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A Simple Colorimetric Method for High-Throughput Screening of Sucrose Content in Legume Seeds

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The soluble sugar content of legume seeds affects the final flavor of legume and legume products. The purpose of this study is to develop a rapid, simple and low-cost colorimetric method for high-throughput screening of sucrose content in legume seeds. The colorimetric method is based on the enzymatic reactions of invertase and glucose oxidase (GOD). A total of 30 different soybean varieties and 20 different cowpea varieties were used in this study. To extract carbohydrates, 150 mg of soybean grounded seeds were added to 1.5 ml water and the mixture was incubated at 50°C for 15 min. For cowpea, 1g of grounded seeds were added to 5.0 ml 80% methanol and the mixture was incubated at 50°C for 30 min. The extracted sucrose was hydrolyzed to glucose and fructose by β-fructosidase (invertase). Hydrolyzed glucose was reacted with glucose oxidase (GOD) reagent and absorbance was measured at 490nm wavelength using a spectrophotometer to estimate sucrose content. In order to verify the colorimetric method, sucrose content was also measured with high performance liquid chromatography-PAD (HPLC-PAD). The HPLC method and the GOD/invertase method showed a high level of correlation at both soybean (r = 0.97 **) and cowpea (r = 0.95**). This colorimetric method is a fast, simple and inexpensive tool for quantitative determination of sucrose in legume.

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