

#### Search history

Search PN=(WO2016061037) (Results 1)

1:

Search [SP]: 1. a method of adjusting the composition of a chromatography product to achieve a target proportion of a desired component, comprising: contacting an input zone of a simulated moving bed ("smb") chromatography apparatus comprising a cation resin with an input feed comprising input feed proportions of the desired component and a second component and having an input feed dissolved solids content contacting an elution zone of the smb apparatus with an eluent feed comprising eluent feed proportions of the desired component and the second component and having an eluent feed dissolved solids content and operating the smb apparatus to blend the desired component from the input feed, delivered through an enrichment zone of the smb apparatus, with the desired component from the eluent feed, delivered through the elution zone, to form an extract product comprising the target proportion of the desired component and an extract dissolved solids content, wherein the target proportion of the desired component is greater than the input feed proportion of the desired component, and wherein the extract dissolved solids content is at least 50 percent, at least 60 percent or at least 80 percent of the input feed dissolved solids content and collecting the extract product having the target proportion of the desired component from the smb apparatus. 2. the method of claim 1, wherein said eluent feed proportion of the desired component is selected to blend with the desired component from the input feed delivered through the enrichment zone to result in the target proportion of the desired component in the extract product. 3. the method of claim 1 wherein the eluent feed is the same as the input feed. 4. the method of claim 1 wherein the eluent feed is diluted no more than 0.2 volumes of water prior to contacting the elution zone. 5. the method of claim 1, wherein the eluent feed is continuously combined with water to contact the elution zone with a diluted eluent feed, wherein a volume ratio of eluent feed to water is 1:2. 6. the method of claim 1 wherein the eluent feed is contacting the elution zone for a period of time, followed by a second period of time where water is contacting the elution zone without the eluent feed, wherein the first period of time and the second period of time are selected so that a volume ratio of eluent feed to water is 1:2 prior to a step movement in the smb apparatus. 7. the method of claim 1 wherein the eluent feed proportion of the desired component is greater than the input feed proportion of the desired component. 8. the method of claim 1, further comprising collecting from the smb apparatus a raffinate stream having raffinate proportions of said desired component and said second component, wherein the raffinate proportion of said second component is higher than the input feed proportion of the second component. 9. the method of claim 1 wherein said desired component is fructose and said second component is glucose. 10. the method of claim 8 wherein said desired component is fructose and said second component is glucose and further comprising: adding the raffinate stream to a input stream comprising glucose to form a combined glucose-enriched stream contacting a glucose isomerase chromatography column comprising glucose isomerase with the combined glucose enriched stream for a time sufficient to enrich a fructose proportion in the column and eluting from the glucose isomerase column a fructose-enriched mixture. 11. the method of claim 10 wherein the step of contacting the input zone with the input feed comprises contacting the input zone with the eluted fructose-enriched mixture. 12. the method of claim 10 wherein said step of contacting the glucose isomerase column comprises contacting the column for less than a time required to bring the proportions of fructose and glucose to an equilibrium point for the glucose isomerase, whereby the eluted fructose-enriched mixture has a lower fructose proportion than would be obtained by contacting the glucose isomerase column for the time required to bring the proportions of fructose and glucose to the equilibrium point for the glucose isomerase. 13. the method of claim 12 wherein the step of contacting the input zone with the input feed comprises contacting the input zone with the eluted fructose-enriched mixture. 14. the method of claim 1 wherein no water is added to the smb apparatus that would dilute the extract dissolved solids content in comparison to the input feed dissolved solids content. 15. the method of claim 1 wherein said desired component is fructose and said second component is glucose, wherein the input feed proportion of fructose is 42-44 percent, with the remainder being glucose, and target proportion of fructose in the extract product is 55 percent -60 percent, with the remainder being primarily glucose. 16. the method of claim 15 wherein the input feed dissolved solids content and the extract dissolved solids content are each at least 50 percent wt/vol. 17. a method of adjusting the proportion of fructose in a high fructose corn syrup product to achieve a target proportion of said fructose, comprising: contacting a simulated moving bed ("smb") chromatography apparatus containing a cation resin that facilitates enrichment of fructose over glucose in a fructose enrichment zone of the smb apparatus with an input feed and an eluent feed, wherein each of said input feed and said eluent feed comprises mixtures of fructose and glucose and has a dissolved solids content operating the smb apparatus to produce in the fructose enrichment zone the high fructose corn syrup product having the target proportion of fructose and a product dissolved solids content and collecting from the fructose enrichment zone of the smb apparatus the high fructose corn syrup product having the target proportion of fructose, wherein the high fructose corn syrup product has a dissolved solids content that is at least 50 percent, at least 60 percent, or at least 80 percent of the dissolved solids content of the input feed. 18. a method of optimizing operational costs of producing a high fructose corn syrup product having a target proportion of fructose, comprising: operating a simulated moving bed ("smb") apparatus to achieve the target proportion of fructose according to the method of claim 15 collecting a glucose-enriched raffinate stream from the smb apparatus wherein a glucose proportion in said raffinate stream is higher than a glucose proportion in said input feed using the glucose-enriched raffinate stream as an input stream for a glucose isomerase column operating the glucose isomerase column to convert glucose in the input stream to fructose to produce a fructose-enriched mixture having determined proportions of fructose and glucose, wherein said input feed of said contacting step comprises the fructose-enriched mixture and using a linear program model to minimize the total costs incident to: (a) replacing the glucose isomerase column as affected by the determined proportions of fructose to glucose in the fructose-enriched mixture (b) frequency of replacing the cation resin in the smb apparatus (c) removal of water from an output stream of either of both of the smb apparatus and glucose isomerase column and (d) maximizing production of the target high fructose corn syrup product per unit of cost. (Results 0)

Search [SP]: cross-reference to related applications[0001] the present application claims priority to u.s. provisional patent application no. 62/063,476, filed oct. 14, 2014. field of the invention[0002] the invention is related generally to the use of simulated moving bed chromatography to separate and enrich sugar or other components in a mixture with limited dilution, and more particularly to methods for preparing an enriched high fructose corn syrup (hfcs) containing a higher concentration of fructose than obtained from the action of glucose isomerase at equilibrium without need to blend the lower percent equilibrium syrup with a higher percent percent fructose enriched syrup. description of related art[0003] high fructose corn syrup (hfcs) is a well-known sweetener obtained from corn starch that has certain defined proportions of fructose and glucose. hfcs is conventionally obtained by (a) liquefaction and hydrolysis of corn starch with heat, alpha amylase and glucoamylase to form an aqueous glucose syrup known as corn syrup, having approximately 95 percent glucose, and (b) isomerization of a portion of the glucose in the corn syrup using a column-bound glucose isomerase, at 60 degrees centigrade, until the material approaches the equilibrium point of the isomerase, which generally produces a syrup mixture that is about 42 percent -44 percent fructose and about 56 percent -58 percent glucose (referred to herein as 42 percent fructose syrup or more simply 42 syrup).[0004] many food and beverage manufacturers desire a hfcs product where the fructose proportion is greater than the glucose proportion to more closely mimic the taste profile of sucrose. the most typically desired hfcs product is a 55 percent fructose syrup, however, some consumers desire hfcs products containing as much as 90 percent fructose. to achieve these higher fructose proportions the 42 percent fructose syrup obtained from the isomerase column is subjected to chromatographic separation over a divalent cation resin that preferentially retards and therefore enriches the fructose relative to the glucose in an enrichment zone of the column. typically the cation is calcium on a sulfonic acid resin. the chromatographic resin is eluted with water as the mobile phase to obtain a hfcs product that is about 90 percent fructose (90 percent fructose syrup). this 90 percent fructose product is then blended with the 42 percent fructose syrup from the isomerase column to achieve hfcs products with fructose proportions greater than 50 percent, and less than 90 percent, most preferably about 55 percent.[0005] typically the chromatographic enrichment process uses a simulated moving bed (smb) chromatography apparatus. smb chromatography operates by dividing a column bed into multiple discrete inter-connected column segments, introducing the input feed and eluent feed in a common flow direction over the linked column segments while essentially moving the column segments in a direction opposite the flow direction of the input and eluent streams. in some designs this is accomplished directly by actually rotating the column segments in a circular carousel in a direction opposite to the flow of the input and eluent streams. in other designs, the column segments are stationary but the ports for input and output of the column segments are rotated in the same direction as the flow of input and eluent streams. in either design, the rotation is herein referred to as a step or a step movement. in either case the effect is the same, the material that preferentially retards with the stationary phase in the column segments (e.g., fructose in hfcs production) is preferentially carried with the column segments opposite in direction to the flow of material that preferentially flows with the moving phase eluent (e.g., glucose with water in hfcs production) across the whole length of the interconnected column segments. the material that preferentially retards with the stationary phase is collected as an extract product and the material that preferentially flows with the moving phase eluent is collected in a raffinate stream.[0006] when input and eluent stream flow rates are properly coordinated with column segment movements, the result is a continuous standing wave of zones of feedstock input, zones of enrichment, zones of elution, and zones of recover (optional). in the case of hfcs production, syrup containing about 90 percent

fructose/10 percent glucose is collected as the extract product and a syrup containing about 10 percent fructose/90 percent glucose is collected in the raffinate stream. a conventional hfcs production process using an smb apparatus with a 42 percent fructose/58 percent glucose feed, a water eluent feed, a fructose-enriched extract product and a glucose-enriched raffinate stream is depicted in fig. 1.[0007] two drawbacks of the conventional method of making hfcs are that first, it requires an additional input of water as the eluent, which increases cost. second, the chromatographic enrichment of fructose using water as the eluent results in dilution of the total sugar concentration in the extract product and the raffinate stream. typically the input stream of 42-44 percent fructose has a dissolved solids content of 45 percent to 60 percent, the 90 percent fructose syrup in the extract product has a dissolved solids content of 10 percent to 30 percent, and the glucose-enriched raffinate stream has a dissolved solids content of about 5-30 percent. in order to produce a product having a commercially desirable dissolved solids concentration of at least 50 percent ds and typically about 70 percent ds, the 90 percent fructose extract product is typically evaporated to a desired concentration that is at least the same as the 42 percent fructose input feed before blending to make a product such as 55 percent hfc as illustrated in fig. 1. the need for evaporation increases cost of operation. brief summary of the invention[0008] one exemplary embodiment of the present invention is directed to a method of adjusting the composition of a chromatography product to achieve a target proportion of a desired component by contacting an input zone of a simulated moving bed ("smb") chromatography apparatus comprising a cation resin with an input feed comprising input feed proportions of the desired component and a second component and having an input feed dissolved solids content, and contacting an elution zone of the smb apparatus with an eluent feed comprising eluent feed proportions of the desired component and the second component and having an eluent feed dissolved solids content.[0009] in certain exemplary embodiments, the smb apparatus is operated to blend the desired component from the input feed, delivered through an enrichment zone of the smb apparatus, with the desired component from the eluent feed, delivered through the elution zone, to form an extract product comprising the target proportion of the desired component and an extract dissolved solids content, wherein the target proportion of the desired component is greater than the input feed proportion of the desired component, and wherein the extract dissolved solids content is at least 50 percent of the input feed dissolved solids content. in more desirable embodiments the dissolved solids content of the extract is at least 60 percent of the input feed dissolved content, and in the most desired embodiments the dissolved solids content of the extract is at least 80 percent of the input feed dissolved content. the extract product having the target proportion of the desired component is collected from the smb apparatus.[0010] in certain exemplary embodiments of the invention, the eluent feed proportion of the desired component is selected to blend with the desired component from the input feed delivered through the enrichment zone to result in the target proportion of the desired component in the extract product.[0011] in some exemplary embodiments, the eluent feed is the same as the input feed or the eluent feed is diluted no more than 0.2 volumes of water prior to contacting the elution zone. [0012] in certain embodiments, the eluent feed is continuously combined with water to contact the elution zone with a diluted eluent feed, wherein a volume ratio of eluent feed to water is 1:2.[0013] in certain exemplary embodiments, the eluent feed is contacting the elution zone for a period of time, followed by a second period of time where water is contacting the elution zone without the eluent feed, wherein the first period of time and the second period of time are selected so that a volume ratio of eluent feed to water is 1:2 prior to a step movement in the smb apparatus.[0014] in certain exemplary embodiments, the method of the present invention further comprises collecting from the smb apparatus a raffinate stream having raffinate proportions of the desired component and the second component, wherein the raffinate proportion of the second component is higher than the input feed proportion of the second component.[0015] in some exemplary embodiments, the method of the present invention can be used wherein the desired component is fructose and the second component is glucose.[0016] in certain embodiments, the raffinate stream comprises glucose and is added to an input stream comprising glucose to form a combined glucose-enriched stream. a glucose isomerase chromatography column comprising glucose isomerase is contacted with the raffinate stream and/or combined glucose-enriched stream for a time sufficient to enrich a fructose proportion in the column. the fructose-enriched mixture is eluted from the glucose isomerase column. the eluted fructose-enriched mixture can be used in the input feed that contacts the input zone of the smb appar (Results 9)

Search method and chromatography and product (Results 401992)

4:

Search 4 and (cation resin) (Results 488)

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Title: **METHODS** FOR TREATING LIGNOCELLULOSIC MATERIALS

**Abstract:** The present invention relates to **methods** of processing lignocellulosic material to obtain hemicellulose sugars, cellulose sugars, lignin, cellulose and other high-value **products**. Also provided are hemicellulose sugars, cellulose sugars, lignin, cellulose, and other high-value **products**.

