

Extrusion Process for Composites of Polymer and Natural Fibers

Low-cost, high-strength polymer-natural fiber composites can compete with glass-fiber reinforced plastics, and can be processed on existing equipment. The resulting products are less abrasive, environmentally friendly, and it need not go to landfills after use.

Agrotechnology & Food Innovations BV

This novel process makes it possible to produce thermoplastic granules reinforced with natural fibers that are 6 times stiffer and 2.5 times stronger than virgin polypropylene. Compared to glass fiber-reinforced plastic, the resulting natural-fiber-reinforced plastic is comparably stiff and strong—but much cheaper to produce. The natural-reinforced plastic has fogging and humidity characteristics and an odor emissions level within present norms, and can be injection molded. The process can be carried out on traditional extrusion equipment with commonly used screws, and therefore eliminates the need for re-tooling. The compounding technology has been demonstrated on a small scale (5–10 kg/hr) for commodity and engineered plastics such as PP, PE, ABS, PS, and for several natural fibers such as flax, hemp, jute, and kenaf. Reject streams from pulp and paper/fiber processing industries also turned out excellent raw materials as fillers in plastics.



This novel process uses natural cellulosic fibers. They have the potential to compete with glass fibers as reinforcing agents in plastics, as their specific strength is 50–80% that of glass fibers, but their specific modulus can exceed that of glass fibers. Other benefits include low cost of material, low density, renewability, and bio-degradability. They are less abrasive during processing with thermoplastics, and do not expose operators to potential safety and health problems.

(RSE). An extruder set up like this results in homogeneous mixing of the fibers with the polymeric melt, while opening up the fibers into elementary fibers with a high aspect ratio. All extruders with two separate feeding ports and a degassing port can handle the process.

Processing temperatures under 200° C appear to offer the best results. Estimates are that the natural-fiber-reinforced polymer is 150 €/ton cheaper than glass-fiber-reinforced polypropylene. Filler grades can be 250–300 €/ton cheaper.

Competes with glass on several levels

There are a number of known methods to produce fiber-reinforced plastics, many of which focus on the use of brittle fibers such as glass, which are added to the plastic at predetermined cut lengths. The apparatus used for these processes comprise several mixing and kneading members.

Traditional extrusion equipment

Other methods, for including natural fibers in thermoplastics, produce shorter fibers than required for adequate reinforcement. This process requires extruders to have positive screw elements, at least one mixing element, and at least one reversed screw element

Interested in this technology? Ask for an introduction to the technology provider.

Contact: yet2.com Introduction Manager, +1-617-557-3800 or email introductions@yet2.com

TOW

Tech of the Week

[Read more about this technology on the \[yet2.com\]\(http://yet2.com\) marketplace.](#)

[Register with \[yet2.com\]\(http://yet2.com\) now to keep current on new technologies and needs as they appear.](#)