

CHAPTER IV

CONCLUSIONS

This work studies the effect of starch on the mechanical properties of the starch-based HDPE blends. The addition of granular starch to HDPE follows the general trend of filler effects on polymer properties. For tensile properties, both the percent strain at yield and tensile strength at yield decrease as the starch content increases. The tensile modulus increases due to the stiffening effect of the starch granules for both tapioca starch-based HDPE and rice starch-based HDPE blends. Flexural properties also show similar trends as tensile properties. The flexural strength at yield decreases while flexural modulus increases with increasing starch content. In addition, the presence of agglomerate particles in rice starch-based HDPE blends has a significant effect on the mechanical properties of the blends, especially on impact properties. Tapioca starch-based HDPE and rice starch-based HDPE blends exhibit opposite results on impact strength. For tapioca starch-based HDPE blends, impact strength increases with increasing starch content whereas the impact strength of rice starch-based HDPE blends decreases with increasing starch content. However at 5% starch content or less, both tapioca starch-based HDPE and rice starch-based HDPE blends show a drastic decrease in impact strength. This is because the rigid particles, having a lower strength than HDPE, will lower the impact strength of the specimen.

From the results presented, it can be concluded that the mechanical properties of tapioca starch-based HDPE blends are superior to those of rice starch-based HDPE blends at high starch loadings.