

Title Effect of extraction method on the formation of anthocyanins and macromolecules complexes in anthocyanin-rich extracts from purple corn (*Zea mays* L.)

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Citation Book of Abstracts, 2004 IFT (Institute of Food Technologists) Annual Meeting and Food Expo, 13-16 July 2004, Las Vegas, Nevada, USA. 321 pages.

Keyword purple corn; anthocyanin; macromolecules complexes

### Abstract

Anthocyanin pigments extracted from purple corncob (*Zea mays* L) were previously found to form complexes with proteins and tannins with limited solubility. Our objectives were to obtain high yields of anthocyanins from purple corncob and low protein and polyphenolics content, also to characterize protein and polyphenolics involved in complexation of anthocyanins. Anthocyanins from Peruvian purple corncob were extracted using different solvents (ddwater, 0.01% HCl acidified ddwater, 0.01% HCl acidified ethanol and 70% aqueous acetone) and temperatures (room temperature, 50, 75 and 100 °C). Monomeric anthocyanins (MA), protein and tannin content were monitored. Proteins were analyzed by SDS-PAGE. Enzymes were applied to decompose protein in extracts. Tannin concentration increased up to three folds when the extraction temperature was increased to 100 °C both in water and acidified water. Protein concentration increased when extraction temperatures rose from room temperature to 75 °C and dropped at 100 °C, possibly due to protein denaturalization at 100 °C. The yields of MA, tannin and protein concentration were higher in extracts obtained with non-acidified water at same extraction temperature, suggesting that acidic conditions could favor precipitation of anthocyanins, proteins and tannins. Concentration of MA was higher in extracts obtained with 70% aqueous acetone (0.98 mg /100mg powder) with low yields of protein and tannins. However, ddwater was a good and economic solvent with a high yield of MA (about 0.94 mg/100 mg powder) and moderate yields of tannins and proteins at 50 °C. A protease was efficient destroying the 29 KD protein from the extract and could help prevent precipitation with tannin following processing. The results showed ddwater at 50 °C worked best for high yields of purple corncob anthocyanins with relatively low tannin and protein content. A protease could be used during industrial extraction to decrease protein concentration and increase yields and solubility of anthocyanin-rich extracts from purple corncob.