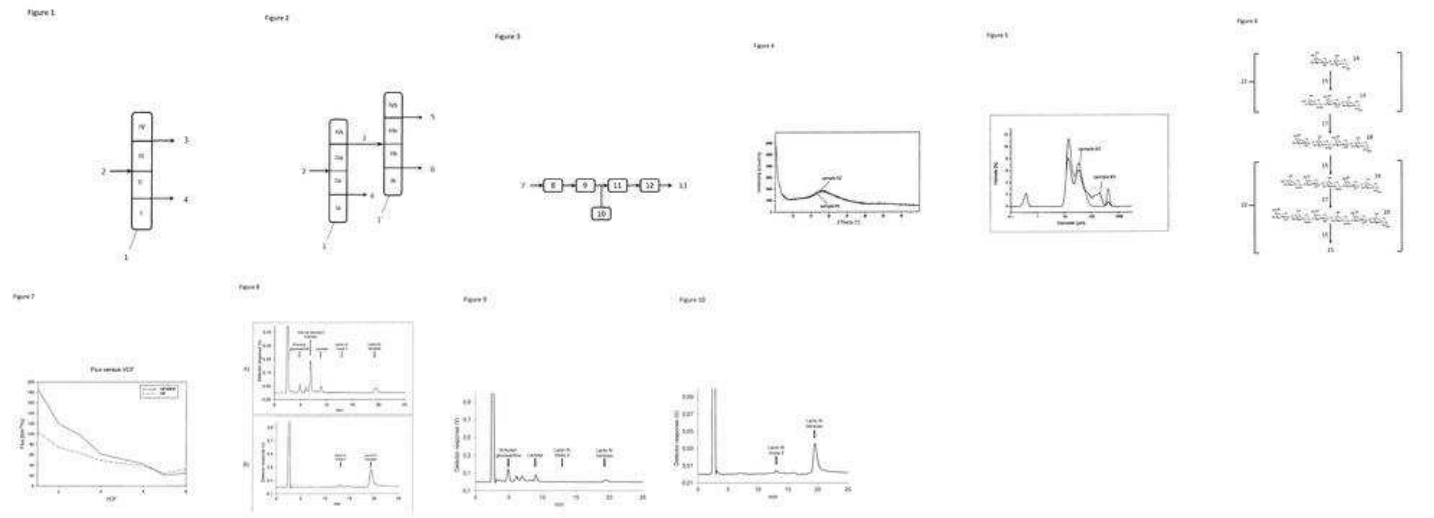
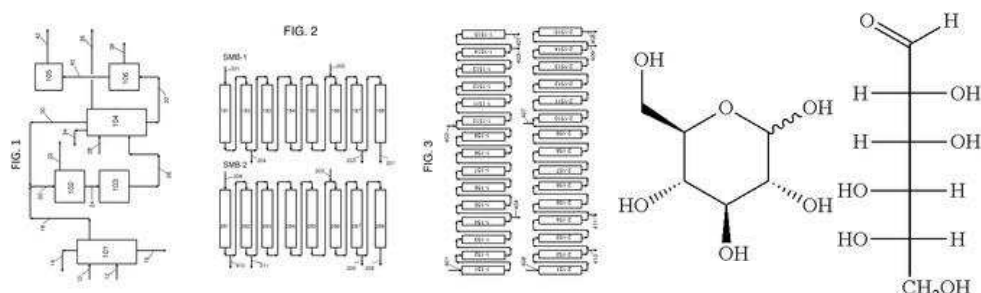




