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Sustainable Bioplastics 2016 - Thermal characterization of vegetable tannin reinforced TPU-based bio-composites

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The aim of this study was to investigate the use of vegetable tannin as a reinforcing material that may be present in polymer aggregates for the sole production of footwear. For this purpose, the berry cups and berry waste obtained after tannin extraction were used as the strengthening materials for thermoplastic polyurethane (TPU) based assemblies. Alkali treatments were applied to adjust the surface of berry cups and crushing to increase the compatibility between the filler and polymer matrix. Preparation of the composites with different filling loads (10, 20 and 30 wt%) was performed by hot extrusion. The effect of surface modification on the thermal and morphological properties of the biocomposites was studied in terms of Fourier infrared spectroscopy (FT-IR), differential scanning calorimeter (DSC), thermogravimetric analysis (TGA) and scanning electron microscopy (SEM). analyzes. The FT-IR results showed that the vegetable fillers were successfully incorporated into the polyurethane matrix and partial structural changes took place as a result of the alkaline treatments. Although the thermal resistance of blended materials at low temperatures was found to be slightly lower than that of TPU, higher thermal protection values were obtained at higher temperatures. Aggregate results showed that the homogenous distribution of vegetable fillers within the polymer matrix was successfully achieved and found that the biodegradable materials obtained were a good candidate for use as a foot based material biomass.

The latter resin consists of linear polymeric chains in block structures. These chains have low polarity sequences that are relatively long (called soft sections), rather than sections with shorter and high polarity (called hard sections). The two types of regions are joined together by covalent bonds so that they actually form block copolymers.

building (roof structure, bridge, window, door, green kitchen), cars, aerospace, military applications, electronics, consumer products and medical industry (prosthetic, bone plate, orthodontic arch, total hip replacement, and screws and pins composite).

Web liner convergence works well for applications that seek a lighter weight choice than other materials, in particular, applications in car interior components and sporting goods. For car interiors, Composites Evolution has tested prototype for the Land Rover Defender and thus the Jaguar XF, with the Defender's net line being 60% lighter than the chassis at similar stiffness, and thus net part XF 35% lighter than the assembly assembly at equivalent stiffness

In sports goods, Ergon Bikes made an idea saddle that won first place among 439 entries within the Accessories category at Eurobike 2012, a true bicycle industry fair. VE Paddles has made a boat paddle blade. Flaxland Canoes has developed a canoe containing a linen cover. Magine Snowboards has developed a snowboarder that comes with linen linen. Samsara Surfboards has created a web surfing board. Lynx Idris Ski won the ISPO Award in 2013 for Lynx skiing.

Web linen convergence also works for applications that have the desired design, feel, or sound of wood, but without the tendency to warm. Entries include furniture and musical instruments. In furniture, a team at the University of Sheffield Hallam designed a press with completely durable materials including

linen linen. In musical instruments, Blackbird Guitars has made a linen liner ukulele that has won numerous design awards within the material industry, also as a guitar player

Another class of biocomposite is called a 'hybrid biocomposite', which is based on different fiber types into a single matrix. The fibers are often synthetic or natural, and could be randomly combined to obtain the hybrid complexes. Functionality is directly dependent on the balance between the great and the bad properties of each individual material used. Moreover, by using a condenser that contains two other types of fibers within the hybrid cement, one fiber can withstand the other when blocked. The properties of this biocomposite depend directly on the fibers calculating their content, length, resolution, and also their affinity to the matrix. Specifically, the strength of the hybrid cement depends on the failure stress of the individual fibers.

Biopolymers have the same privileges as biodegradable and similar structural groups for natural extra cellular components. Chitosan as a functional material suitable for biomedical applications because of its excellent properties such as bio-compatibility, antigenicity, biodegradability, antibacterial, blood coagulation, and high mechanical strength suitable for tissue engineering are considered. It is often combined with clays such as Na-montmorillonite to enhance the mechanical strength, good chemical, dimensional stability and hardness of the chitosan. Within this study, a highly specialized scaffold freeze-drying method consisting of chitosan (CTS), montmorillonite (MMT) and nano-zirconia (nano-SRO2) was prepared.

CTS / MMT / ZrO2 Montmorillonite for nanocomposite, And strengthened by zirconia. SEM, XRD and FT-IR studies were characteristic of these, demonstrating the formation of nanocomposite scaffolds. The thermal stability was shown using the TGA method, so the area, pore size, and hence the pore distribution of CTS / MMT / SRO2 were calculated using the BET technique.

Montmorillonite may also be a mild phyllosilicate group of minerals that can be formed after dissolving into water-soluble microparticles called clay crystals. It is named after

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Montmorillon, France. The smectite A member of the group, Montmorillonite, may be a 2: 1 clay, that is, a central octahedral sheet of alumina, two tetrahedral sheets of silica sandwich. The particles are in the shape of a plate with a diameter around 0.9 nm and a thickness around 1 μm; To "see" individual clay particles, they need to be enlarged approximately 25,000 times with a microscope. Members of this group include saponite.Montmorillonite could even be a subclass of smectite, a 2: 1 phyllosilicate mineral characterized as having an octahedral charge greater than 50%; its cation exchange capacity is due to the isomorphic substitution of Mg for Al in the central plane of alumina. Substitution of lower valence cations in such cases leaves the oxygen atoms nearby with a net charge which can attract the cations. In contrast, beidellite is smectite with a tetrahedral charge greater than 50% from the isomorphic substitution of Al for Si in the silica sheet.

Biography:

Fatma Erdoğan has graduated in Mechanical Engineering in 2014 and is pursuing her Master's from Ege University in Material Science and Engineering. Her areas of interests are Polymeric Composites, Biocomposites and Polymer Materials. She is also interested in biomedical materials, biomedical structures and their finite element analysis.

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