Determination of rheological properties of bio mastic asphalt

ABSTRACT

Due to the high oil prices the price of asphalt binder has increased tremendously. This scenario has warranted demand for higher viscosity cheaper asphalt for pavement construction. A study was conducted to take advantage of the Empty Fruit Bunch (EFB) of Date and Oil Palm trees (which are considered as waste) to produce cellulose fiber to be used as additives in the asphalt binder. If these EFB's could be beneficially utilized in any application, it would reduce the load on the nation's landfills and at the same time reducing the cost of road construction. A total of 11 blends were prepared that consisted of 5 blends with date palm fiber, 5 blends with oil palm fiber and one control sample that contained no fibers. The samples were evaluated using Dynamic Shear Rheometer (DSR) equipment in accordance with the superpave Strategic Highway Research Program (SHRP) requirements. The neat asphalt binders (Unaged), Rolling Thin Film Oven (RTFO) aged and Pressure Ageing Vessel (PAV) samples were then measured for phase angle, shear strain and complex shear modulus and then evaluated in accordance with SHRP requirements. The results indicated that the fibers enhanced the rheological performance of Bio Mastic Asphalt (BMA) blends. The control sample which was categorized as PG58 was enhanced to PG76 with 0.375% date palm fiber. The oil palm has also improved the blend up to PG70 with 0.3% oil palm fiber.

Keyword: Bio Mastic Asphalt (BMA); Date palm fiber; Oil palm fiber; Asphalt cement stabilizer; Waste materials