

of a 2-component layered composite support material. Instead, residues were mostly immobilised directly or through linker moieties of low molecular weight on the bulk carrier material.

OBJECTS OF THE INVENTION

One object of the invention is to provide a novel purification method for proteins and peptides and a sorbent for performing said method.

BRIEF SUMMARY OF THE INVENTION

In one aspect, there is provided a sorbent comprising a solid support material, the surface of which comprises a first residue comprising a pyridyl ring ($-C_5H_4N$), whose hydrogen atoms may be substituted, and a second residue comprising a carboxyl group ($-COOH$), wherein the solid support material comprises a carrier the surface of which is covered with a film of a polymer having functional groups which are at least partially substituted with the first and second residue, and wherein the polymer is a partially derivatised polyamine, said polyamine preferably being polyvinylamine, or any partially derivatised copolymer or polymer blend comprising a polyamine.

In another aspect, there is provided a method for preparing a sorbent as defined above, comprising:

- (i) providing a polymer having functional groups;
- (ii) adsorbing a film of said polymer onto the surface of a carrier;
- (iii) crosslinking a defined portion of said functional groups of the adsorbed polymer with at least one crosslinking reagent;
- (iv) derivatising further defined portions of said functional groups of the crosslinked polymer with first residues comprising a pyridyl ring ($-C_5H_4N$), whose hydrogen atoms may be substituted, and with second residues comprising a carboxyl group ($-COOH$), and with optional further residues, wherein the polymer is a partially derivatised polyamine, said polyamine preferably being polyvinylamine, or any partially derivatised copolymer or polymer blend comprising a polyamine.

In yet another aspect, there is provided a method of separating, or increasing the concentration and / or purity of a protein or peptide from a mixture containing said protein or peptide, comprising:

- (i) contacting said mixture being dissolved or suspended in a first liquid with a sorbent as defined above or with a sorbent prepared as defined above for a period of time sufficient to enable said protein or peptide to become bound to said sorbent;
- (ii) optionally rinsing said sorbent with a second liquid;
- (iii) contacting said sorbent with said bound protein or peptide with a third liquid for a period of time sufficient to enable said protein or peptide to become released from said sorbent;
- (iv) optionally washing and / or regenerating the sorbent with a fourth and / or fifth liquid.

The present invention is directed toward a sorbent comprising a solid support material, the surface of which comprises at least two different residues among which are first residues comprising a pyridyl ring, whose hydrogen atoms may be substituted, and second residues comprising a carboxyl group. Optionally, these at least two residues are being carried by a film of a polymer covering said surface. Due to its of fully synthetic origin, said sorbent is characterised by a high physical (particularly thermal) and chemical robustness, though still allowing the specific separation of biomolecules under gentle physiological conditions, even from unfavourable sample matrices. Alternative methods for the preparation of such sorbent are also provided.

The invention also provides a method for separating, or increasing the concentration and / or purity of, a protein or peptide from a mixture containing the protein or peptide. The method comprises contacting said mixture with a sorbent according to the invention, to which the desired protein or peptide is bound, the subsequent elution of said protein or peptide from the sorbent, and optionally an intermediate rinsing step.

Disclosed are also various analytical and preparative biochemical as well as medical applications in which the sorbent and / or the method can be beneficially employed. Antibodies purified according to the method are characterised by percentages of recovery, purity, and biological activity which are comparable to those obtained via conventional bioaffinity separation techniques, without suffering from the disadvantages of such techniques.

Certain specific embodiments of the invention are disclosed below, whereby also combinations of the characteristic features of individual embodiments are imaginable and thus within the scope of the invention: