

Application of cellulose nanofibers in foliar fertilization

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Nowadays, soil fertilization still plays an important role in agricultural production because the macronutrient NPK fertilizers are great in demand for plant growing. However, several factors leading to decrease soil fertilization efficiency still bother the agricultural yield. In this moment, foliar fertilization could compensate some losses. Foliar fertilizers can be absorbed directly through the leaves and can be transported more quickly and efficiently to the other plant organs. It is also an economic way to supplement micronutrient fertilizers for plants. Usually, water is a common solvent to solute and spray foliar fertilizers. Since there is a wax layer existing on the leaf surface, the water-soluble foliar fertilizers have to face several challenges. The first challenge is foliar fertilizer droplets are easy to bounce away and some residual foliar fertilizers are even rain washed away easily due to the bad interface between foliar fertilizer and leaf surface. Meanwhile, the dispersion of foliar fertilizer could be worse during the drying process. Therefore, a third adjuvant which has compatible surface properties to provide enhanced interactions between the leaf surface and fertilizer particles via electrostatic, hydrophobic and van der waals forces should be added to improve the current situation. The cellulose nanofibers are gradually drawing plenty of attention because of its large specific surface area, high aspect ratio, renewability and degradability. It is a possible way to add cellulose nanofibers into foliar fertilization formula to adsorb enough foliar fertilizer and form a strong adhesion to leaf surface so that the foliar fertilizers could be released in a proper rate and increase plant yield.