



Silver modified chitosan polymer support for separation of fatty acids

Argentation is a silver ion liquid chromatography technique integrating silver ions onto the stationary or mobile phases where it can react with unsaturated components of fatty acids to form weak polar complexes. At present, the only commercially available argentation column is the Discovery® column. However, these columns have only been used on an analytical scale, and are too expensive to use for preparative purposes. Bulk separation of marine oils requires a cost effective solid support material.

This modified chitosan provides an alternative support for argentation by providing a solid support. The polymer, derived from naturally occurring chitosan found in crayfish or lobster shells, is designed to effect the separation of fatty acids into valuable saturated and unsaturated fatty acids and into cis and trans unsaturated fatty acids.

Marine and plant oils contain saturated and unsaturated fatty acids, both of which have economic value once separated. Unsaturated fatty acids, such as omega 3 and 6 fatty acids, have nutritional value, whereas saturated fatty acids are being used in cosmetics. Trans fatty acids have been known to increase the risk of coronary heart disease and, as a result, an interest in separating trans fatty acids from their cis counterparts has greatly increased.

Various existing technologies claim selective fractionation of saturated and unsaturated fatty acids, such as liquid-liquid extraction, liquid extraction of urea complexed fatty acids, and argentation chromatography using solid supports such as benzene sulfonate resins, zeolites, or alumina.

Benefits

- Significantly higher silver loading is achieved: In excess of 10x that of conventional resins
- Produced from biodegradable marine waste products, such as crayfish shells, and as such provides a more environmentally friendly and sustainable alternative to conventional resins
- One waste stream (crayfish shells) used to add value to another low value product (fish oil)
- After the extraction of residual silver ions, the material can be used as an organic fertilizer

Applications

- Fatty acids fractionation of various plant or marine oils, such as fish oil, citrus oil and olive oil
- The technology could be applied to the production of nutraceuticals, health products, cosmetics and fragrances

Keywords:

Chitosan, fatty acids, biopolymer, sustainable, biodegradable, argentation chromatography

Intellectual Property Rights:

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Market

The invention targets two possible markets: (1) the market for Solid Phase Extraction (SPE) resins, and (2) the bulk separation of plant of marine oils into valuable constituents.

Technical Details

The invention relates to a chromatography resin consisting of a sulfonated chitosan polymer support complexed with silver ions. The sulfonated polymer may include sulphonamide chitosan, 2-N-sulfopropyl chitosan, 2-N-sulfobenzamido chitosan, 6-deoxy-amino chitosan, sulphonamide-6-deoxy 6-amino chitosan, 6-deoxy-2,6-bis-[sulfopropyl] chitosan, and 6-deoxy-2,6-bis-[sulfobenzamido] chitosan.

Intellectual Property Status

Type	Region	Application No	Filing Date	Publication Number	Priority Date
Provisional	South Africa	2012/08014	24-Oct-12		24-Oct-12
PCT	PCT	PCT/IB2013/059617	24-Oct-13		24-Oct-12

This IP is a specific 'selection' patent relating to UCT's modified chitosan patent family.

The inventor is Anwar Jardine.

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