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Grupa Azoty S.A. develops thermoplastic starch-based technologies

The Company is launching Poland's first line of biodegradable and compostable polymer granules marketed under the envifill® brand.

Grupa Azoty S.A. is the first company in Poland to launch a line of biodegradable and compostable polymer granules. The new envifill® line has been developed based on Grupa Azoty's proprietary technology for obtaining thermoplastic starch that is made from bio-renewable and compostable materials and contains no plasticizers. Envifill® products are designed for applications in extrusion blow moulding, injection moulding and other technologies, including 3D printing technology.

The envifill® line is designed for extrusion and injection moulding in traditional plastics processing equipment, which is clearly an advantage. The products made with these technologies include films, packaging, plant pots, consumables and replacement parts of appliances and equipment, tableware components, cosmetics packaging, etc. Injection-moulded products made from envifill® granules have unique surface aesthetics and relatively low shrinkage rates.

For example, films made from envifill® granules have high strength and elasticity, a velvety texture, a semi-transparent milky colour and a characteristic odour. They can be sealed using traditional LDPE polyethylene film sealing machines. Films made from envifill® granules can be used to produce shopping bags, garbage bags, particularly biodegradable waste bags, agro films and wraps. Envifill® granules can be used to make both thin films of less than 15µm and thicker films with extremely high strength.

To note, the pilot thermoplastic starch production line with a capacity of 300 tonnes per year was launched at Grupa Azoty S.A. in May 2021. The line of biodegradable and compostable polymer granules being launched under the envifill® brand has been developed based on that thermoplastic starch. The new line thus marks another step towards expanding Grupa Azoty's portfolio of biodegradable products.

Grupa Azoty S.A.'s proprietary thermoplastic starch which served as the basis for developing the envifill® line stands out primarily in that it can be used as a stand-alone polymer in certain applications and as a base or additive for polymeric biodegradable or compostable compositions. In addition to polymer granules, Grupa Azoty has also used the thermoplastic starch to develop an environmentally-friendly hot-melt adhesive that can be used as a binder for wood- and cellulose-based products, as confirmed by customer tests. The adhesive contains no formaldehyde or toxic additives.

'I am confident the new line in our portfolio is a revolution in the domestic granulates market and another technology we have developed that meets the requirements of the European Green Deal. We are seeing

growing customer interest in biodegradable plastics – as the market shows great potential, we are confidently *taking further steps to grow this business line. The envifill® line is our response to trends in expanding applications of biodegradable and compostable thermoplastic materials. Importantly, the share of bio-renewable components in the new line of granules can reach up to 100%, with the final compositions containing no plasticizers;* **explained Tomasz Hinc, President of the Management Board, Grupa Azoty S.A.**

Since we launched our thermoplastic starch production line a year ago, we have been receiving a growing number of enquiries about the product. Envifill® products are made from plant-based, biodegradable and compostable ingredients. They decompose in soil or compost in the presence of microorganisms to just CO₂, H₂O and biomass without releasing microplastics. As a standard, the granules are biodegradable and compostable according to EN 13432 within 180 days in home composting and within 90 days in industrial composting. With our advanced technology resources, we are able to adjust the product degradation time in line with customer needs and expectations; **noted dr Grzegorz Kądziałowski, Vice President of the Management Board, Grupa Azoty S.A.**

The shelf life of envifill® products depends on the conditions of use and their composition. Under standard conditions, at room temperature, without direct exposure to high humidity and temperature, products made from envifill® granules retain their qualities for many years.

Grupa Azoty S.A.'s portfolio comprises granule varieties for extrusion applications (envifill® F and envifill® E series) and for injection processing (envifill® M), as well as hot-melt adhesive (envifill® G and envifill® GP).

The granules naturally have a transparent milky colour and a characteristic pleasant odour. The range comprises mass coloured varieties, varieties coloured with natural additives and granules for special applications, such as high density or designer effects.

The new line has already received first positive market feedback. Envifill® thermoplastic compositions were awarded during the 26th International Fair of Plastics and Rubber Processing PLASTPOL 2022.