**Classifications:**

**International (IPC 8-9):** A61L15/16 B01D11/00 B01D15/18 B01D15/36 B01J39/26 C01B3/02 C07C1/20 C07C15/08 C07C51/48 C07G1/00 C07H C07H1/08 C07H3/02 C07H3/06 C08B1/00 C08B37/00 C08B37/14 C08H7/00 C08H8/00 C08J3/20 C08K3/00 C08K5/00 C08L1/02 C08L5/14 C08L97/00 C08L97/02 C10L1/02 C12P1/00 C12P13/00 C12P19/02 C12P19/14 C12P21/00 C12P7/02 C12P7/10 C12P7/40 C13B20/00 C13K1/00 C13K1/02 C13K1/04 C13K11/00 C13K13/00 D01F6/54 D01F9/00 D01F9/12 D01F9/17 D01H1/00 D21C1/00 D21C11/00 D21C9/00 (Advanced/Invention); C07H3/02 C07H3/06 (Advanced/Non-invention); C07H1/08 (Core/Invention)

**CPC:** C08B37/0003 C08L1/02 C08L33/20 C08L63/00 C08L67/00 C08L97/02 D21H17/23 C10G2400/30 C08L77/00 C07H1/08 C07G1/00 C13K1/04 C12P19/14 C12P19/02 C12P2203/00 C12P2201/00 C08L95/00 D01F6/54 D01F9/00 D01F9/17 C13K1/00 C13K13/00 C13K11/00 C13K13/002 B01D15/1821 B01D2215/023 B01D2215/024 C10G3/00 Y02P30/20 Y02T50/678 C10L1/02 C10L1/023 C10L1/026 D21C11/0007 Y02E50/13 C08L5/14 C08B1/003 B01D15/1828 C08B37/0057 C13K1/02 C13K13/007 B01D15/362 B01J39/26 D21C11/0042 D21C11/005 C08H6/00 C08H8/00 C08L97/005

**US:** 106/287.26 127/30 127/36 127/37 127/46.1 127/53 127/55 252/601 252/62 423/648.1 435/128 435/134 435/136 435/140 435/142 435/145 435/146 435/148 435/155 435/158 435/160 435/162 435/165 435/99 44/605 442/181 442/327 502/401 514/777 516/9 524/556 524/72 526/317.1 526/348 526/351 526/352 528/361 530/350 530/500 530/507 549/417 549/483 549/488 549/489 554/1 554/124 562/400 562/577 562/607 568/303 568/700 568/840 585/16 585/24 585/469

PatBase - US2015087031\_AA

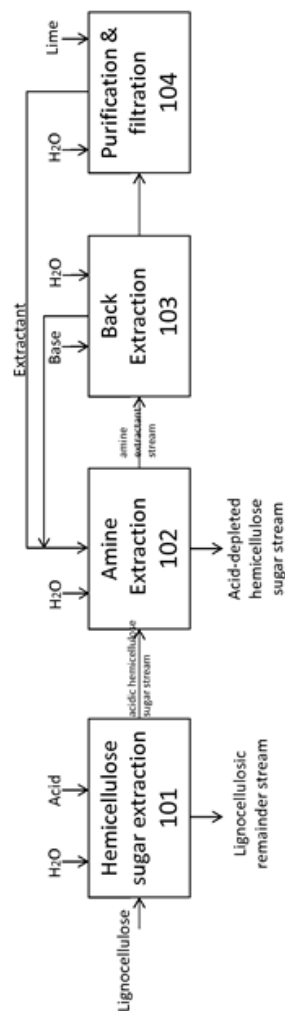


Fig. 1

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
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| AU2013256049 AB    | 20141127         | AU20130256049      | 20130503         |
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#### Priority:

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| AU20170203211  | 20170514 | US20170624952  | 20170616 |                |          |

#### Probable Assignee: VIRIDA INC

**Assignee(s):** (std): BAUER TIMOTHY ALLEN ; BELMAN ZIV VLADIMIR ; BURKE LUKE ; CARDEN ADAM ; EYAL AHARON M ; GERSHINSKY YELENA ; JANSEN ROBERT ; GREGOIRE CLAIRE ; HALLAC BASSEM ; HAR TAL Yael ; ELIAHU SHAY ; MADSEN LEE ; VIRDIA INC ; LAWSON JAMES ALAN ; MCWILLIAMS PAUL ; TRAVISANO PHILIP ; LAPIDOT NOA ; SADE HAGIT ; MATIS NETA ; VIRDIA LTD ; VIRDIA LTD AND VIRDIA INC ; VIRDIA INK ; ZVIELY MICHAEL

**Assignee(s):** LAWSON JAMES ALLEN ; PERRY ROTEM ; VIRIDA INC ; VIRDIA LTD6 GALGALE HAPLADAP.O. BOX 1242446733HERZELIAIL ; VIRDIA INC600 - 303 TWIN DOLPHIN DRIVE,REDWOOD CITYCA94065US ; HCL CLEANTECH INC

**Inventor(s):** (std): AHARON M EYAL ; ADAM CARDEN ; BASSEM HALLAC ; BAUER TIMOTI ALLEN ; BERK LYUK ; CLAIRE GREGOIRE ; DZHENSEN ROBERT ; CARDEN ADA ; ELIAKHU SHEJ ; EYAL AKHARON M ; GERSHINSKY YELENA ; GERSHINSKI ELENA ; EYAL AHARON ; GREGUAR KLER ; HAGIT SADE ; HAR TAL Yael MIRIAM ; KARDEN ADAM ; KHALLAK BASSEM ; KHAR TAL Yael ; JAMES ALAN LAWSON ; LAWSON JAMES ALLEN ; LUKE BURKE ; MAKUILLYAMS POL ; LEE MADSEN ; LOUSON DZHEJMS ALAN ; MEDSEN LI ; MICHAEL ZVIELY ; NETA MATIS ; NOA LAPIDOT ; PAUL MCWILLIAMS ; PERRY ROTEM ; ROBERT JANSEN ; PHILIP TRAVISANO ; SADE KHAGIT ; SHAY ELIAHU ; TIMOTHY ALLEN BAUER ; ZVILI MAJKL ; TRAVISANO PHILIP ; SADE HAGIT ; MCWILLIAMS PAUL ; MATIS NETA ; MADSEN LEE ; LAWSON JAMES ALAN ; LAPIDOT NOA ; JANSEN ROBERT ; HAR TAL Yael ; HALLAC BASSEM ; GREGOIRE CLAIRE ; GERSHINSKY YELENA ; EYAL AHARON M ; ELIAHU SHAY ; CARDEN ADAM ; BURKE LUKE ; BELMAN ZIV VLADIMIR ; BAUER TIMOTHY ALLEN ; TRAVISANO PHILLIP ; TRAVIZANO FILIP ; Yael HAR TAL ; YELENA GERSHINSKY ; ZIV VLADIMIR BELMAN ; ZVIELY MICHAEL

**Inventor(s):** ZVIELY MICHAELIL ; ZIV VLADIMIR ; YELENA ; Yael ; ADAM ; TRAVISANO ; TRAVISANO PHILIPUS ; TIMOTHY ; SHAY ; ROBERT ; ROTEM ; SADE ; SADE HAGITIL ; PHILIP ; PERRY ; PAUL ; NOA ; NETA ; LUKE ; MATIS ; MATIS NETAIL ; MCWILLIAMS ; MCWILLIAMS PAULUS ; M ; MADSEN ; MADSEN LEEUS ; LEE ;

JANSEN ; JANSEN ROBERTUS ; LAPIDOT ; LAPIDOT NOAIL ; LAWSON ; LAWSON JAMES ALANUS ; HAR TAL  
YAEIL ; HARTAL Yael ; JAMES ; HALLAC ; HALLAC BASSEMIL ; HAR TAL ; HAGIT ; EYAL AHARON MIL ;  
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VLADIMIRIL ; BELMAN ZIVVLADIMIR ; BAUER ; BAUER TIMOTHY ALLENUS ; AHARON ; ALAN ; ALLEN ;  
BASSEM

**Agent(s):**

PIZZEYS PATENT AND TRADE MARK ATTORNEYS; PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD;  
GOWLING LAFLEUR HENDERSON LLP; GOWLING WLG CANADA LLP; ROQUES SARAH ELIZABETH;  
SRINIVASAN RAVI CHANDRAN; NABILA AM BADAR SH LLM; OOO YURIDICHESKAYA GORODISSKIY I  
PARTNERY FA; WILSON SONSINI GOODRICH AND ROSATI; CHEN SHENGFENG ET AL

**Designated states:**

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SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: PROCESSING BIOMASS

**Abstract:** **Methods** and systems are described for processing cellulosic and lignocellulosic materials into useful intermediates and **products**, such as energy and fuels. For example, conveying systems and **methods**, such as highly efficient vibratory conveyors, are described for the processing of the cellulosic and lignocellulosic materials.

**Classifications:**

**International (IPC 8-9):** A23K10/37 A23L A23L3/26 A61L11/00 A61L2/08 B01D B01D15/00 B01D15/02 B01D15/04 B01D15/18 B01D3/00 B01D33/06 B01D35/00 B01D37/02 B01D37/04 B01D39/08 B01D39/18 B01D53/32 B01D53/44 B01D53/66 B01D53/81 B01D53/82 B01D61/42 B01D61/44 B01F15/06 B01F7/08 B01J B01J19/08 B01J19/12 B01J19/14 B01J19/22 B01J20/12 B01J20/18 B01J20/26 B01J20/281 B01J20/34 B01J23/36 B01J27/053 B01J38/10 B01J38/12 B01J39/20 B01J39/26 B03B5/02 B07B1/28 B07B9/00 B09B3/00 B09B5/00 B65G B65G17/30 B65G27/00 B65G27/04 B65G33/14 B65G33/24 B65G47/00 B65G49/00 B65G53/04 B65G53/24 B65G53/40 B65G53/60 C02F11/00 C02F11/02 C07C29/149 C07C29/156 C07C31/00 C07C31/12 C07C51/00 C07C67/00 C07C67/08 C07C69/24 C08H8/00 C08J3/00 C08J3/28 C08L97/02 C10B19/00 C10B53/02 C10G1/00 C10G1/02 C10G1/10 C10G32/04 C10L1/02 C10L5/40 C10L5/44 C10L5/46 C10L9/08 C12F3/02 C12M1/00 C12N C12N1/02 C12N1/22 C12N13/00 C12P C12P1/00 C12P1/02 C12P1/04 C12P19/00 C12P19/02 C12P19/14 C12P3/00 C12P7/00 C12P7/02 C12P7/04 C12P7/06 C12P7/08 C12P7/10 C12P7/14 C12P7/24 C12P7/26 C12P7/40 C12P7/44 C12P7/52 C12P7/54 C12P7/56 C12P7/62 C12P7/64 C13K1/00 C13K1/02 C13K1/04 C13K13/00 D06M D06M10/00 D21B1/02 D21C1/00 D21C1/10 D21C5/00 D21C9/00 E04B1/92 E04H5/00 E04H5/02 F01D15/10 F01K13/00 F22B1/02 G01T G01T7/08 G1T7/08 G21F G21F1/04 G21F1/08 G21F3/00 G21F7/00 G21K G21K5/00 G21K5/02 G21K5/04 G21K5/10 H01J33/04 H01J37/20 H01J37/30 H01J37/317 H01J5/18 H01J7/26 H05H7/00 (Advanced/Invention); A61L2/08 C08H8/00 C08J3/28 C12P19/00 C12P7/10 D21C1/00 G21F7/005 G21K5/04 G21K5/10 (Advanced/Non-invention); B01D15/02 B01D15/18 B01J19/08 B65G27/00 C10L1/02 C10L1/04 C12N13/00 C12P19/00 C12P19/02 C12P7/08 C12P7/10 C12P7/52 D06M10/00 D21C5/00 G01T7/08 G21K5/00 G21K5/04 (Core/Invention); A23L B01D B01J B65G C12N C12P D06M G01T G21F G21K (Subclass/Invention)

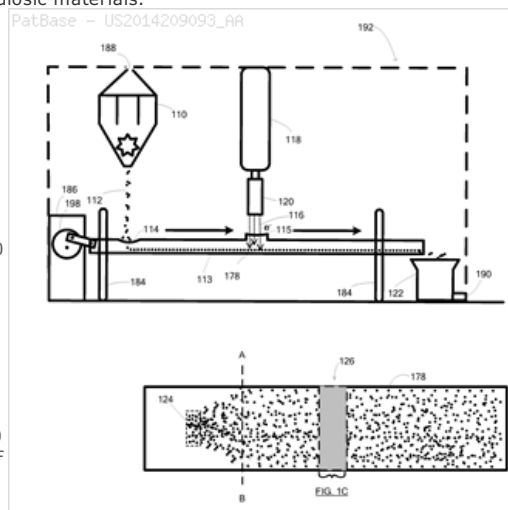
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**Family:**

| Publication number | Publication date | Application number | Application date |
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**Probable Assignee:** XYLECO INC

**Assignee(s):** (std): JOHN J BAXTER ; JOHN M CAHILL ; PETERS ANTHONY ; ROBERT PARADIS ; THOMAS CRAIG MASTERMAN ; MARSHALL MEDOFF ; MAIA STAPLETON MUKHERJEE ; SOLOMON I RODITI ; RANDY LAVIGNE ; NATALYA A KORYABKINA ; MICHAEL W FINN ; CHRISTOPHER COOPER ; ANDREW PAPOULIS ; XYLECO INC ; XYLECO INC XYLECO INC ; XYLECO