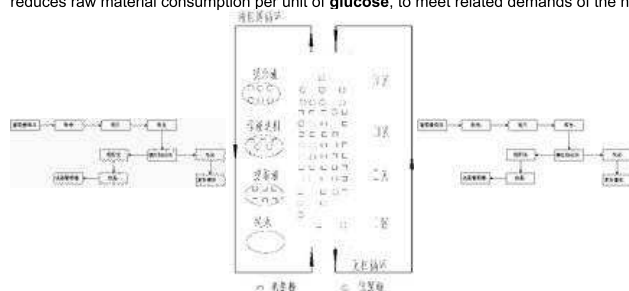
Disclosed is a process for the production of **L-glucose** from a mixture of L-mannose and **L-glucose** to provide a high purity **L-glucose** product. More particularly, the invention relates to a process for the isomerization of mixtures of L-mannose and **L-glucose** to favor the epimerization or transformation of the L-mannose into **L-glucose** combined with the selective removal of impurities and the selective separation of **L-glucose** by a multi-stage **simulated moving bed** SMB separation process integrating ion exclusion and isomer separation. The process is useful for providing a simplified and economic continuous processing route to providing pure **L-glucose** from mixtures of **L-glucose** and L-mannose in the presence of inorganic and organic salts and other sugars such as L-arabinose. **L-glucose** is useful as a sweetener, a laxative and as a therapeutic agent.



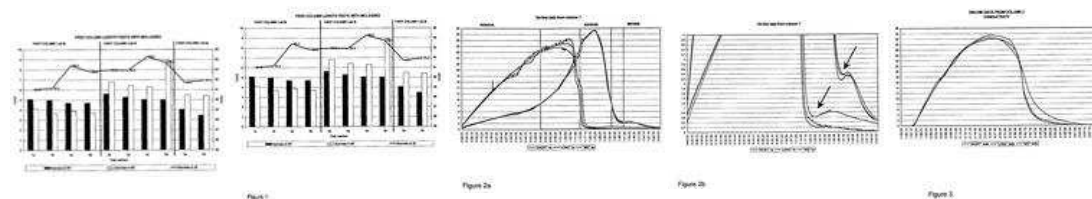
The invention discloses a method for purifying trehalose and **glucose** by an SSMB (sequential **simulated moving bed**) chromatography. The method comprises the following step: separating trehalose and **glucose** by adopting SSMB chromatography equipment by taking the pretreated mixed liquid **glucose** of trehalose and **glucose** as a raw material, taking deionized water as an eluent at the operation temperature of 50-70 DEG C and taking sodium-type or potassium-type strong-acidity positive ion gel resin as a chromatographic support phase, thereby obtaining the high-purity trehalose and achieving high yield. The whole technology is low in running cost and high in automation degree; the production energy consumption is reduced, continuous production can be realized, and the production efficiency is improved.



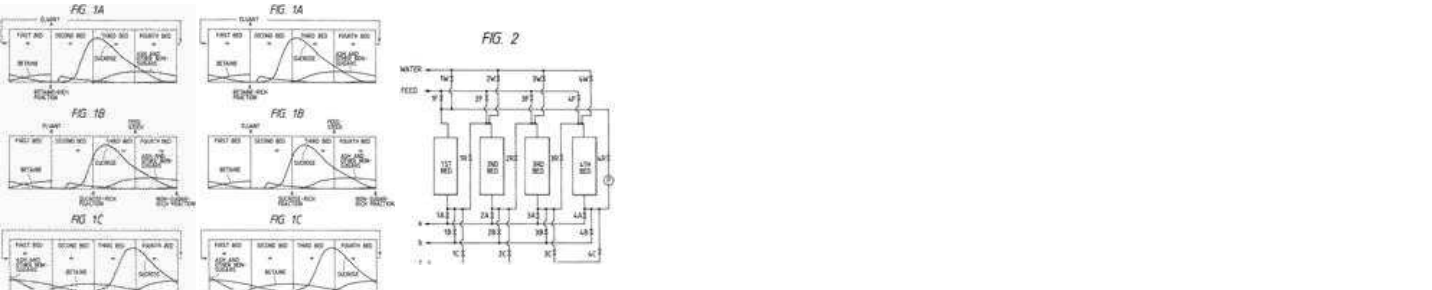
The invention discloses a method for processing a **glucose** mother liquid by a **simulated moving bed**, which comprises the following steps of: after decoloring and ion exchange, separating a byproduct, namely a **glucose** mother liquid which is generated in a process of producing crystalline **glucose** by a **simulated moving bed** to separate the **glucose** from oligosaccharide; delivering an extracting liquid obtained from separation by the **simulated moving bed** into **glucose** crystallizing equipment to produce crystalline **glucose**; pre-condensing, decoloring, ion-exchanging and condensing a residual liquid obtained from the separation, to obtain a malt syrup product. The method for processing the **glucose** mother liquid by the **simulated moving bed** has the advantages that the process is simple; various components in the **glucose** mother liquid are separated by a physical way through the **simulated moving bed**; by consumption of same corn or starch raw material, the crystal yield improving amplitude of the **glucose** can reach 11.5%; and meanwhile, maltose and other components in the **glucose** syrup are fully used to produce the malt syrup. At present that the grain safety policy is tense, the method improves the yield of the **glucose** and reduces raw material consumption per unit of **glucose**, to meet related demands of the national policy.



