

INVESTIGATION OF THE PLASTICIZING PROPERTIES OF A BIOPLASTICIZER IN PVC FILMS

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ABSTRACT

Polyvinyl chloride (PVC) is one of the most common plastics used worldwide because of its durability and low cost. PVC when blended with plasticizers is a versatile thermoplastic and is used in many applications. A plasticizer is a substance that is added to a material, usually a polymer to increase flexibility, softness and workability. Many elastomers and polymers need plasticizers to make them useful. A plasticizer must be thoroughly incorporated in the elastomer or polymer in order for it to be effective. Phthalate plasticizers are the most commonly used plasticizers of the past century comprising 92% of the global production of plasticizers. Phthalate plasticizers have been shown to cause many harmful diseases to humans e.g. kidney failure, heart disease, liver failure, fertility and growth disorders. There is sufficient evidence to raise fears over the use of phthalate plasticizers and therefore the use of certain phthalates has been banned in cosmetics and consumer products. Thus there exists a great opportunity to find non-toxic replacements for phthalate plasticizers in PVC products. These non-toxic replacements are called bio-plasticizers since they are derived from naturally occurring compounds and are characterized by low toxicity and low migration and are therefore less harmful to the environment and human beings. A bio-plasticizer has been synthesized by our research institute and shown to exhibit plasticizing properties in selected cosmetic products. This study extends the work done by us to incorporate this bio-plasticizer at various concentrations into solvent-cast PVC films and to test these plasticized films for tensile strength, flexibility, thermal stability, migration and leaching. The properties of the PVC films will also be compared with those of PVC films plasticized with DBP in order to establish whether our bio-plasticizer can be used as a viable substitute for DBP.

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