**Assignee(s):** XYLECO INC XYLECO INC ; BAXTER JOHN J ; CAHILL JOHN M ; INC XYLECO ; IP KENNY KIN CHUI ; FINN MICHAEL W ; KORYABKINA NATALYA A ; COOPER CHRISTOPHER ; LAVIGNE RANDY ; PT PERTAMINA PERSERO FUNGSI QUALITY SYSTEM AND KNOWLEDGE MANGEMENT ; MEDOFF MARSHALL ; PARADIS ROBERT ; MASTERMAN THOMAS CRAIG ; RODITI SOLOMON I ; PAPOULIS ANDREW ; MUKHERJEE MAIA STAPLETON

**Inventor(s):** (std): ANDREW PAPOULIS ; ANTHONY PETERS ; BAXTER JOHN J ; CAHILL JOHN M ; CHRISTOPHER COOPER ; COOPER CHRISTOPHER ; CRAIG MASTERMAN THOMAS ; FINN MICHAEL ; FINN MICHAEL W ; IP KENNY KIN CHUI ; JOHN J BAXTER ; JOHN M CAHILL ; KENNY KIN CHUI IP ; KIN CHUI IP KENNY ; KORYABKINA NATALYA ; KORYABKINA NATALYA A ; LAVIGNE RANDY ; MAIA STAPLETON MUKHERJEE ; MARSHALL MEDOFF ; MASTENRMAN THOMAS CRAIG ; MASTERMAN THOMAS ; MASTERMAN THOMAS CRAIG ; MASTERMAN THOMAS CRAIG MASTERMAN THOMAS CRAIG ; MATERMAN THOMAS CRAIG ; MEDOFF MARSHALL ; MEDOFF MARSHALL MEDOFF MARSHALL ; MEDORFF MARSHALL ; MICHAEL W FINN ; MUKHERJEE MAIA STAPLETON ; MUKHERJEE MARIA STAPLETON ; NATALYA A KORYABKINA ; PAPOULIS ANDREW ; PARADIS ROBERT ; PARADIS ROBERT PARADIS ROBERT ; PARADISO ROBERT ; PARADISO ROBERT J ; PETERS ANTHONY ; RANDY LAVIGNE ; ROBERT PARADIS ; RODITI SOLOMON ; RODITI SOLOMON I ; SOLOMON I RODITI ; STAPLETON MUKHERJEE MAIA ; THOMAS CRAIG MASTERMAN ; THOMAS MASTENRMAN ; THOMAS MASTERMAN

**Inventor(s):** PARADIS ROBERT PARADIS ROBERT ; MEDOFF MARSHALL MEDOFF MARSHALL ; MASTERMAN THOMAS CRAIG MASTERMAN THOMAS CRAIG ; MASTENRMAN THOMAS

**Agent(s):** WRAYS; WRAYS PTY LTD; MARKS AND CLERK; SMART AND BIGGAR; KEANE PAUL FACHTNA; OCONNELL MAURA; O CONNELL MAURA; CASEY ALAN MICHAEL; ACHMAD FATCHY; ACHMAD FATCHY AFFA INTELLECTUAL PROPERTY RIGHTS; REINHOLD COHN AND PARTNERS; BEN AMI AND ASSOCIATES; KOBAYASHI SUMIKO; OHMORI NORIO; KOBAYASHI HIROSHI; DONALDSON AND BURKINSHAW LLP; LEBER PATENT LAW PC; WILMER CUTLER PICKERING HALE AND DORR LLP; LEBER IP LAW; DENNIS R; DE REGE THESAURO FRANCESCO; MORRELL DENNIS G; MORRELL DENNIS G ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** CORN FIBER FOR THE **PRODUCTION** OF ADVANCED CHEMICALS AND MATERIALS: ARABINOXYLAN AND ARABINOXYLAN DERIVATIVES PREPARED THEREFROM

**Abstract:** In one aspect, the invention provides a **method** of extracting arabinoxylan from corn fiber wherein the **method** comprises the steps of: (a) heating an aqueous mixture of corn fiber and a liquid; (b) contacting the mixture of step (a) with a protease enzyme, thereby providing a proteolyzed corn fiber and a liquid; (c) separating the liquid from the proteolyzed corn fiber; (d) contacting the proteolyzed corn fiber at least once with an alkaline extractant, thereby providing an insoluble cellulose material and a liquid comprising arabinoxylan; (e) separating the insoluble cellulose material from the liquid comprising arabinoxylan; and (f) reducing the volume of the liquid comprising arabinoxylan by removing excess alkaline extractant, thereby providing a concentrated liquid comprising from about 10 percent to about 50 percent solids, wherein the solids comprise arabinoxylan. In a further aspect, the invention provides **methods** of preparing novel arabinoxylan esters and ethers. Still further, the invention provides novel arabinoxylan esters and ethers.

**Classifications:**

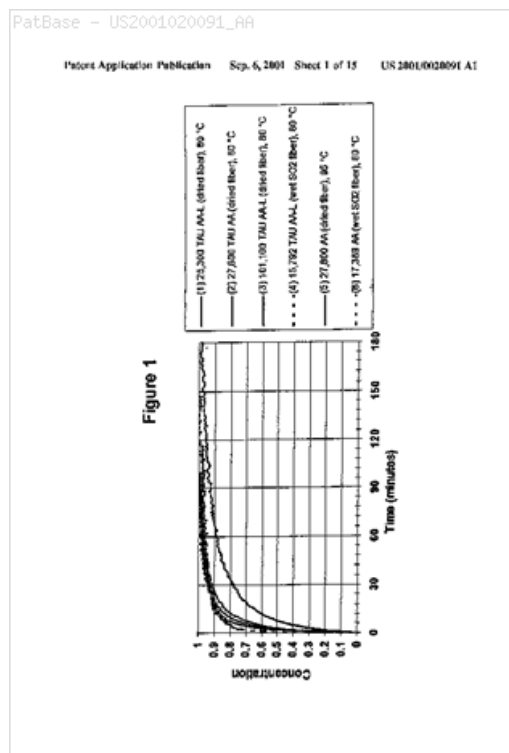
**International (IPC 8-9):** A23D9/007 A23D9/02 A23K1/14 A23K1/16 A23L1/0534 A23L1/10 A23L1/105 A23L1/30 A23L1/308 C08B11/00 C08B3/00 C08B30/10 C08B37/00 C11B1/02 C11B1/10 C12S3/00 C13K1/02 C13K1/08 C13K13/00 D21C5/00 (Advanced/Invention); C12S3/00 (Advanced/Non-invention)

**International (IPC 1-7):** A01H1/00 A23K1/14 C07J9/00 C07M1/00 C08B11/00 C08B3/00 C08B3/16 C08B37/14 C11B1/02 C12N15/82 C12N5/04 C12P19/00 C12P19/02 C12P19/04 C12Q1/37 C12S3/00 C13K13/00 D21C5/00

**CPC:** Y02P60/877 C13K1/08 A23D9/007 A23D9/02 A23V2002/00 C08B3/00 C08B11/00 C08B30/10 C08B37/0057 C08B37/006 C11B1/025 C11B1/10 C13K1/02 C13K13/00 C13K13/002 D21C5/00 D21C5/005 A23K10/37 A23K20/147 A23K20/163 A23L7/107 A23L7/115 A23L29/262 A23L33/11 A23L33/115 A23L33/24

**European:** A23D9/007 A23D9/02 A23K1/14C A23K1/16G A23K1/16L A23L1/0534 A23L1/105B A23L1/10E A23L1/308B A23L1/30B2 A23L1/30C C08B11/00 C08B3/00 C08B30/10 C08B37/00M7 C08B37/00P C11B1/02B C11B1/10 C13K1/02 C13K1/08 C13K13/00 C13K13/00B D21C5/00 K23V2/00 N21C5/00B

**US:** 424/750 435/101 435/101P 435/101S 435/105 435/23 435/264 435/274 435/277 435/412 435/412P 435/72 435/74 435/99 536/123 536/123.1 536/123P 536/56 536/58 536/64 536/64S 536/65 536/65S 536/72 536/84 552/54 552/540 552/540S 552/545 800/281 800/281P



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU200032281 A1     | 20000829         | AU20000032281      | 20000210         |
| AU200032281 A5     | 20000829         | AU20000032281D     | 20000210         |
| EP1155104 A2       | 20011121         | EP20000910139      | 20000210         |
| US2001020091 AA    | 20010906         | US20010818209      | 20010327         |
| US2003188340 AA    | 20031002         | US20030384208      | 20030306         |
| US2003199087 AA    | 20031023         | US20030383891      | 20030306         |
| US2003207407 AA    | 20031106         | US20020325774      | 20021219         |
| US6352845 BA       | 20020305         | US20000502099      | 20000210         |
| US6388069 BA       | 20020514         | US20000502077      | 20000210         |
| US6586212 BA       | 20030701         | US20000502094      | 20000210         |
| US6589760 BA       | 20030708         | US20000501917      | 20000210         |
| WO0047701 A2       | 20000817         | WO2000US03492      | 20000210         |
| WO0047701 A3       | 20010301         | WO2000US03492      | 20000210         |
| WO0047701 C2       | 20011025         | WO2000US03492      | 20000210         |

**Priority:**

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|----------------|----------|---------------|----------|---------------|----------|
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| US20010818209  | 20010327 | US20020325774 | 20021219 | US20030384208 | 20030306 |
| US20030383891  | 20030306 |               |          |               |          |

**Probable Assignee:** EASTMAN CHEMICAL CO

**Assignee(s):** (std): EASTMAN CHEM CO

**Assignee(s):** EASTMAN CHEMICAL CO ; EASTMAN CHEMICAL COMPANY

**Inventor(s):** (std): ARUMUGAM BHASKAR K ; BLAIR LARRY ; BUCHANAN CHARLES M ; BUCHANAN NORMA L ; DEBENHAM JOHN S ; LINGERFELT JR LARRY R ; LINGERFELT LARRY R JR ; SANDERS JOHN K ; SHELTON MICHAEL C ; VISNESKI MICHAEL J ; WOOD MATTHEW D

**Inventor(s):** NORMA L BUCHANAN ; MICHAEL J VISNESKI ; MICHAEL C SHELTON ; MATTHEW D WOOD ; LINGERFELT LARRY R ; LARRY R LINGERFELT JR ; LARRY BLAIR ; JOHN S DEBENHAM ; JOHN K SANDERS ; CHARLES M BUCHANAN ; BHASKAR K ARUMUGAM

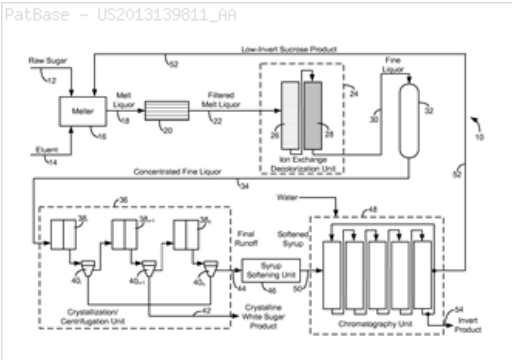
**Designated states:** AE AL AM AT AU AZ BA BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CR CU CY CZ DE DK DM EE ES FI  
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MC MD MG MK ML MN MR MW MX NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT  
TZ UA UG UZ VN YU ZA ZW

Title: SYSTEM AND PROCESS FOR REFINING SUGAR

**Abstract:** A system and process for refining raw sugar, comprising a melting unit configured to receive the raw sugar and an **eluent** to produce a melt liquor, a decolorization unit configured to receive the melt liquor and to produce a fine liquor, a crystallization unit configured to fractionate high-purity crystalline sucrose from the fine liquor and to provide a run-off syrup, a softening unit configured to receive the run-off syrup to produce a softened syrup, at least one separation unit configured to receive the softened syrup to produce a low-invert sucrose **product**, and a recycle line configured to relay the low-invert sucrose **product** from the at least one separation unit to the melting unit.

