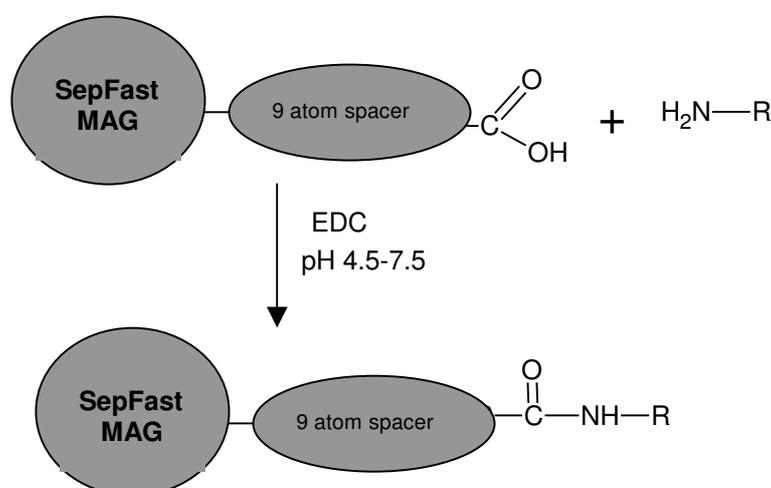


Data & Instructions

Carboxyl-activated SepFast MAG

Carboxyl-activated SepFast MAG is used to make magnetic chromatography media. It forms chemically stable amide linkages with ligands containing primary amine groups. It has a long spacer (9 atoms). After binding of target molecules, the magnetic resin can be readily isolated from the biological feedstocks with the aid of a magnet.

Carboxyl-activated agarose can be used for the immobilization of amine containing molecules. The coupling chemistry is carbodiimide-based and is a successful and well-documented technique.



1. Properties

Carboxyl-activated SepFast MAG 4HF is made of highly cross-linked 4% agarose containing magnetic material. It makes harsher operational conditions possible so that low pH and certain organic solvents of high concentrations can be applied.

Agarose has long been used for chromatographic separations due to its excellent hydrophilic and low non-specific-binding nature. The particles have an open pore structure with excellent mass transfer properties to large protein molecules.

The base matrix is activated by attaching a long hydrophilic spacer arm to the backbone. It reacts directly with primary amine groups in the presence of a carbodiimide agent. Carboxyl-activated SepFast MAG is supplied as an aqueous suspension in 20% ethanol. The main characteristics are summarized in Table 1.

Table 1: Characteristics of Carboxyl-activated SepFast MAG 4HF:

Group to be coupled	-NH ₂
Matrix	Highly cross-linked 4% magnetic agarose (4HF)
Particle size*	50 – 150 μm
Spacer arm	9 atoms

Activation level	8 - 19 μmol carboxyl / ml medium
pH stability	4 -13 (ligand dependent)
Chemical stability	Compatible with all commonly used aqueous chemicals, provided the ligand to be coupled can withstand
Storage	+4 $^{\circ}\text{C}$ - +8 $^{\circ}\text{C}$

**Other particle sizes available on request.*

2. Ligand immobilization

The following is a general ligand coupling procedure.

2.1 Dissolve the target ligand in coupling buffer. Adjust pH to 4.5. The volume of the coupling buffer should be the same as or half that of the settled gel.

2.2 Wash the Carboxyl-activated gel with at least 5 volumes of coupling buffer in a filtration device.

2.3 Transfer the washed and suction dried gel (from step 2.2) to the solution prepared in step 2.1.

2.4 Add carbodiimide as a dry powder or a pre-dissolved solution to the slurry to a final concentration of 0.1 M. If carbodiimide is pre-dissolved in water, adjust the pH to 4.5.

2.5 Mix the slurry at room temperature or at +4 $^{\circ}\text{C}$ - +8 $^{\circ}\text{C}$.

2.6 Monitor and adjust the reaction pH to 4.5 during the first 1 hr by adding 0.1 M sodium hydroxide.

2.7 Leave the coupling reaction from 2 hrs to 24 hrs.

2.8 Wash the gel with 5 volumes of 0.1 M acetate buffer + 0.5 M NaCl, pH 4.0, followed with 5 volumes of 0.1 M Tris/HCl + 0.5 M NaCl, pH 8.0. Repeat the above washing cycle 2 more times.

2.9 Wash the gel with working / equilibration buffer before use.

3. General considerations over the immobilization efficiency

3.1 pH

The coupling reaction proceeds quite efficiently between pH 4.5 to pH 7.5. However, the coupling pH may be optimized to get the best result (e.g. high coupling yield with high ligand activity).

The pH value decreases during the first hour of the coupling reaction. Always remember to adjust the coupling pH by adding 0.1 M sodium hydroxide. The pH value will become stable afterwards.

3.2 Coupling solution

Deionized water can be used directly as a coupling solution. A buffer solution containing amino groups, sulphhydryls or carboxyl groups should be avoided, as these will compete with ligand coupling.

Certain organic solvents in diluted form may be introduced to improve the solubility of the ligand. The suitability of such solvents should be tested in advance.

3.3 Choice of carbodiimide

A water soluble carbodiimide should be used, for example 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (EDC) or 1-cyclohexyl-3-(2-morpholinoethyl) carbodiimide (CMC) (usually synthesized as the metho-p-toluene sulphonate salt). EDC is the most frequently used carbodiimide agent.

3.4 Concentration of carbodiimide

The amount of carbodiimide added should exceed the activated carboxyl groups in a stoichiometric way. 0.1 M in the final reaction slurry is recommended as a starting point.

3.5 Reaction time and temperature

The contact time between a ligand and the activated medium during a coupling process may be optimized to maintain the biological activity of the ligand. The typical reaction time is overnight at room temperature or in a cold room.

3.6 Blocking remaining activated groups

If an excess amount of ligand is added, blocking of the residual activated groups may not be necessary.

The activated groups that haven't reacted with the ligand should be capped by adding extra small molecules containing primary amines at pH 8 to 9, such as 1 M ethanolamine, in the presence of carbodiimide.

3.7 Washing of the final medium

The non-attached or weakly attached ligand needs to be fully washed away after the coupling reactions. A washing method employing alternating high pH and low pH can ensure an efficient removal of the unwanted species.

4. Use of the immobilized affinity medium

The ligand-coupled medium can be used for purifications using batch stirred tank mode or packed column mode. Handling of this material follows the same principles as handling of other agarose-based media.

5. Storage

Carboxyl-activated SepFast MAG 4HF should be stored under 8°C. The coupled wet medium should be stored in the presence of a bacteria-proof agent (e.g. 20% ethanol) at 4-8°C. Never freeze the coupled medium.

6. Further information

Visit www.biotooolomics.com for further information or contact the technical team or sales representatives.

7. Ordering information

Product	Quantity	Code no.
Carboxyl-activated SepFast MAG 4HF	5 ml	380201
	50 ml	380202
	1 litre	380203



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