

## DynaGreen Protein A and DynaGreen Protein A/G magnetic beads for immunoprecipitation



### Green benefits

- Less hazardous: microplastic-free, does not persist in the environment
- Less waste: contains up to 48% less material
- Sustainable packaging: up to ~57% less primary packaging

### Introduction

We are committed to designing our products with the environment in mind—it's part of how we enable our customers to make the world healthier, cleaner and safer. This fact sheet provides the rationale behind the environmental claims that Invitrogen™ DynaGreen™ Protein A and DynaGreen™ Protein A/G magnetic bead products are microplastic-free, contain up to 48% less material, and generate up to ~57% less primary packaging waste relative to comparable products on the market.

### Product description

DynaGreen Protein A and Protein A/G magnetic beads enable high-performance immunoprecipitation (IP) workflows. These products are microplastic-free magnetic beads that can reproducibly isolate target proteins in a simple, efficient workflow, which can be performed manually or automated on Thermo Scientific™ KingFisher™ instruments.

DynaGreen Protein A and Protein A/G products are superparamagnetic 250 nm beads with recombinant protein A or protein A/G ligands, respectively, covalently coupled to the surface. The submicron bead size provides a low sedimentation rate and large available target capture surface area. This results in efficient, high-yield isolation of target protein by direct or indirect IP in less than 80 minutes (manual) or 40 minutes (automated), in a simple bind-incubate-wash-elute protocol. No pre-clearing is required. DynaGreen products use magnetic separation technology that is rapid and gentle, causing minimal physical stress to your target proteins. The yield and purity of the isolated target protein are highly compatible for use in western blotting or mass spectrometry.



Figure 1. DynaGreen Protein A and DynaGreen Protein A/G magnetic bead products.

## Green features

### Less hazardous

DynaGreen Protein A and Protein A/G products are the next generation of magnetic beads, incorporating additional greener features beyond those of traditional magnetic bead products.

DynaGreen magnetic beads are free of microplastics and are primarily composed of an iron oxide core, an improvement over the microplastic core common to most prior-generation magnetic beads on the market. Choosing DynaGreen beads helps reduce microplastic release into the environment and persistence there.

Additionally, the bead-storage buffer contains only phosphate-buffered saline (PBS), pH 7.4, with a biodegradable surfactant and a preservative replacement, for the more traditional sodium azide. Together these components ensure the DynaGreen products comply with the European Union Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulation, with no substances of very high concern (SVHC) in the final formulation.

### Less waste

DynaGreen Protein A and Protein A/G magnetic beads yield equivalent results using less material than comparable products. As a result, the protocol for use reduces the volume of beads required per reaction from 50  $\mu$ L (1.5 mg) for a market-leading product from another supplier to 25  $\mu$ L (0.5 mg) with these DynaGreen products. The mass of product received is also less; therefore, the DynaGreen products are made with up to 48% less material than the comparable previous-generation magnetic bead products (Table 1, DynaGreen Protein A representative example).

Additionally, the DynaGreen Protein A and Protein A/G products do not require formulated buffers to be supplied.

Common buffer recipes can be used with the provided protocols. Therefore, these DynaGreen products are not offered as a kit configuration, to avoid sending unnecessary buffers and packaging. This reduces shipping size and weight.

### Sustainable packaging

The 3 mL and 25 mL sizes for DynaGreen Protein A and Protein A/G magnetic beads are now packaged in plastic bottles made of high-density polyethylene (HDPE), a highly recyclable plastic.\* Comparable products are packaged in polypropylene or polypropylene copolymer plastic bottles, which have more limited recycling outlets.

DynaGreen magnetic bead products also have less primary packaging. Since they provide the same functionality with less material, they are packaged in smaller size bottles. This results in up to ~57% less primary packaging mass, and ultimately less waste at time of disposal (Table 2, DynaGreen Protein A representative example).

\* Please consult with applicable federal, state, and local regulatory agencies for waste disposal instructions.

**Table 1. Product mass comparison for DynaGreen Protein A magnetic beads and comparable protein A magnetic beads from another supplier.**

Product from another supplier	Product material, mass (g)	DynaGreen equivalent product	Product material, mass (g)	Product material mass reduction with DynaGreen Protein A (%)
Protein A magnetic beads (1 mL)	1.00	DynaGreen Protein A (0.5 mL)	0.54	46.0
Protein A magnetic beads (5 mL)	5.00	DynaGreen Protein A (3 mL)	3.15	37.0
Protein A magnetic beads (50 mL)	50.00	DynaGreen Protein A (25 mL)	26.00	48.0

**Table 2. Primary packaging bottle mass comparison for DynaGreen Protein A magnetic beads and comparable protein A magnetic beads from another supplier.**

Product from another supplier	Primary packaging, mass (g)	DynaGreen equivalent product	Primary packaging, mass (g)	Primary packaging mass reduction with DynaGreen Protein A (%)
Protein A magnetic beads (1 mL)	2.6	DynaGreen Protein A (0.5 mL)	1.5	42.3
Protein A magnetic beads (5 mL)	6.0	DynaGreen Protein A (3 mL)	2.6	56.7
Protein A magnetic beads (50 mL)	11.7	DynaGreen Protein A (25 mL)	10.8	7.7

DynaGreen products reduce packaging waste in other ways as well. They have an easily recyclable paperboard box for secondary packaging. We also maintained the greener benefit of ambient shipping, avoiding any need for additional corrugated cardboard or expanded polystyrene coolers typical of cold shipment tertiary packaging. As before, no paper inserts are included with the product.

In a holistic effort to make a more sustainable product, we also implemented improvements to our manufacturing process. We switched to using biorenewable solvents, reduced the

number of steps for manufacture, and reduced energy use by decreasing temperature or time for key manufacturing steps. In order to capture all the sustainability benefits of these new products, we also completed review and labeling through My Green Lab's ACT™ platform to provide the total Environmental Impact Factor for each product. Learn more about the ACT label principles at <https://act.mygreenlab.org>.

Designing the DynaGreen Protein A and Protein A/G magnetic beads to be less hazardous and use less material for the product and packaging is a win for our customers, our company, and the planet.

Visit [fishersci.com](https://fishersci.com) or [fishersci.ca](https://fishersci.ca) and search DynaGreen to learn more.

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