**Classifications:**

**International (IPC 8-9):** C13B C13B20/14 C13B30/04 C13B30/14 C13B35/06 C13B50/00 (Advanced/Invention);  
C13B (Subclass/Invention)  
**CPC:** C13B50/00 C13B20/14 C13B30/04 C13B30/14 C13B35/06  
**US:** 1/1 127/46.2 127/9



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU2012346140 AA    | 20130606         | AU20120346140      | 20121127         |
| AU2012346140 BB    | 20170427         | AU20120346140      | 20121127         |
| DE602012014523 D1  | 20160317         | DE201260014523T    | 20121127         |
| EP2785880 A1       | 20141008         | EP20120795982      | 20121127         |
| EP2785880 B1       | 20160203         | EP20120795982      | 20121127         |
| ES2565633 T3       | 20160406         | ES20120795982T     | 20121127         |
| HU027090 T2        | 20160829         | HU20120795982T     | 20121127         |
| IL232937 A0        | 20140731         | IL20120232937      | 20121127         |
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| RU2014126821 A     | 20160220         | RU20140126821      | 20121127         |
| TR201603533 T4     | 20160421         | TR20160003533T     | 20121127         |
| US2013139811 AA    | 20130606         | US20120684798      | 20121126         |
| US9080221 BB       | 20150714         | US20120684798      | 20121126         |
| WO13082018 A1      | 20130606         | WO2012US66634      | 20121127         |
| WO13082018 A8      | 20140703         | WO2012US66634      | 20121127         |

Priority:

US20110566307P 20111202      US20120684798 20121126      EP20120795982 20121127  
WO2012US66634 20121127

Probable Assignee: AMALGAMATED RESEARCH LLC

**Assignee(s):** (std): AMAL GAMATED RES LLC ; AMALGAMATED RES LLC  
**Assignee(s):** AMALGAMATED RESEARCH LLC ; AMALGAMATED RESEARCH LLC WILMINGTON ; AMAL GAMATED RESEARCH LLC  
**Inventor(s):** (std): PRYOR TIMOTHY E ; VELASQUEZ LAWRENCE ; HIEB ALAN W ; KEARNEY MICHAEL M  
**Inventor(s):** MICHAEL M KEARNEY ; VELASQUEZ LAWRENCE TWIN FALLS ; PRYOR TIMOTHY E TWIN FALLS ; KEARNEY MICHAEL M TWIN FALLS ; HIEB ALAN W BOISE  
**Agent(s):** WADESON; WITTMANN HERNANDEZ PATENTANWALTE PARTNERSCHAFT MBB; SAYER ROBERT DAVID; LAZCANO JESUS; WOLFF BREGMAN AND GOLLER; HANDE MUMCUOGLU; WESTMAN CHAMPLIN AND KOEHLER PA; DAVID D; BRUSH DAVID D ET AL  
**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **METHOD** OF PREPARING A COMPOSITION USING ARGENTATION **CHROMATOGRAPHY**

**Abstract:** The present invention is directed to a **method** of preparing compositions enriched in compounds containing carbon chains of varying degrees of unsaturation using argentation **chromatography**. The present **method** utilizes an argentized cationic resin or a conditioned argentized alumina to separate compounds containing saturated or mono-unsaturated carbon chains from compounds having polyunsaturated carbon chains present in a starting composition. The invention is particularly useful for preparing a composition enriched in polyunsaturated fatty acid alkyl esters from mixtures of fatty acid esters in a starting composition derived from vegetable oils. The present invention is also directed to a **method** of preparing a conditioned argentized alumina adsorbent having increased selectivity for compounds containing one or more polyunsaturated carbon chains.

**Classifications:**

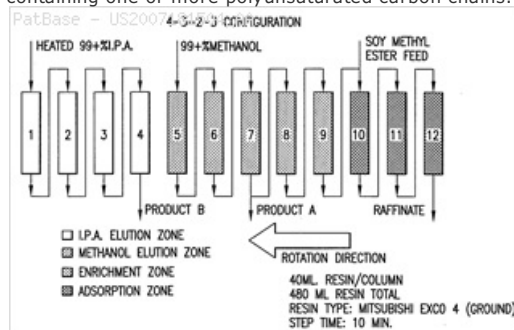
**International (IPC 8-9):** B01D15/00 B01D15/08 B01D15/18 B01D15/20 B01D15/36 B01J20/00 B01J20/02 B01J20/26 B01J20/284 B01J20/32 B01J47/00 C07C67/56 C11B3/10 C11B7/00 G01N30/42 G01N30/46 G01N30/50 (Advanced/Invention); B01D15/36 G01N30/46 (Advanced/Non-invention); B01D15/00 B01D15/08 B01D15/10 B01J20/22 B01J20/281 C11B7/00 G01N30/00 (Core/Invention)

**International (IPC 1-7):** G01N30/46 G01N30/50

**CPC:** C11B3/10 B01D15/1828 B01D15/20 B01D15/362 B01J20/0233 B01J20/284 B01J20/3234 B01J20/3236 C07C67/56 G01N30/462 B01J47/016

**European:** B01D15/18R2A B01D15/20 B01J20/02B14 B01J20/284 B01J20/32F4 B01J20/32F4D B01J47/00K C07C67/56 L01D15/36B2 S01N30/46A2

**US:** 210/656 210/667 502/415 554/193 554/194



**Family:**

| Publication number | Publication date | Application number | Application date |
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| BRPI0620310 A2     | 20111108         | BR2006PI20310      | 20061218         |
| BRPI0620310 B1     | 20171205         | BR2006PI20310      | 20061218         |
| CA2633509 AA       | 20080616         | CA20062633509      | 20061218         |
| CA2633509 C        | 20140211         | CA20062633509      | 20061218         |
| DE602006043032 D1  | 20141016         | DE200660043032T    | 20061218         |
| EP1979062 A2       | 20081015         | EP20060848941      | 20061218         |
| EP1979062 B1       | 20140910         | EP20060848941      | 20061218         |
| MX2008007627 A1    | 20080911         | MX20080007627      | 20061218         |
| US2007181504 AA    | 20070809         | US20060612250      | 20061218         |
| US2010093530 AA    | 20100415         | US20090639137      | 20091216         |
| US7667061 BB       | 20100223         | US20060612250      | 20061218         |
| US8088710 BB       | 20120103         | US20090639137      | 20091216         |
| WO07075499 A2      | 20070705         | WO2006US48098      | 20061218         |
| WO07075499 A3      | 20070927         | WO2006US48098      | 20061218         |

**Priority:**

US20050750794P 20051216 EP20060848941 20061218 US20060612250 20061218  
 WO2006US48098 20061218 US20090639137 20091216

**Probable Assignee:** ARCHER DANIELS MIDLAND CO

**Assignee(s):** (std): ARCHER DANIELS MIDLAND CO ; GEIER DOUG ; SOPER JOHN G ; SANDAGE ROBERT DUANE ; BINDER THOMAS P ; HILALY AHMAD ; HILALY AHMAD K ; SANDAGE ROBERT D

**Assignee(s):** ARCHER DANIELS MIDLAND CO DECATUR ; ARCHER DANIELS MIDLAND CO4666 FARIES PARKWAYBOX 1470DECATURIL62525US ; ARCHER DANIELS MIDLAND COMPANY

**Inventor(s):** (std): AHMAD K HILALY ; BINDER THOMAS P ; HILALY AHMAD ; SANDAGE ROBERT DUANE ; GEIER DOUG ; SOPER JOHN G ; THOMAS P BINDER ; SANDAGE ROBERT D ; ROBERT DUANE SANDAGE ; JOHN G SOPER ; HILALY AHMAD K ; DOUG GEIER

**Inventor(s):** AHMAD HILALY ; SOPER JOHN G MT ZION ; SOPER JOHN GUS ; GEIER DOUG DECATUR ; GEIER DOUGUS ; SANDAGE ROBERT DUANE DECATUR ; SANDAGE ROBERT DUANEUS ; SOPER JOHN ; HILALY AHMAD FORSYTH ; HILALY AHMADUS ; SANDAGE ROBERT ; BINDER THOMAS P DECATUR ; BINDER THOMAS PUS ; BINDER THOMAS

**Agent(s):** GOUDREAU GAGE DUBUC ; BERESKIN AND PARR LLP SENCRL SRL ; BENOIT AND COTE INC ; KILBURN AND STRODE LLP ; MEYERS HANS WILHELM ; VON KREISLER SELTING WERNER PARTNERSCHAFT VON PATENTANWALTEN U RECHTSANWALTEN MBB ; STERNE KESSLER GOLDSTEIN AND FOX PLLC ; ARCHER DANIELS MIDLAND COMPANY ; ARCHER DANIELS MIDLAND CO ; SCOTT

**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** **METHOD** FOR PURIFICATION OF HIGH PURITY SUCROSE MATERIAL

**Abstract:** A **method** for purifying a sucrose material already in a high purity liquid, crystalline or other form of sucrose, such as raw sugar, utilizing **chromatography**, or utilizing **chromatography** in connection with other **methods** of purification.

**Classifications:**

**International (IPC 8-9):** B01D15/08 B01D15/12 B01D15/18 B01D15/36 B01D15/42 C13B20/14 C13B20/16 C13B30/06 C13B35/06 C13D3/14 C13D3/16 C13F1/06 C13J1/06 C13K13/00 (Advanced/Invention); B01D15/26 (Core/Invention); C13D (Subclass/Invention)

**International (IPC 1-7):** C13D3/14 C13J1/06

**CPC:** B01D15/1821 B01D15/362 C13B20/14 C13B20/148

**European:** B01D15/18R2 B01D15/36B2 C13B20/14 C13B20/14H

**US:** 127/30 127/42 127/46.2 127/46.200 127/46.200P 127/53 127/53S 127/55 127/55S 127/56 127/56S

PatBase - US2005056273\_A1

Patent Application Publication Mar. 17, 2006 Sheet 1 of 2 US 2005/086273 A1

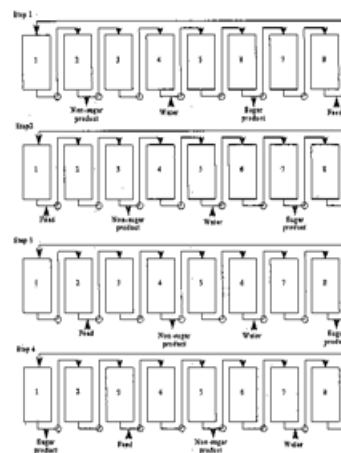


FIGURE 1

**Family:**

| Publication number | Publication date | Application number | Application date |
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| DE602004039481 D1  | 20121122         | DE200460039481T    | 20040709         |
| EP1649068 A2       | 20060426         | EP20040777844      | 20040709         |
| EP1649068 A4       | 20070110         | EP20040777844      | 20040709         |
| EP1649068 B1       | 20120926         | EP20040777844      | 20040709         |
| ES2396123 T3       | 20130219         | ES20040777844T     | 20040709         |
| PT1649068 T        | 20130110         | PT20040777844T     | 20040709         |
| US2005056273 AA    | 20050317         | US20040888155      | 20040709         |
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| US2009151715 AA    | 20090618         | US20090372356      | 20090217         |
| US7125455 BB       | 20061024         | US20040888155      | 20040709         |
| US7662234 BB       | 20100216         | US20060543511      | 20061005         |
| US7931751 BB       | 20110426         | US20090372356      | 20090217         |
| WO05010216 A2      | 20050203         | WO2004US22010      | 20040709         |
| WO05010216 A3      | 20051229         | WO2004US22010      | 20040709         |

**Priority:**

US20030487706P 20030716 EP20040777844 20040709 US20040888155 20040709  
WO2004US22010 20040709 US20060543511 20061005 US20090372356 20090217

**Probable Assignee:** AMALGAMATED RESEARCH LLC

**Assignee(s):** (std): AMALGAMATED RES INC ; AMALGAMATED RES LLC ; COSTESSO DENNIS D ; KEARNEY MICHAEL M

**Assignee(s):** AMALGAMATED RESEARCH INC ; AMALGAMATED RESEARCH LLC ; AMALGAMATED RESEARCH LLC TWIN FALLS

**Inventor(s):** (std): ARNEY MICHAEL M ; COSTESSO DENNIS ; COSTESSO DENNIS D ; KEARNEY MICHAEL ; KEARNEY MICHAEL M

**Inventor(s):** KEARNEY MICHAEL M TWIN FALL ; MICHAEL M ARNEY ; COSTESSO DENNIS D OGDEN ; DENNIS D COSTESSO

**Agent(s):** MARKS AND CLERK LUXEMBOURG LLP; MORELAND DAVID; CARPINTERO MARIO; TRASK BRITT; WESTMAN CHAMPLIN AND KELLY PA; TRASKBRITT PC; DAVID D

**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

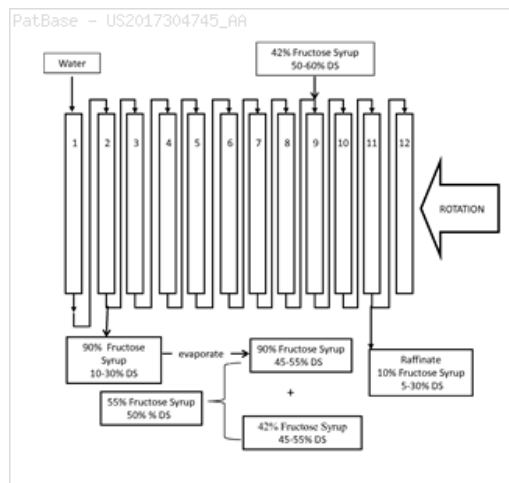
Title: **METHOD** FOR ADJUSTING THE COMPOSITION OF **CHROMATOGRAPHY PRODUCTS**

**Abstract:** Described herein is a **method** of adjusting the composition of a **chromatography product** to achieve a target enriched proportion of a desired component from an input feed having a lower proportion of the desired component using simulated moving bed ("SMB") **chromatography**, wherein the **eluent** for the **SMB** apparatus may comprise the very input feed being enriched. The **method** is exemplified by enriching a high fructose corn syrup from a 42 percent fructose syrup to a 55 percent fructose syrup without substantially reducing the dissolved solids concentration of the 55 percent syrup relative to the input 42 percent syrup. The 42 percent syrup is also used as the **eluent** for the **SMB** apparatus and may be reconstituted from the raffinate stream by passing the raffinate stream over a glucose isomerase column alone or in combination with a dextrose feed. The **method** reduces water usage and saves energy by minimizing the need for evaporation to obtain a 55 percent fructose syrup with a high dissolved solids content.

