

EFFECT OF GENETIC MODIFICATION OF MAIZE PLANT ON PHARMACEUTICALLY IMPORTANT PROPERTIES OF ITS STARCH

ABSTRACT

Genetic engineering of maize plants for improved yield, drought and pest resistance has received considerable attention in agricultural research. The aim of this work is to determine the effect of genetic modification of maize plant on some pharmaceutically relevant fundamental properties of its isolated starches. Properties of starches isolated from PVA 39 and IWD 15 maize genotypes were compared with starch from unmodified maize grains. Morphology studied by scanning electron microscopy (SEM), Fourier transform infrared (FTIR) spectroscopy and differential scanning calorimetry (DSC) were evaluated. Swelling capacity, amylose content, pasting behaviour of the starches were also determined. SEM revealed that all the starches are largely irregular and polygonal with few round shaped granules. FTIR showed identical peaks in all the starch samples and DSC revealed higher enthalpies of starch gelatinisation from the modified grains. Modification also increased amylose content, swelling capacity and viscosity of the starches. Genetic modification increased amylose content which positively affected pharmaceutically important properties like moisture sorption and viscosity, thus, increasing their value in formulations especially as binders.

Keywords: Amylose content, Genetic modification, Maize starch, Pharmaceutical properties, Swelling capacity