

TITLE EFFECT OF BIO-BASED PROCESSING OILS ON LONG-TERM PROPERTIES OF SILICA-FILLED NATURAL RUBBER VULCANIZATES

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ABSTRACT A new bio-based oil, tea oil (TO), was studied as possible alternative processing oil to the commonly used but potentially carcinogenic petroleum-based oils, viz. heavy naphthenic oil (HNO) and light naphthenic oil (LNO). Comparison was also made with two other bio-based oils, palm oil (PO) and coconut oil (CO). The results revealed that all bio-based oils studied provide superior processing properties over the petroleum-based oils. These include higher thermal stability, greater mixing efficiency of NR with silica, improved silica dispersion in NR compound and greater plasticising effect for silica-filled NR compounds when compared under similar mixing condition. For cure characteristics of the rubber compounds, they potential of the bio-based oils studied, TO, PO and CO, as possible alternative processing oils to replace petroleum-based oils.