**Classifications:**

**International (IPC 8-9):** B01D15/00 B01D15/12 B01D15/16 B01D15/18 B01D15/36 B01D15/38 C12P19/02 C13K1/08 C13K11/00 C13K3/00 G01N30/46 G01N30/88 (Advanced/Invention)

**CPC:** B01D15/1828 B01D15/362 C13K1/08 C13K3/00 C13K11/00



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| BR112017007743 A2  | 20180130         | BR20171107743      | 20151013         |
| CL2017000905 A1    | 20171215         | CL20170000905      | 20170412         |
| CO20170004650 A2   | 20170728         | CO20170004650      | 20170508         |
| EP3206771 A1       | 20170823         | EP20150851346      | 20151013         |
| EP3206771 A4       | 20180606         | EP20150851346      | 20151013         |
| JP2017533817 T2    | 20171116         | JP20170519661T     | 20151013         |
| KR20170067851 A    | 20170616         | KR20177012599      | 20151013         |
| MX2017004966 A1    | 20170821         | MX20170004966      | 20151013         |
| PE08312017 A1      | 20170704         | PE20170000716      | 20151013         |
| PH2017500691 A     | 20171009         | PH20170500691      | 20170411         |
| US2017304745 AA    | 20171026         | US20150518278      | 20151013         |
| WO16061037 A1      | 20160421         | WO2015US55224      | 20151013         |

**Priority:**

US20140063476P 20141014 US20150518278 20151013 WO2015US55224 20151013

**Probable Assignee:** ARCHER DANIELS MIDLAND CO

**Assignee(s):** (std): ARCHER DANIELS MIDLAND CO

**Inventor(s):** (std): BINDER THOMAS ; BINDER THOMAS P ; SCHULTZ MITCHELL J ; MITCHELL J SCHULTZ ; THOMAS P BINDER

**Agent(s):** ESTUDIO CAREY LTDA; MAURICIO JARAMILLO CAMPUZANO; DOMPATENT VON KREISLER SELTING WERNER PARTNERSCHAFT VON PATENT U RECHTSANWAELTEN MBB; INABA YOSHIYUKI; CRAFTON COREY M

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **Method** of displacement **chromatography**

**Abstract:** A plurality of chromatographic separation operations, including a first simulated moving bed operation, are coupled into a process which functions, preferably through the application of continuous displacement **chromatography**, to recover a fraction rich in small organic molecules, notably betaine and/or invert from sucrose solutions, enabling the subsequent **production** of a high purity sucrose **product**.

**Classifications:**

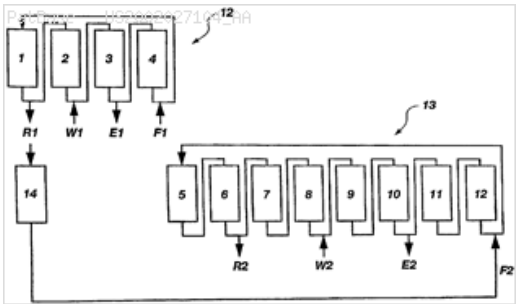
**International (IPC 8-9):** B01D15/00 B01D15/08 B01D15/18 B01D15/42 G01N30/02 G01N30/88 (Advanced/Invention); B01D15/00 G01N30/02 (Advanced/Non-invention)

**International (IPC 1-7):** B01D15/00 B01D15/08 G01N30/88

**CPC:** B01D15/1864 B01D15/1828 B01D15/422 G01N30/02

**European:** B01D15/18R2A B01D15/18T B01D15/42D S01N30/02

**US:** 127/46.2 127/46.3 210/198.2 210/656 210/656S 210/659



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU199860435 A1     | 19980818         | AU19980060435      | 19980128         |
| BRPI9807521 A      | 20000321         | BR1998PI07521      | 19980128         |
| EP1017467 A1       | 20000712         | EP19980903747      | 19980128         |
| EP1017467 A4       | 20011121         | EP19980903747      | 19980128         |
| EP1017467 B1       | 20140716         | EP19980903747      | 19980128         |
| JP2001509730 T2    | 20010724         | JP19980532219T     | 19980128         |
| JP4185572 B2       | 20081126         | JP19980532219T     | 19980128         |
| US2002027104 AA    | 20020307         | US20010956580      | 20010919         |
| US6379554 BA       | 20020430         | US19990355415      | 19991118         |
| US6602420 BB       | 20030805         | US20010956580      | 20010919         |
| WO9832514 A1       | 19980730         | WO1998US01512      | 19980128         |

**Priority:**

US19970036603P 19970129      WO1998US01512 19980128      US19990355415 19991118  
US20010956580 20010919

**Probable Assignee:** AMALGAMATED RESEARCH LLC

**Assignee(s):** (std): AMALGAMATED RES INC ; AMALGAMATED RES LLC ; AMALGAMATED RESEARCH INC ; KEARNEY MICHAEL M ; KOCHERGIN VADIM N

**Assignee(s):** AMALGAMATED RESEARCH LLC

**Inventor(s):** (std): KEARNEY MICHAEL M ; KOCHERGIN VADIM N

**Inventor(s):** MICHAEL M KEARNEY ; VADIM N KOCHERGIN

**Agent(s):** COYLE PHILIP AIDAN

**Designated states:** AL AM AT AU AZ BA BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CU CZ DE DK EE ES FI FR GA GB GE GH GM GN GR HU IE IL IS IT JP KE KG KP KR KZ LC LK LR LS LT LU LV MC MD MG MK ML MN MR MW MX NE NL NO NZ PL PT RO RU SD SE SG SI SK SN SZ TD TG TJ TM TR TT UA UG US UZ VN ZW

**Title:** **METHOD** FOR SEPARATING A BASIC AMINO ACID FROM FERMENTATION BROTH

**Abstract:** This invention relates to a **method** for separating basic amino acids from fermentation broth comprising contacting the broth with strong acid cation exchange resins that have a low degree of cross-linkage and eluting the amino acid. The **method** described herein results in higher yield and higher purity of lysine, in addition to higher throughput, as compared to conventional processes of purification of lysine from fermentation broth.

**Classifications:**

**International (IPC 8-9):** A23K1/16 B01J39/04 B01J39/26 B01J49/00

C07C227/40 C07C229/26 C07C29/76 C07D233/61 C12P13/08

C12P13/10 C12P13/24 C12P7/18 (Advanced/Invention);

C07C227/40 C07C229/26 (Advanced/Non-invention);

C07C227/00 C07C229/00 C07C29/00 C12P7/02 (Core/Invention);

C07C (Subclass/Invention)

**International (IPC 1-7):** A23K1/16 C07C C07C227/00 C07C227/40

C07C229/00 C07C229/26 C07C27/26 C07C29/74 C07C31/18 C07C31/20

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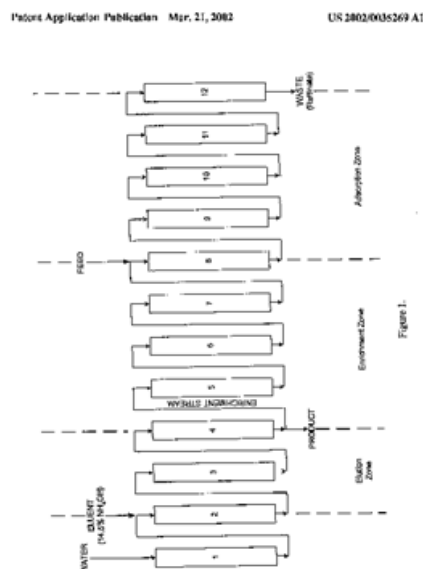
**CPC:** C07C227/40 C07C29/76 C12P7/18

**European:** C07C227/40 C07C29/76 C12P7/18

**US:** 548/339.1 548/339.100P 548/497 548/497S 562/553 562/554

562/554S 568/868 568/872 568/872P

PatBase - US2002035269\_AA



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AT273269 E         | 20040815         | AT20010914806T     | 20010315         |
| AU2001240151 AA    | 20011008         | AU20010240151      | 20010315         |
| AU2001240151 BB    | 20050602         | AU20010240151      | 20010315         |
| AU2001245737 AA    | 20011008         | AU20010245737      | 20010315         |
| AU200140151 A1     | 20011008         | AU20010040151      | 20010315         |
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| AU200145737 A1     | 20011008         | AU20010045737      | 20010315         |
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| DE60104833 T2      | 20050324         | DE20016004833T     | 20010315         |
| DK1268399 T3       | 20041206         | DK20010914806T     | 20010315         |
| EP1268399 A2       | 20030102         | EP20010914806      | 20010315         |
| EP1268399 B1       | 20040811         | EP20010914806      | 20010315         |
| EP1268838 A2       | 20030102         | EP20010918689      | 20010315         |
| ES2225499 T3       | 20050316         | ES20010914806T     | 20010315         |
| JP2003528602 T2    | 20030930         | JP20010570604T     | 20010315         |
| JP2011177709 A2    | 20110915         | JP20110076405      | 20110330         |
| JP5530389 B2       | 20140625         | JP20110076405      | 20110330         |
| KR100726204 B1     | 20070611         | KR20027012855      | 20010315         |
| KR20020086721 A    | 20021118         | KR20027012855      | 20010315         |
| PT1268399 T        | 20041130         | PT20010914806T     | 20010315         |
| TR200402085 T4     | 20040921         | TR20040002085T     | 20010315         |
| US2002035269 AA    | 20020321         | US20010808123      | 20010315         |
| US2002133049 AA    | 20020919         | US20010808121      | 20010315         |
| US6479700 BB       | 20021112         | US20010808123      | 20010315         |
| US6479716 BB       | 20021112         | US20010808121      | 20010315         |
| WO0172689 A2       | 20011004         | WO2001US08109      | 20010315         |
| WO0172689 A3       | 20020321         | WO2001US08109      | 20010315         |
| WO0173097 A2       | 20011004         | WO2001US08248      | 20010315         |
| WO0173097 A3       | 20020228         | WO2001US08248      | 20010315         |
| ZA200208705 A      | 20040203         | ZA20020008705      | 20021028         |

**Priority:**

|                         |                         |                         |
|-------------------------|-------------------------|-------------------------|
| US20000192891P 20000329 | US20000192892P 20000329 | US20010263228P 20010123 |
| US20010266473P 20010206 | JP20010570604 20010315  | US20010808121 20010315  |
| WO2001US08109 20010315  | US20010808123 20010315  | WO2001US08248 20010315  |
| WO2001US08109 20020927  |                         |                         |

**Probable Assignee:** ARCHER DANIELS MIDLAND CO**Assignee(s):** (std): BINDER THOMAS P ; AHMAD K HILALY ; ARCHER DANIELS MIDLAND CO ; HILALY AHMAD K ; THOMAS P BINDER**Assignee(s):** ARCHER DANIELS MIDLAND COMPANY ; ARCHER DANIELS MIDLAND CO DECATUR ; HILALY AHMAD ; SOPER JOHN ; MOORE KEVIN**Inventor(s):** (std): BINDER THOMAS P ; HILALY AHMAD ; BINDER P ; BINDER P THOMAS ; MOORE KEVIN ; SOPER JOHN ; HILALY AHMAD K**Inventor(s):** P THOMAS BINDER ; AHMAD HILALY ; AHMAD K HILALY ; KEVIN MOORE ; JOHN SOPER ; THOMAS P BINDER**Agent(s):** PETER MAXWELL AND ASSOCIATES; GOUDREAU GAGE DUBUC**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EE ES FI FR GA GB GD GE GH GM GN GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

**Title:** PROCESS FOR PREPARING FONDAPARINUX SODIUM AND INTERMEDIATES USEFUL IN THE SYNTHESIS THEREOF

**Abstract:** Processes for the synthesis of the Factor Xa anticoagulant Fondaparinux, and related compounds are described. Also described are protected pentasaccharide intermediates as well as efficient and scalable processes for the industrial scale **production** of Fondaparinux sodium by conversion of the protected pentasaccharide intermediates via a sequence of deprotection and sulfonation reactions.

