

From Waste to Bioplastic: Sustainable Production of Bioplastic

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Taking into account the environmental problems associated with plastics, it is increasingly necessary to look for less harmful alternatives, such as bioplastics. However, most existing bioplastic models do not aim at sustainable production. Thus, we decided to produce bioplastic sustainably from natural materials that we do not usually use, namely dregs of coffee, dried leaves, annual plants, acorns, lupine peels and acacia seeds, using commercial glycerin, but also glycerine resulting from obtaining biodiesel, from the used food oil. From rice grains discarded by major industries, we produced a bioplastic that could be used to manufacture packaging and biofilters capable of removing heavy metals. We also utilized surplus cooked rice, thus combating food waste. The materials were crushed and sieved to give a granulate. We added distilled water and glycerine and, depending on the model of bioplastic, also starch, in different percentages. The solutions were cooked for 50 minutes at 95°C with stirring. The preparations were allowed to dry at room temperature. Subsequently, we performed tests of biodegradation and resistance, having produced some objects of bioplastic, such as bags and packaging. The results obtained were very positive, since the specimens are biodegradable, flexible and resistant, especially the acorn bioplastics, coffee grounds and rice. We also found that after 24h the cellulose bioplastic (75%) was able to decrease the Hg concentration of an aqueous solution by about 75%. To sum up, we have been able to develop bioplastics in a sustainable way, an excellent future alternative to common plastic, promoting the protection and preservation of the environment.