Determining the Presence of BETA-carotene in the Pericarp of the Kernel in a Heritage Breed of Zea mays

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Beta carotene is a precursor to vitamin-A, a deficiency of which has been linked to blindness. Beta carotene has been found in the endosperm of corn, but not the pericarp. My study will seek to determine whether beta carotene is present in the pericarp (PC) of our breed of Z. Mays. I will measure beta carotene content in six groups of kernels whose endosperm (ES) and PC vary as follows: white ES with a clear PC, white ES with a red PC, yellow ES with a clear PC, yellow ES with a red PC, yellow ES with an orange PC, and yellow ES with a red-orange PC. Direct observation reveals that the PC of Z. Mays has a very broad color spectrum suggesting that there are many pigment types present in the PC. Given that beta carotene is a pigment, I hypothesize that beta carotene is present in the PC of our heritage breed of Z. Mays. Beta carotene was isolated from all of the sample groups by extraction using water saturated n-butanol The kernels with orange and red-orange PC contained the highest levels of beta carotene and higher than those with clear PC and either white or yellow ES. The kernels with white ES contained less beta carotene than those with yellow ES. Kernels of Zea Mays with yellow ES and orange/red-orange PC contains significantly more beta carotene than kernels with the yellow ES and clear PC. This suggests that the orange and red-orange colored PC contains beta carotene. Directly isolating beta carotene from the pigmented PC would confirm this finding if methods to remove the pericarp from the kernel without harming the physical or chemical properties of the PC could be determined. Further testing directly isolated beta carotene in the pericarp.

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