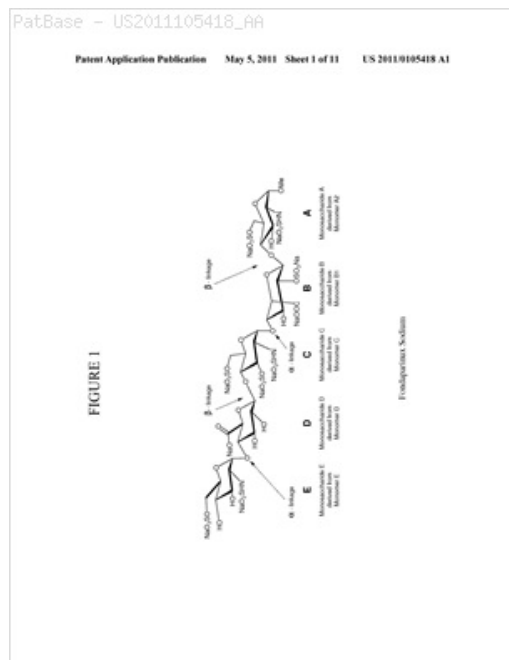
**Classifications:**

**International (IPC 8-9):** A61K31/7028 A61K31/7048 A61K31/737  
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C07H17/00 C07H17/04 C07H19/01 C07H5/04 C07H5/06 C07H5/08  
C07H5/10 C08B37/00 C08B37/10 (Advanced/Invention)

**CPC:** C07H1/00 C07H5/06 C07H19/01 C07H5/04 C07H5/08 C07H5/10  
A61K31/737 C07H13/04 C08B37/0063 A61K2300/00

**European:** A61K31/737 C07H13/04 C08B37/00P2

**US:** 1/1 514/25 514/25P 514/54 514/56 536/123.1 536/123.12 536/17.2  
536/17.200S 536/17.5 536/17.500S 536/17.9 536/18.5 536/18.6 536/21  
536/54 536/55 536/55.1 536/55.3



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| CA2777099 AA       | 20120130         | CA20102777099      | 20100730         |
| CA2777099 C        | 20180327         | CA20102777099      | 20100730         |
| CN104245718 A      | 20141224         | CN201080041055     | 20100730         |
| CN104245718 B      | 20161109         | CN201080041055     | 20100730         |
| EP2464668 A2       | 20120620         | EP20100740809      | 20100730         |
| IN01822DN2012 A    | 20160212         | IN2012DN01822      | 20120229         |
| US2011105418 AA    | 20110505         | US20100847719      | 20100730         |
| US2013102764 AA    | 20130425         | US20120618786      | 20120914         |
| US2015018537 AA    | 20150115         | US20140256235      | 20140418         |
| US8288515 BB       | 20121016         | US20100847719      | 20100730         |
| US8703923 BB       | 20140422         | US20120618786      | 20120914         |
| US9255119 BB       | 20160209         | US20140256235      | 20140418         |
| WO11014793 A2      | 20110203         | WO2010US43946      | 20100730         |
| WO11014793 A3      | 20130207         | WO2010US43946      | 20100730         |
| WO11014793 A9      | 20110324         | WO2010US43946      | 20100730         |

**Priority:**

US20090230557P 20090731 US20100847719 20100730 WO2010US43946 20100730  
US20120618786 20120914 US20140256235 20140418

**Probable Assignee:** RELIABLE BIOPHARMACEUTICAL LLC

**Assignee(s):** (std): NADJI SOURENA ; RELIABLE BIOPHARMACEUTICAL CORP ; SOURENA NADJI ; SMOOT JAMES T ;  
VANARTSDALEN JOSEPH A

**Assignee(s):** RELIABLE BIOPHARMACEUTICAL LLC ; BANK OF NEW YORK MELLON TRUST CO NA NOTES COLLATERAL  
AGENT AS ; CITIBANK NA COLLATERAL AGENT AS ; GOLDMAN SACHS BANK USA COLLATERAL AGENT AS

**Inventor(s):** (std): NADJI SOURENA ; SMOOT JAMES T ; SOURENA NADJI ; VANARTSDALEN JOSEPH A

**Agent(s):** STIKEMAN ELLIOTT SENCRL SRL LLP; PONS ARINO ANGEL; BLANK ROME LLP; LESSLER JAY

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY  
CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS  
IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY  
MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SD SE SG SI SK SL SM SN ST SV SY SZ TD TG  
TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** TAGATOSE **PRODUCTION** USING SIMULATED MOVING BED SEPARATION

**Abstract:** Disclosed is a process for the **production** of d-tagatose from lactose after acid hydrolysis to provide a hydrolysate having 1 equiv of d-glucose and 1 equiv of d-galactose for each unit of lactose converted. More particularly, the invention relates to a process for the isomerization of d-galactose to d-tagatose and the use of a simplified separation scheme based on simulated moving bed (**SMB**) separation. The isomerization of d-galactose to d-tagatose is carried out in the presence of calcium oxide or calcium hydroxide. The process is useful for providing a simplified processing route to providing pure d-tagatose and glucose as two **products** from lactose hydrolysate. In an alternate embodiment, a process is disclosed for the **production** of d-tagatose from fermented lactose hydrolysate to provide a crystallized d-tagatose **product**. D-tagatose is useful as a food additive, as a sweetener, as a texturizer, as a stabilizer, or as a humectant.

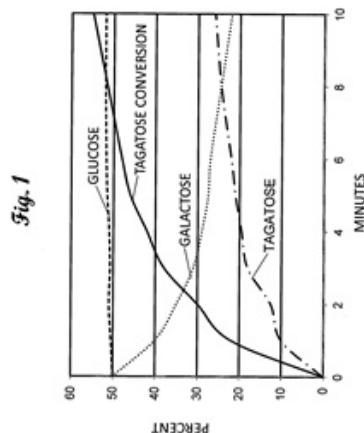
**Classifications:**

**International (IPC 8-9):** B01D15/02 B01D15/08 C07H1/00 C07H1/06 C07H1/08 C07H3/02 (Advanced/Invention)

**CPC:** C13K1/00 B01D15/185 B01D15/365 B01J39/26 B01J47/022 B01J39/05 C13K13/00

**US:** 536/125 536/127

PatBase - US2013317210\_AA



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US2013317210 AA    | 20131128         | US20120506889      | 20120522         |
| US8802843 BB       | 20140812         | US20120506889      | 20120522         |
| WO13177058 A1      | 20131128         | WO2013US41853      | 20130520         |

**Priority:**

US20120506889 20120522

**Probable Assignee:** OROCHEM TECHNOLOGIES INC

**Assignee(s):** (std): HOUSE DAVID W ; KULKAMI OMKAR M ; KULKARNI OMKAR M ; OROCHEM TECHNOLOGIES INC ; OROSKAR ANIL R ; VIKRAMAN NAIR REMA RAKESH ; SHARMA DEEPAK

**Inventor(s):** (std): HOUSE DAVID W ; KULKAMI OMKAR M ; KULKARNI OMKAR M ; OROSKAR ANIL R ; SHARMA DEEPAK ; VIKRAMAN NAIR REMA RAKESH

**Agent(s):** RICHARD P SILVERMAN AND ASSOC LLC; SILVERMAN RICHARD P

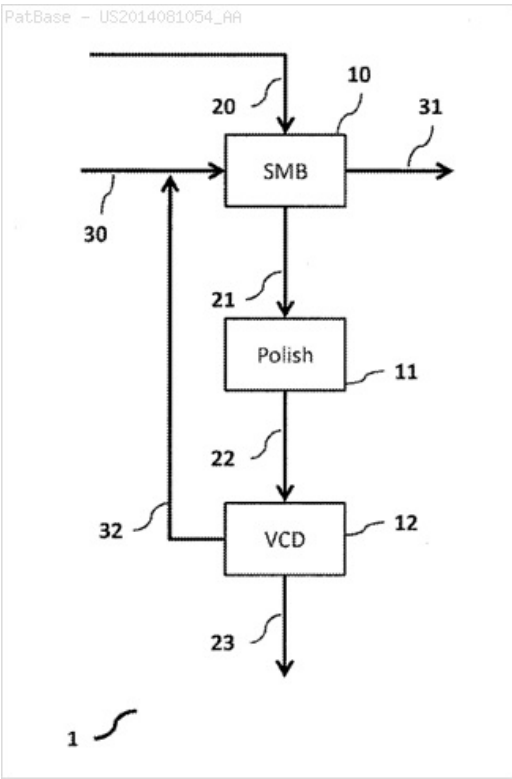
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**Title:** CLASS OF HDAC INHIBITORS EXPANDS THE RENAL PROGENITOR CELLS POPULATION AND IMPROVES THE RATE OF RECOVERY FROM ACUTE KIDNEY INJURY

**Abstract:** The invention concerns separation **methods** and systems including those comprising a continuous chromatographic simulated moving bed integrated with vapor compression distillation to create a high efficiency separations platform applicable to a broad range of separation functions.

**Classifications:**

**International (IPC 8-9):** A61K31/10 A61P13/12 B01D15/18 C07C29/80 C07C323/22 (Advanced/Invention)  
**CPC:** C07C29/80 B01D15/1821 C07C229/18 C07C317/44 C07C323/52 C07C323/56 C07C323/60 C07C323/62  
**US:** 210/178 568/868



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US2014081054 AA    | 20140320         | US20120982512      | 20120210         |
| US2016332943 A9    | 20161117         | US20120982512      | 20120210         |
| WO12109527 A2      | 20120816         | WO2012US24625      | 20120210         |
| WO12109527 A3      | 20121018         | WO2012US24625      | 20120210         |

**Priority:**

US20110441560P 20110210      US20120982512 20120210      WO2012US24625 20120210

**Probable Assignee:** PRIMAFUEL INC

**Assignee(s):** (std): DAY BILLY W ; HUKRIEDE NEIL ; UNIV PITTSBURGH ; UNIV OF PITTSBURGH OF COMMW SYSTEM OF HIGHER EDUCATION PITTSBURGH PA

**Assignee(s):** UNIVERSITY OF PITTSBURGH OF THE COMMONWEALTH SYSTEM OF HIGHER EDUCATION ; OF PITTSBURGH OF COMMW SYSTEM OF HIGHER EDUCATION UNIV ; OF PITTSBURGH OF COMMW SYSTEM OF HIGHER EDUCATION PITTSBURGH PA UNIV ; PRIMAFUEL INC ; NATIONAL INSTITUTES OF HEALTH NIH US DEPT OF HEALTH AND HUMAN SERVICES DHHS US GOVERNMENT ; OF PITTSBURGH OF COMMW SYSTEM OF HIGHER EDUCATION UNIV

**Inventor(s):** (std): DAY BILLY W ; HUKRIEDE NEIL

**Agent(s):** HIRSHMAN JESSE A ET AL

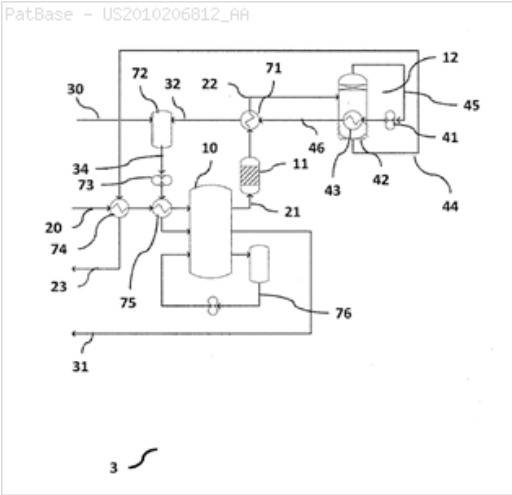
**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** HIGH EFFICIENCY SEPARATIONS **METHOD** AND APPARATUS

**Abstract:** The invention concerns separation **methods** and systems comprising a continuous chromatographic simulated moving bed integrated with vapor compression distillation to create a high efficiency separations platform applicable to a broad range of separation functions.

**Classifications:**

**International (IPC 8-9):** B01D15/08 B01D17/12 B01D3/00 C10G31/00 C10L1/02 (Advanced/Invention);  
B01D15/08 B01D17/00 B01D3/00 C10G31/00 C10L1/00 (Core/Invention)  
**CPC:** B01D15/1821 C10G21/00  
**European:** C10G21/00 L01D15/18R2  
**US:** 210/177 210/656



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| US2010206812 AA    | 20100819         | US20100708491      | 20100218         |
| WO10096587 A2      | 20100826         | WO2010US24625      | 20100218         |
| WO10096587 A3      | 20101216         | WO2010US24625      | 20100218         |

**Priority:**

US20090153919P 20090219      US20100708491 20100218

**Probable Assignee:** PRIMAFUEL INC

**Assignee(s):** (std): KRIKORIAN VAHIK ; PRIMAFUEL INC ; SMITHERS JUSTON ; WOODS RICHARD R

**Inventor(s):** (std): KRIKORIAN VAHIK ; SMITHERS JUSTON ; WOODS RICHARD R ; WOODS RICHARD ROOD

**Agent(s):** JOSEPH M KOBZEFF; KOBZEFF JOSEPH M

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** UMAMI-ACTIVE TOMATO FRACTION

**Abstract:** The invention provides an efficient **method** for producing a high quality umami-active tomato fraction, said process comprising the steps of: a. providing a tomato serum; b. separating the tomato serum into two or more portions, including a lycopene-depleted portion and a lycopene-enriched portion; c. concentrating the lycopene-depleted portion to at least 10 degrees Brix; d. chromatographically fractionating the concentrated lycopene-depleted portion into two or more fractions, including a crude umami fraction with a weight ratio glutamate:monosaccharide of X and a monosaccharide fraction with a weight ratio glutamate:monosaccharide of Y, wherein the ratio X:Y exceeds 20; e. optionally, concentrating the crude umami fraction; f. chromatographically fractionating the crude umami fraction into two or more fractions, including a clean umami fraction with a weight ratio glutamate:citrate of K and a citrate fraction with a weight ratio glutamate:citrate of L, wherein the ratio K:L exceeds 10. The invention further relates to a tomato isolate comprising glutamate, aspartate and sucrose; wherein the weight ratio glutamate:citrate exceeds 2 and wherein glutamate, 5'-AMP, aspartate and pyroglutamate together represent at least 15 weight percent of the dry matter contained in the tomato isolate.

