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# Physical and mechanical evaluation of porous asphalt incorporated with untreated and treated waste cooking oil

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## Abstract

The vast amount of waste cooking oil (WCO) has invited odds effects on the environment when disposed of improperly. Incorporating waste materials into asphalt mixture is common practice

these days as it minimizes the amount of waste material as well as improves the performance of the mixture. WCO is known for its natural fluidity characteristics, wherein affecting good cracking performance at low temperature, yet indicate poor rutting resistance at high temperature. Plus, less strength in porous asphalt has worsened the rutting condition. Hence, pretreatment of WCO is suggested before the modification was done. In this study, WCO is being treated with chemical treatment of the transesterification process. Then, the modified binder of 5%, 10%, 15% and 20% untreated and treated WCO were tested with physical testing of penetration and softening point temperature. Later, a similar percentage of untreated and treated WCO were incorporated into porous asphalt mixture to analyze the mechanical performance of Marshall Stability, Flow and Stiffness. The result of porous asphalt mixture with 10% treated WCO showed an improvement in Marshall Stability, Flow and Stiffness. It can be concluded, samples with treated WCO indicated remarkable performance in terms of physical and mechanical evaluation , owing to similar polarity which enhances good interaction bonding that strengthens the asphalt mixture. 

Author keywords

Marshall Test; Penetration and Softening Point; Porous Asphalt Mixture; Transesterification; Waste Cooking Oil

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