 417 °C d for 'Alcade', 'Carlo', 'Cleo' and 'Mutin', respectively.

The aim of this study was to fit empirical models to simulate the course of pod quality variables of green beans.

Keywords: *Phaseolus vulgaris* L.; Growth model; Optimum harvest date; Alcohol-insoluble solids; Dry matter content; Mineral composition

* Corresponding author. Tel.: +351 214403690; fax: +351 214411797.
E-mail address: me.ferreira@iniap.min-agricultura.pt (M.E. Ferreira).

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