**Classifications:**

**International (IPC 8-9):** A23L A23L1/015 A23L1/221 A23L1/222 A23L1/227 A23L1/228 A23L1/39 A23L1/40 A23L2/56 A23L23/00 A23L23/10 A23L27/00 A23L27/10 A23L27/12 A23L27/21 A23L27/22 A23L5/20 (Advanced/Invention)

**CPC:** A23V2002/00 A23L27/12 A23L27/56 A23L5/20 A23L23/00 A23L27/21 A23L27/22 A23L27/88

**US:** 426/271 426/590 426/655

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AR089400 AA        | 20140820         | AR2012P104904      | 20121221         |
| BR112014015533 A2  | 20170613         | BR20141115533      | 20121204         |
| BR112014015533 A8  | 20170613         | BR20141115533      | 20121204         |
| BR112014015533 A8  | 20170704         | BR20141115533      | 20121204         |
| CN103997907 A      | 20140820         | CN201280063304     | 20121204         |
| EA201400746 A1     | 20140930         | EA20140000746      | 20121204         |
| EP2793611 A1       | 20141029         | EP20120795432      | 20121204         |
| EP2793611 B1       | 20180228         | EP20120795432      | 20121204         |
| IN01166MN2014 A    | 20150306         | IN2014MN01166      | 20140611         |
| TR201803850 T4     | 20180424         | TR20180003850T     | 20121204         |
| US2015125581 AA    | 20150507         | US20120365808      | 20121204         |
| US2018110247 AA    | 20180426         | US20170849707      | 20171221         |
| US9867390 BB       | 20180116         | US20120365808      | 20121204         |
| WO13092196 A1      | 20130627         | WO2012EP74312      | 20121204         |
| ZA201404302 A      | 20160727         | ZA20140004302      | 20121204         |

**Priority:**

EP20110195292 20111222 EP20120795432 20121204 WO2012EP74312 20121204  
US20140365808 20140616 US20170849707 20171221

**Probable Assignee:** CONOPCO INC D B A UNILEVER

**Assignee(s):** (std): CONOPCO INC ; CONOPCO INC D B A UNILEVER ; CONOPCO INC DBA UNILEVER ; UNILEVER NV ; UNILEVER PLC ; UNILEVER HINDUSTAN ; UNILEVER PLC A CO REGISTERED IN ENGLAND AND WALES

**Assignee(s):** UNILEVER N V ; HINDUSTAN UNILEVER LTD

**Inventor(s):** (std): MARCO GIUSEPPE MAZZOTTI ; MAVROUDIS NIKOLAOS ; MAZZOTTI MARCO GIUSEPPE ; MICHAEL JACOBUS SUIJKER ; NIKOLAOS MAVROUDIS ; SUIJKER MICHAEL JACOBUS

**Agent(s):** TJON HON KONG GUNO; VAN DEN BROM COENRAAD RICHARD; HALISE BETUEL ATABAY VARLIK; CATHERINE A; NLO NV

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** PROCESS FOR THE RECOVERY OF BETAINE FROM MOLASSES

**Abstract:** A process for the recovery of betaine from a raw material consisting essentially of molasses. The process includes a demineralisation step, a conversion step and a separation step. In the demineralisation step the overall amount of salts in the molasses is brought to a level lying below 2 weight percent (on overall dry matter). In the conversion step the molasses is subjected to the action of a fructan-forming enzyme, to form a fructan-containing molasses (fructan-molasses). Finally in the separation step, the fructan-molasses is subjected to a chromatographic separation, thereby obtaining a betaine-containing fraction. Whereby the demineralisation step is executed prior to the separation step and whereby demineralisation step may be executed prior to, during, or subsequent to the conversion step. The raw material may alternatively contain or consist essentially of thick juice.

**Classifications:**

**International (IPC 8-9):** A23K1/02 A23K1/16 A23K10/33 A23L1/09 A23L1/30 A23L1/308 A23L29/30 C07C227/40 C07C229/12 C12P13/00 C12P13/04 C12P19/04 C12P19/16 C12P19/18 C12P19/20 C13B20/14 C13K1/02 C13K13/00 (Advanced/Invention)

**CPC:** C07C227/40 C12P19/04 A23K10/33 A23L29/30 C12P13/001 C13B20/144 C13K1/02 C13K13/007 A23L5/00 A23L33/125

**US:** 252/182.12 426/442 426/658 435/101 435/267

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| BR112014011636 A2  | 20170502         | BR20141111636      | 20121115         |
| CA2855787 AA       | 20140513         | CA20122855787      | 20121115         |
| CL2014001290 A1    | 20141114         | CL20140001290      | 20140515         |
| CN104080920 A      | 20141001         | CN201280064269     | 20121115         |
| DE602012047245 D1  | 20180705         | DE201260047245T    | 20121115         |
| EA201490896 A1     | 20141128         | EA20140090896      | 20121115         |
| EP2802665 A1       | 20141119         | EP20120808250      | 20121115         |
| EP2802665 B1       | 20180606         | EP20120808250      | 20121115         |
| IN04672DN2014 A    | 20150220         | IN2014DN04672      | 20140609         |
| JP2014534230 T2    | 20141218         | JP20140540360T     | 20121115         |
| JP6215833 B2       | 20171018         | JP20140540360T     | 20121115         |
| KR20140110864 A    | 20140917         | KR20147016222      | 20121115         |
| MX2014005858 A1    | 20150602         | MX20140005858      | 20121115         |
| MX355197 B         | 20180409         | MX20140005858      | 20121115         |
| US2014295505 AA    | 20141002         | US20120358259      | 20121115         |
| US9896410 BB       | 20180220         | US20120358259      | 20121115         |
| WO13072048 A1      | 20130523         | WO2012EP04732      | 20121115         |

**Priority:**

EP20110009055 20111115 EP20120808250 20121115 WO2012EP04732 20121115

**Probable Assignee:** TIENSE SUIKERRAFFINADERIJ NV

**Assignee(s):** (std): TIENSE SUIKERRAFFINSDERIJ N V ; VAN LOO JAN ; WACH WOLFGANG ; TIENSE SUIKERRAFFINADERIJ NV

**Assignee(s):** TIENSE SUIKERRAFFINADERIJ NVTERVURENLAAN 182B-1150BRUSSELBE ; TIENSE SUIKERRAFFINADERIJ N V ; TIENSE SUIKERRAFFINSDERIJ NV

**Inventor(s):** (std): JAN VAN LOO ; LOO JAN VAN ; WACHTER WOLFGANG ; WOLFGANG WACH ; WACH WOLFGANG ; VAN LOO JAN

**Inventor(s):** WOLFGANG WACHTER ; VAN LOO JANBE ; WACH WOLFGANGDE

**Agent(s):** BORDEN LADNER GERVAIS LLP; ESTUDIO CAREY LTDA; KOSTER NICO; KITA AOYAMA INT PATENT BUREAU; BROOKS KUSHMAN PC

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** PROCESS FOR THE PREPARATION AND ISOLATION OF CARBOXYLIC ESTERS

**Abstract:** The disclosed **methods** for preparing and isolating carboxylic esters ensure a high **product** purity and minimize technical complexity. These **methods** are based on the reaction of a carboxylic acid with an alcohol in an aqueous medium. In some examples, the alcohol is used both for the esterification and for the precipitation of the salts, preferably ammonium salts, formed in the synthesis.

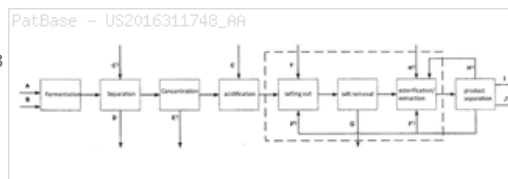
**Classifications:**

**International (IPC 8-9):** C07C51/02 C07C51/09 C07C51/42 C07C51/43 C07C51/493 C07C55/10 C07C67/08 C07C67/54 C07C67/56 C07C69/003 C07C69/34 C07C69/40 C07C69/675 C12P7/40 C12P7/62 (Advanced/Invention);

C07C51/02 (Core/Invention)

**CPC:** C07C51/42 C07C67/54 C07C67/56 C07C51/02 C07C51/09 C07C51/43 C07C67/08 C12P7/62 C07C55/10 C07C69/40 C07C51/493

**US:** 435/134



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| BR112016012699 A2  | 20170808         | BR20161112699      | 20141205         |
| CA2932376 AA       | 20160601         | CA20142932376      | 20141205         |
| CA2932376 C        | 20180724         | CA20142932376      | 20141205         |
| DE102013225215 A1  | 20150611         | DE201310225215     | 20131206         |
| EP3077359 A1       | 20161012         | EP20140814765      | 20141205         |
| IN201637018294 A   | 20160826         | IN201637018294     | 20160527         |
| TH173080 A         | 20180215         | TH20161003205      | 20141205         |
| US2016311748 AA    | 20161027         | US20140101899      | 20141205         |
| US9963414 BB       | 20180508         | US20140101899      | 20141205         |
| WO15082077 A1      | 20150611         | WO2014EP03254      | 20141205         |

**Priority:**

DE201310225215 20131206 WO2014EP03254 20141205

**Probable Assignee:** THYSSENKRUPP AG

**Assignee(s):** (std): THYSSENKRUPP AG ; THYSSENKRUPP IND SOLUTIONS AG

**Assignee(s):** THYSSENKRUPP INDUSTRIAL SOLUTIONS AG ; THYSSENKRUPPAG ; BOERNER ARMIN ; FRITSCH MARKUS ; KNEZ ZELJKO ; SHUKLOV IVAN

**Inventor(s):** (std): BOERNER ARMIN ; FRITSCH MARKUS ; KNEZ ZELJKO ; SHUKLOV IVAN

**Inventor(s):** ZELJKO KNEZ ; ARMIN BOERNER ; MARKUS FRITSCH ; IVAN SHUKLOV

**Agent(s):** KIRBY EADES GALE BAKER; THYSSENKRUPP INTELLECTUAL PROPERTY GMBH; THYSSENKRUPP NORTH AMERICA INC; KIRCHNER SVEN

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **METHOD** FOR PURIFYING AROMATIC AMINO ACIDS

**Abstract:** A **method** for purifying an amino acid from an initial mixture is disclosed, in which the amino acid includes an aromatic ring and has an acidity constant  $K_a$ , the **method** including:

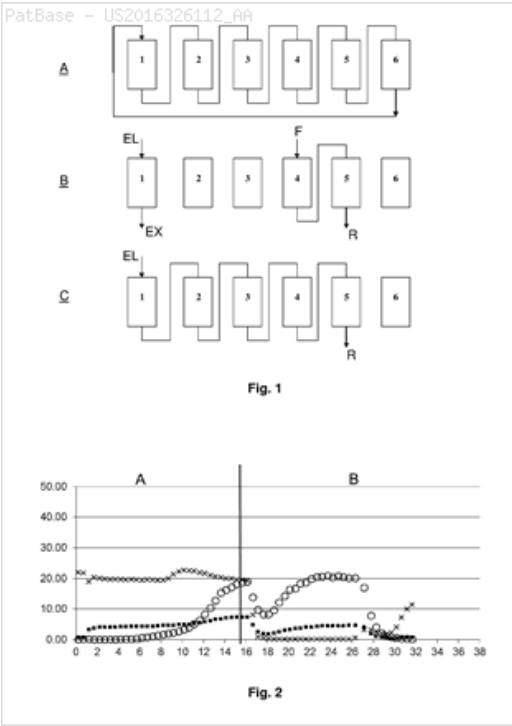
- a first step of putting the initial mixture into contact with a strong **cation resin**, at a pH greater than or equal to  $pK_a$ ; and
- a second elution step with an aqueous solution of **eluent** having a pH greater than the pH of the first step, giving the possibility of collecting a flow enriched in the amino acid.

**Classifications:**

**International (IPC 8-9):** B01J39/04 B01J39/20 C07B63/00 C07C227/40 C07C229/36 C07D209/20 C07D233/64 C12P13/22 C12P13/24 (Advanced/Invention)

**CPC:** B01J39/20 C07D209/20 C07C227/40 C07D233/64 B01J39/05

**US:** 548/339.1



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| BR112016015718 A2  | 20170808         | BR20161115718      | 20140107         |
| CN104761423 A      | 20150708         | CN201410274032     | 20140618         |
| EP3092218 A1       | 20161116         | EP20140701813      | 20140107         |
| JP2017506620 T2    | 20170309         | JP20160545823T     | 20140107         |
| JP6303017 B2       | 20180328         | JP20160545823T     | 20140107         |
| KR20160105827 A    | 20160907         | KR20167020336      | 20140107         |
| US2016326112 AA    | 20161110         | US20140109286      | 20140107         |
| WO15104464 A1      | 20150716         | WO2014FR50015      | 20140107         |

**Priority:**

WO2014FR50015 20140107

**Probable Assignee:** NOVASEP PROCESS

**Assignee(s):** (std): NOVASEP PROCESS

**Assignee(s):** SEPP NOVA TECHNOLOGY CORP

**Inventor(s):** (std): BAUDOUIN STANISLAS ; BRICHANT DAMIEN ; DAMIEN BRICHANT ; FREDERIC SCHAB ; ORIEZ VINCENT ; SCHAB FREDERIC ; STANISLAS BAUDOUIN ; VINCENT ORIEZ

**Agent(s):** BANDPAY AND GREUTER; POCHART FRANCOIS ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** Separation process

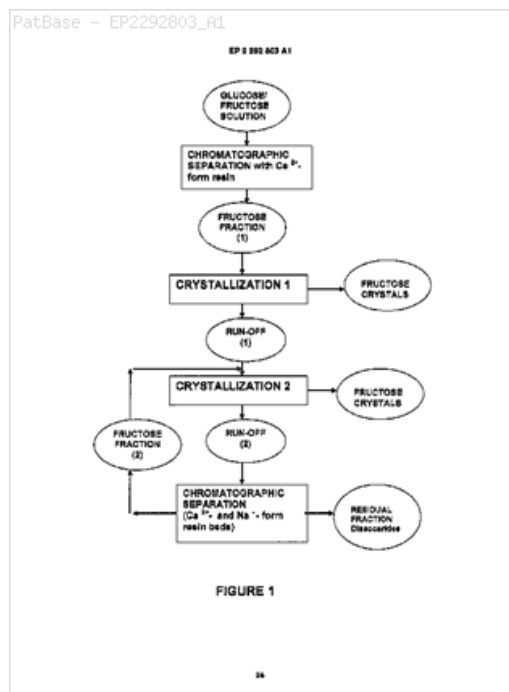
**Abstract:** The present invention relates to an improved process of producing crystalline fructose. The process is based on chromatographic fractionation of one or more fructose crystallization run-offs obtained from the crystallization, followed by introducing the fructose fraction(s) thus obtained into further crystallization for the **production** of crystalline fructose. The chromatographic fractionation is carried out in a separation system, which comprises a cation exchange resin in two different ion forms, whereby at least one of the resins is in a Ca<sup>2+</sup> form.

