Determination of optimum cooking time of Central American small red beans (*Phaseolus vulgaris L.*) with a Texture Analyzer.

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An average Honduran consumes 11 kg of Central American small red beans per year. Cooking time is the most important culinary trait of red beans. Regional breeding programs rely on sensory evaluation and lack objective rheological methods to determine optimum cooking time. The objective of this study was to determine the texture parameters that can be used to measure optimum cooking time of beans. An empirical texture method was developed using a Brookfield CT3 texture analyzer with a 4500g load cell in 25% compression mode with a TA11/1000 probe on individual beans. The cooking process of three bean varieties (Paraisito, Amadeus 77 and Dorado) was monitored. A completely randomized design was used with three replications. Percent moisture (AOAC 952.08), hardness (N), and deformation at maximum hardness (mm) were monitored 60 min on beans and data was obtained every 10 min. A repeated measures analysis procedure was used to determine changes in parameters due to cooking time and to varieties using SAS v.9.3. A significant increase (P<0.05) from 10% to 55-65% bean moisture was observed during the 60 min cooking process. Optimum cooking time (50 min for all three varieties) was determined when beans reached 55% moisture by sensory analysis. Significant differences in moisture content among varieties were observed only at 60 min cooking. Significant reductions in bean hardness were observed after 40 min cooking, while significant increases in deformation were observed after 30 min. Amadeus showed significantly higher hardness (52 N) than Dorado (44 N) and Paraisito (45 N) at 50 min cooking. Both hardness and deformation correlated significantly and strongly (r>±0.90, respectively) with moisture content of beans. Deformation was a more sensitive parameter than hardness during cooking.