ABSTRACT

Cellulose microfibers isolated from natural fibers as reinforcement in polymeric matrices have gained much momentum in recent years. However no work has yet been undertaken based on composites of EVA and cellulose microfibers. The present thesis discusses the development and characterization of CMF reinforced EVA. EVA, one of the most widely used ethylene copolymer is well known for its high performance. It is widely used in many forms in food packaging applications. However, the wide application of this non-biodegradable copolymer is a major concern to environment. Hence the development of CMF/EVA composite is expected to provide a much more ecofriendly product with excellent performance.

Cellulose microfibers were extracted from *Hibiscus sabdariffa* fibers by steam explosion technique. CMF/EVA composite films were fabricated with different ratio of CMF using a twin screw extruder and a roller. The composites were characterized for mechanical, thermal and barrier properties. Special emphasis was given during characterization to the application of EVA in food packaging. Properties such as mechanical properties, dynamic mechanical analysis, thermal properties were evaluated in detail. The composites developed were analyzed for barrier nature against liquid food such as milk, curd, orange juice at different temperatures. The oxygen transport rate of composite is evaluated as a function of CMF loading. The composites were also evaluated for the growth of microbes when in contact with food materials. Since gamma radiation is one of the most commonly used sterilization, we studied the effect of these radiations on the mechanical properties of composites. The biodegradation of composites were evaluated under different conditions.