**Classifications:**

**International (IPC 8-9):** C13B30/00 C13B35/00 C13K11/00 (Advanced/Invention)

**CPC:** C13B30/00 C13B35/00 C13K11/00

**European:** C13B30/00 C13B35/00 C13K11/00



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| DE602009013206 D1  | 20130411         | DE200960013206T    | 20090707         |
| EP2292803 A1       | 20110309         | EP20090164728      | 20090707         |
| EP2292803 B1       | 20130213         | EP20090164728      | 20090707         |

**Priority:**

EP20090164728 20090707

**Probable Assignee:** DUPONT NUTRITION BIOSCIENCES APS

**Assignee(s):** (std): DANISCO ; DUPONT NUTRITION BIOSCI APS

**Assignee(s):** DUPONT NUTRITION BIOSCIENCES APS ; DANISCO A S

**Inventor(s):** (std): HEIKKILAE HEIKKI ; LEWANDOWSKI JARI ; NURMI JUHA

**Agent(s):** PURANEN MAIJA LIISA

**Designated states:** AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

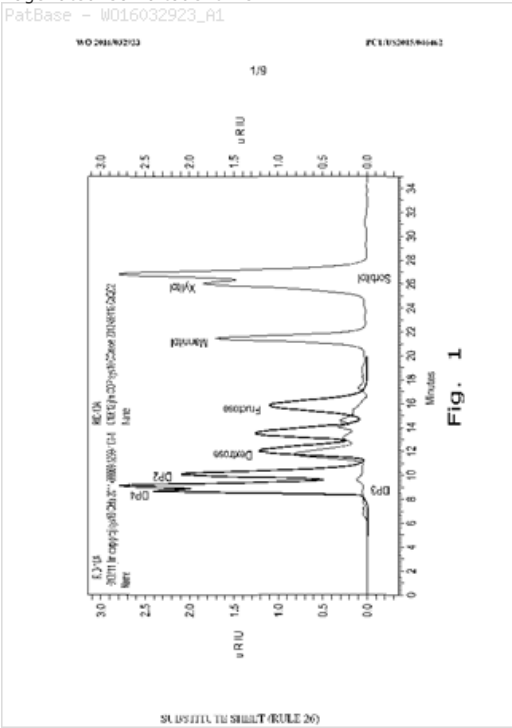
Title: **METHOD** FOR THE CHROMATOGRAPHIC SEPARATION OF SORBITOL FROM DEXTROSE

**Abstract:** A **method** for the continuous **production** and separation of sorbitol from dextrose to produce a high purity sorbitol **product** is described. The **method** comprises hydrogenating a dextrose composition in a continuous reaction to produce a mixture of sorbitol and dextrose, and contacting the mixture with a matrix containing a strong acid cation exchange resin in a simulated moving bed **chromatography** apparatus. An extract stream comprising 99.5 percent or greater sorbitol and a raffinate stream depleted of sorbitol and enriched in dextrose relative to the mixture are recovered from the apparatus. The **method** can also be used to produce hydrogenated maltodextrins and hydrogenated isomaltodextrins.

**Classifications:**

**International (IPC 8-9):** C07C29/141 (Advanced/Invention)

**CPC:** C07C29/132 C07C29/76



Family:

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| WO16032923 A1      | 20160303         | WO2015US46462      | 20150824         |

Priority:

US20140041407P 20140825

**Probable Assignee:** ARCHER DANIELS MIDLAND CO

**Assignee(s):** (std): ARCHER DANIELS MIDLAND CO

**Inventor(s):** (std): BINDER THOMAS P ; SOPER JOHN G

**Agent(s):** CRAFTON COREY M

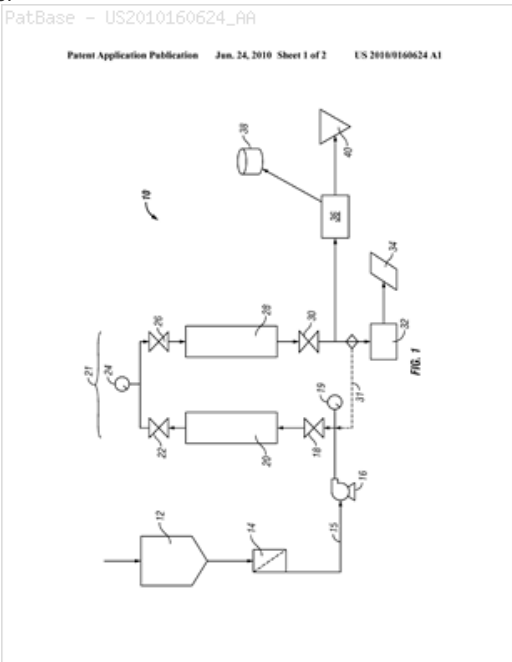
**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

**Title:** PROCESS FOR PRODUCING HIGH-PURITY SUCROSE

**Abstract:** Improved processes for the purification of raw or refined sugar, or sucrose, to produce sucrose and sucrose-related **products** having substantially no inorganic impurities are described, wherein the processes include the use of both cation and anion exchange resins. In accordance with the process, a sucrose starting material, such as refined sugar or invert syrup, is dissolved in water at a temperature sufficient to dissolve the sucrose **product** and produce a low viscosity sucrose solution having not more than about 76 weight percent solids. Thereafter, the process includes contacting the low viscosity sucrose solution with one or more ion exchange resin beds, which can be separate or mixed, for a time sufficient to yield a highly-purified sucrose **product** that is substantially free of inorganic elemental impurities.

**Classifications:**

**International (IPC 8-9):** C13B20/14 C13B35/06 C13B50/00 C13J1/06  
C13K13/00 (Advanced/Invention);  
C13B50/00 (Core/Invention)  
**CPC:** C13B20/142 C13B35/06  
**European:** C13B20/14B C13B35/06  
**US:** 127/46.2 127/46.200S 536/123.13 536/123.130P



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| CA2688855 AA       | 20100620         | CA20092688855      | 20091218         |
| MX2010000086 A1    | 20100809         | MX20100000086      | 20091221         |
| US2010160624 AA    | 20100624         | US20080340712      | 20081220         |

**Priority:**

US20080340712 20081220

**Probable Assignee:** RAGUS HOLDINGS INC

**Assignee(s):** (std): RAGUS HOLDINGS INC

**Inventor(s):** (std): CUNNINGHAM MARY LOU

**Agent(s):** LOCKE LORD BISSELL AND LIDDELL LLP,ATTN: IP DOCKETING; LOCKE LORD BISSELL AND LIDDELL LLP  
ATTN IP DOCKETING

**Title:** PROCESS FOR MANUFACTURE OF GADOFOSVESET TRISODIUM MONOHYDRATE

**Abstract:** This application relates to a process for making a pharmaceutically acceptable formulation of gadofosveset trisodium monohydrate, wherein the process uses no more than one chromatographic purification for removal of impurities.

**Classifications:**

**International (IPC 8-9):** A61K31/685 A61K49/00 A61K49/04 A61K49/10 C07B63/00 C07C229/10 C07D C07D233/02 C07D233/28 C07F19/00 C07F9/117 C07F9/12 C07F9/146 C07F9/572 C07F9/6506 (Advanced/Invention);  
C07D (Subclass/Invention)

**CPC:** A61K49/04 C07B63/00 C07D233/02 C07D233/28 C07F9/146 A61K49/106 A61K31/685 C07F9/117 C07F9/6506

**US:** 424/9.364 424/9.42 514/114 534/16

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AU2014244205 AA    | 20141002         | AU20140244205      | 20140313         |
| BR112015022859 A2  | 20170718         | BR20151122859      | 20140313         |
| CA2905941 AA       | 20150911         | CA20142905941      | 20140313         |
| CN105209439 A      | 20151230         | CN201480027015     | 20140313         |
| EP2970140 A1       | 20160120         | EP20140776124      | 20140313         |
| EP2970140 A4       | 20161026         | EP20140776124      | 20140313         |
| IL241510 A0        | 20151130         | IL20140241510      | 20140313         |
| JP2016514151 T2    | 20160519         | JP20160501943T     | 20140313         |
| KR20150130467 A    | 20151123         | KR20157028510      | 20140313         |
| MX2015012809 A1    | 20160531         | MX20150012809      | 20140313         |
| SG11201507458U A1  | 20151029         | SG20151107458      | 20140313         |
| TW201514188 A      | 20150416         | TW20140108791      | 20140312         |
| US2016016979 AA    | 20160121         | US20140774944      | 20140313         |
| WO14160039 A1      | 20141002         | WO2014US25687      | 20140313         |
| ZA201507463 A      | 20170125         | ZA20150007463      | 20140313         |

**Priority:**

US20130780132P 20130313      US20140774944 20140313      WO2014US25687 20140313

**Probable Assignee:** LANTHEUS MEDICAL IMAGING INC

**Assignee(s):** (std): LANTHEUS MEDICAL IMAGING INC ; LANTHEUS MEDICAL IMAGING INC A CORP ORGANISED AND EXISTING UNDER LAWS OF STATE OF DELAWARE

**Assignee(s):** ANKLEKAR TARAKESHWAR ; CHAMPION NICOLAS ; DYNAMIT NOBEL GMBH EXPLOSIVSTOFF U SYSTEMTECHNIK ; HALLER JAN ; HERKENRATH FRANZ WILLI ; JPMORGAN CHASE BANK NA COLLATERAL AGENT AS

**Inventor(s):** (std): ANKLEKAR SUNIL ; ANKLEKAR TARAKESHWAR ; CHAMPION NICOLAS ; FRANZ WILLI HERKENRATH ; HALLER JAN ; HERKENRATH FRANZ WILLI ; JAN HALLER ; NICOLAS CHAMPION ; TARAKESHWAR ANKLEKAR

**Agent(s):** PIZZEYS PATENT AND TRADE MARK ATTORNEYS; PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; MARKS AND CLERK; VOSSIUS AND PARTNER PATENTANWALTE RECHTSANWALTE MBB; KOGA TETSUJI; AOKI ATSUSHI; FUKUMOTO TSUMORU; ISHIDA TAKASHI; GOODSON SUSANNE H ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **METHOD** FOR MANUFACTURING A LITHIUM CHLORIDE SOLUTION FROM BRINE

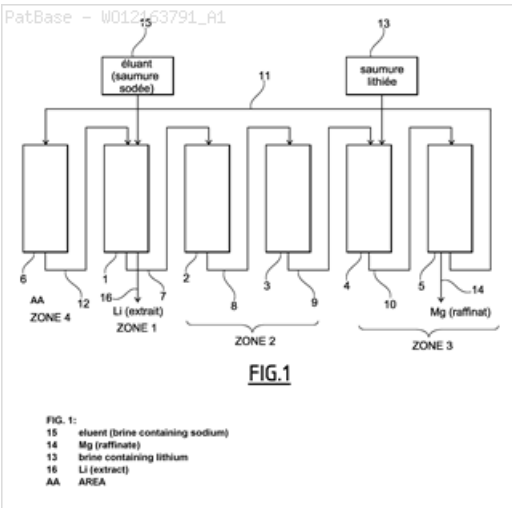
**Abstract:** The invention relates to a **method** for producing a lithium chloride solution from brine containing lithium, characterized in that the separation of lithium chloride from the other components of the brine containing lithium is carried out using an ion-exchange resin arranged in at least one column (1, 2, 3, 4, 5, 6), and in that said separation is carried out using the sequential simulated moving bed (**SMB method**).

**Classifications:**

**International (IPC 8-9):** B01D15/18 C01D15/04 C01D3/16 C02F1/42 (Advanced/Invention)

**CPC:** C01D15/04 B01D15/185 C01D3/16

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**Family:**

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**Probable Assignee:** ERAMET

**Assignee(s):** (std): BERNARDI JULIE ; ERAMET ; GOUZE ANTOINE ; LE QUESNE YVES

**Inventor(s):** (std): BERNARDI JULIE ; BERNARDI JULIE ANNE ; GOUZE ANTOINE ; LE QUESNE YVES ; LE QUESNE YVES MARIE BERNARD

**Inventor(s):** YVES MARIE BERNARD LE QUESNE ; JULIE ANNE BERNARDI

**Agent(s):** CABINET LAVOIX; JACOBSON CLAUDE ET AL

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW