

Light-degradable material for producing disposable medical appliances**Technical Field**

The present invention relates to the material for producing disposable medical appliances, especially relates to the light-degradable material for producing disposable medical appliances.

Background Art

As the increasing awareness of environment protection, it is limited or forbidden to any production or action which can result in environmental pollution in all over the world. Meanwhile, relevant regulations have been issued. The polypropylene as the light-degradable material is only used for food packing according to the Chinese patent publication No. CN1194275A, which mainly focuses on the international problem of environment pollution i.e. "the white pollution". However, there is no better solution to deal with the large quantity of usage and discard of disposable medical appliances, such as injectors, dropping bottles, and droppers, those are usually made of polypropylene. While more and more disposable medical appliances are used, the waste medical appliances are left in nature by a large amount. Such medical appliances would decompose in decades, or even longer in nature, because the C-C bonds and C-O bonds in their structure are not sensitive to light. The disposable medical appliances are very useful in preventing from the mutual virus infection. Although it is prescribed in China that all disposable injectors must be sterilized and destroyed on the spot after use, there is no suitable method available to destroy the injectors so that some disposable injectors were

used for many times, resulting in severe mutual infection on patients. Therefore it is an important agenda for the governments of each country to prevent the above problem from doing harm to human and pollution to environment. At present, although, the light degradable material is available, it is generally used in food packing. Because the disposable medical appliances require high transparence and high bio-security for the material, the light degradable material for food packing is not suitable for producing disposable medical appliances.

Disclosure of the Invention

In order to solve above problem that harmfulness brings to people by used disposable medical appliances and pollutant brings to environment, the present invention provides the light-degradable material, obtained from polypropylene resin by adding composite allochromatic agent therein, for producing disposable medical appliances. The allochromatic agent is composed of photoinitiator and sensitizer, wherein the photoinitiator contains ferric citrate ($\text{FeC}_6\text{H}_5\text{O}_7$) and ferrous pentadione ($\text{FeC}_5\text{H}_8\text{O}_2$); the sensitizer contains hexachloroacetone ($\text{Cl}_6\text{C}_3\text{O}$) and acetylbenzene ($\text{C}_8\text{H}_8\text{O}$). The content of these components is photoinitiator 0.04%~0.08% and sensitizer 0.4%~0.9% based on the weight of polypropylene resin. As in photoinitiator, ferric citrate ($\text{FeC}_6\text{H}_5\text{O}_7$) is 0.02%~0.04%, ferrous pentadione ($\text{FeC}_5\text{H}_8\text{O}_2$) is 0.02%~0.04%, and in sensitizer, hexachloroacetone ($\text{Cl}_6\text{C}_3\text{O}$) is 0.2%~0.45%, acetylbenzene ($\text{C}_8\text{H}_8\text{O}$) is 0.2%~0.45% based on the weight of the polypropylene resin.

According to the present invention, the disposable medical appliances such as disposable injectors made by light-degradable material remain high

transparence, high bio-security, and is insoluble to water. After being used, the medical appliances would change color to yellow while being sterilized by UV rays in short time because of the presence of the composite allochromatic agent. Reuse of these medical appliances can be thereby avoided. Even when the medical appliances are thrown away in nature, they will keep degrading and decay to powder within 45~75 days while exposing in light. When molecular weight thereof decreases to about 5000, they will decompose to carbon dioxide and water by microorganism in soil as well as the problem of pollution to environment introduced by discarded plastic is resolved. The material is neither toxic nor polluted, and may be as the desired substitute of material for producing disposable medical appliances.

Examples

Example 1

Raise the temperature of high speed stirrer to 90°C, and put 125000g of polypropylene, 25g of ferric citrate ($\text{FeC}_6\text{H}_5\text{O}_7$), 25g of ferrous pentadione ($\text{FeC}_5\text{H}_8\text{O}_2$), 250g of hexachloroacetone ($\text{Cl}_6\text{C}_3\text{O}$) and 250g of acetylbenzene ($\text{C}_8\text{H}_8\text{O}$) into the high speed stirrer, and stirring for 5 minutes at this constant temperature. Then put the mixture into single-screw extruder using automatic feed equipment, and extrude out the pelletings. The heating temperatures of three parts from feed inlet to outlet of single-screw extruder are 140°C, 200°C, 125°C respectively.

Example 2

Raise the temperature of high speed stirrer to 90 °C , put 125000g of

polypropylene, 50g of ferric citrate ($\text{FeC}_6\text{H}_5\text{O}_7$), 50g of ferrous pentadione ($\text{FeC}_5\text{H}_8\text{O}_2$), 562.5g of hexachloroacetone ($\text{Cl}_6\text{C}_3\text{O}$) and 562.5g of acetylbenzene ($\text{C}_8\text{H}_8\text{O}$) into the high speed stirrer, and stirring for 5 minutes at this constant temperature. Then put the mixture into single-screw extruder using automatic feed equipment, and extrude out the pelletings. The heating temperatures of three parts from feed inlet to outlet of single-screw extruder are 140°C , 200°C , 125°C respectively.

Example 3

This is the best mode to carry out the invention. Raise the temperature of high speed stirrer to 90°C , put 125000g of polypropylene, 37.5g of ferric citrate ($\text{FeC}_6\text{H}_5\text{O}_7$), 37.5g of ferrous pentadione ($\text{FeC}_5\text{H}_8\text{O}_2$), 406.25g of hexafluoroacetone ($\text{Cl}_6\text{C}_3\text{O}$) and 406.25g of acetylbenzene ($\text{C}_8\text{H}_8\text{O}$) into the high speed stirrer, and stirring for 5 minutes at this constant temperature. Then put the mixture into single-screw extruder using automatic feed equipment, and extrude out the pelletings. The heating temperatures of three parts from feed inlet to outlet of single-screw extruder are 140°C , 200°C , 125°C respectively.

Claims

1. Light-degradable material for producing disposable medical appliance, which is made of polypropylene resin, characterized in that composite allochromatic agent which comprises the photoinitiator and the sensitizer is added into polypropylene resin, wherein the photoinitiator contains ferric citrate ($\text{FeC}_6\text{H}_5\text{O}_7$) and ferrous pentadione ($\text{FeC}_5\text{H}_8\text{O}_2$), the sensitizer contains hexachloroacetone ($\text{Cl}_6\text{C}_3\text{O}$) and acetylbenzene ($\text{C}_8\text{H}_8\text{O}$), the content of these components is: the photoinitiator 0.04%~0.08% and the sensitizer 0.4%~0.9% based on the weight of polypropylene resin.

2. Light-degradable material for producing disposable medical appliances according to claim 1, characterized in that the content of ferric citrate ($\text{FeC}_6\text{H}_5\text{O}_7$) is 0.02%~0.04%, and ferrous pentadione ($\text{FeC}_5\text{H}_8\text{O}_2$) is 0.02%~0.04% in the photoinitiator based on the weight of polypropylene resin.

3. Light-degradable material for producing disposable medical appliances according to claim 1, characterized in that the content of hexachloroacetone ($\text{Cl}_6\text{C}_3\text{O}$) is 0.2%~0.45%, and acetylbenzene ($\text{C}_8\text{H}_8\text{O}$) is 0.2%~0.45% in the sensitizer based on the weight of polypropylene resin.