The invention relates to an equipment for fractionating a solution by a sequential SMB process, which equipment comprises a feed column and one or several other columns, which include a chromatographic separation **resin bed**. The equipment of the invention is characterized in that the feed column consists of or comprises a compartment where the **resin bed** is shallower than that of one or more of the other columns of the equipment. The invention also relates to a method for fractionating a solution into two or more fractions with the equipment of the invention.

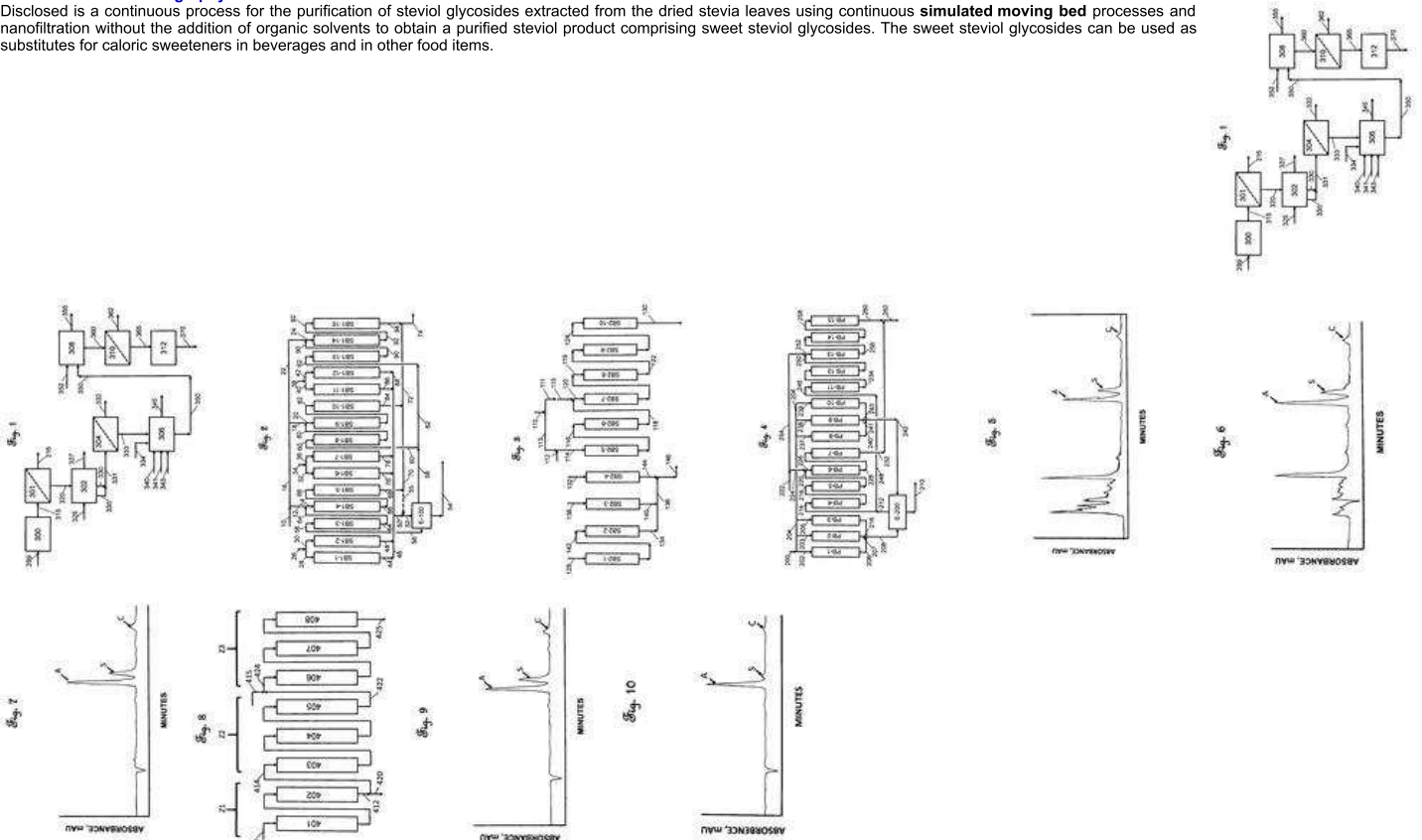


The method of chromatographic separation comprises: a feed-withdrawal step in which, with liquid flow being permitted from the first to the third unit beds in the **simulated moving bed**, an eluant is fed into the first unit **bed** and the feed stock is fed into the third unit **bed** while, at the same time, part of the effluent from the first unit **bed** is withdrawn from the system as a fraction rich in component B and the effluent from the third unit **bed** is withdrawn from the system as a fraction rich in component C; a circulation stage in which, with liquid circulation being permitted through the **simulated moving bed**, the liquid in the **simulated moving bed** is moved downstream without liquid feed to or withdrawal from the **simulated moving bed**; and a withdrawal stage in which, with liquid flow being permitted from the second to the first unit beds, the eluant is fed to the second unit **bed** and the effluent from the first unit **bed** is withdrawn from the system as a fraction rich in component A; wherein, after the above three stages are performed, the same stages are repeated except that feed stock and eluant are fed to, and effluents are withdrawn from unit beds which exist immediately downstream of the respective corresponding unit beds.

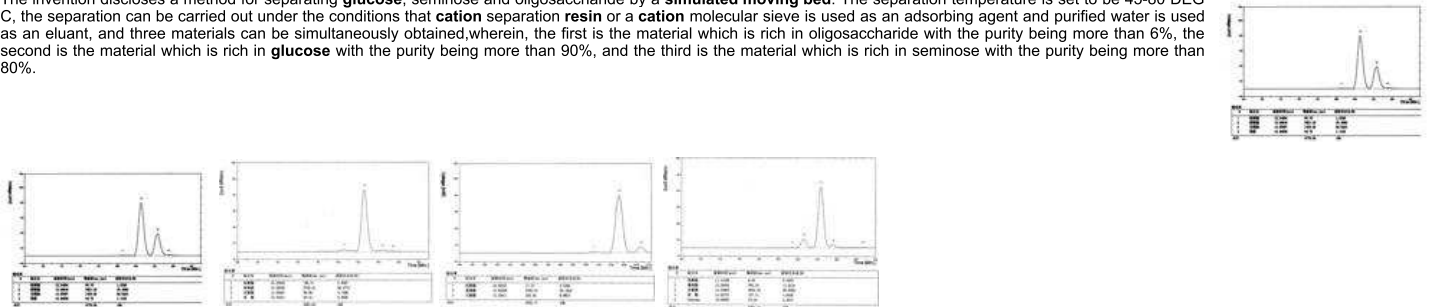


A method for fractionating a solution into two or more fractions. More particularly the invention relates to a method for fractionating a solution by a chromatographic **simulated moving bed** (SMB) process in which the dissolved substances present in the feedstock are separated in the partial packed beds, and the formed separation profile is circulated more than once or less than once through the chromatographic separation loop during one cycle.

Disclosed is a continuous process for the purification of steviol glycosides extracted from the dried stevia leaves using continuous **simulated moving bed** processes and nanofiltration without the addition of organic solvents to obtain a purified steviol product comprising sweet steviol glycosides. The sweet steviol glycosides can be used as substitutes for caloric sweeteners in beverages and in other food items.



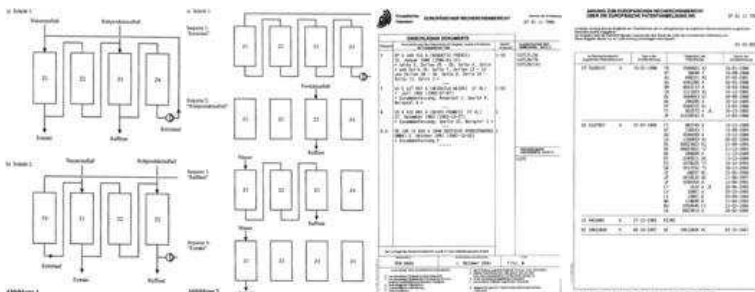
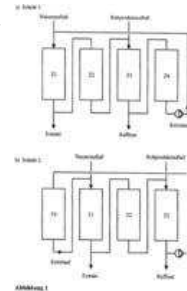
The invention discloses a method for separating **glucose**, semiose and oligosaccharide by a **simulated moving bed**. The separation temperature is set to be 45-80 DEG C, the separation can be carried out under the conditions that **cation separation resin** or a **cation** molecular sieve is used as an adsorbing agent and purified water is used as an eluant, and three materials can be simultaneously obtained, wherein, the first is the material which is rich in oligosaccharide with the purity being more than 6%, the second is the material which is rich in **glucose** with the purity being more than 90%, and the third is the material which is rich in semiose with the purity being more than 80%.



The invention relates to a method for purifying tagatose by using sequential **simulated moving bed chromatography** (SMB). Pretreated tagatose crude syrup is used as a raw material, an SSMB is utilized to purify the tagatose, deionized water is used as eluting agent, the working temperature of the separating column is 50-70 DEG C, and a calcium-type strongly-acidic **cation gel resin** is used as a chromatographic stationary phase, thereby obtaining the high-purity tagatose and implementing higher yield. The whole technique has the advantages of low operating cost, low production energy consumption, zero discharge and high degree of automation, and can implement continuous production and enhance production efficiency.



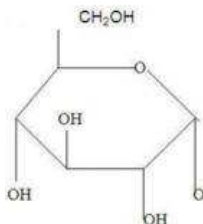
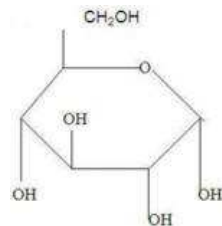
Production of sorbitol by hydrogenation of standard **glucose**, desalting and concentrating to up to 70% dry substance, as well as chromatographic separation of the sugar alcohol mixture by the Sequential **Simulated Moving Bed** (SSMB) process on a strongly acidic **cation** exchanger is such that each step is divided into 4 sequences. Production of sorbitol by hydrogenation of standard **glucose**, desalting and concentrating to up to 70% dry substance, as well as chromatographic separation of the sugar alcohol mixture by the Sequential **Simulated Moving Bed** (SSMB) process on a strongly acidic **cation** exchanger is such that (i) each step is divided into 4 sequences, viz (1) a first 'recycle' sequence, (2) a 'crude product flow' sequence, (3) a 'raffinate' sequence and (4) an 'extract' sequence; (ii) sequences 2 and 4 are effected simultaneously in one step and the raffinate fractions of sequences 2 and 3, which comprises a marketable non-crystallizing sorbitol solution, are collected; and (iii) in order to influence the separation effect with regard to the **resin** loading, the composition of the extract and raffinate and the sorbitol content of the extract fraction the column **bed** volumes are altered by altering the duration of one or more sequences and/or the flow-through rate such that different extract fractions contain pure or highly-pure sorbitol, the resulting raffinate- and extract-fractions then being concentrated to solutions with up to 70% dry substance.



The invention discloses a method for preparing high-purity polyfructose through **simulated moving bed chromatography**. The method comprises the following steps: (1) performing decolorization, debittering and desalting treatment on an inulin crude extraction solution to obtain an inulin refined solution; (2) adding the inulin refined solution obtained in the step (1) into a **simulated moving bed chromatographic separation device**, and performing separation and purification by using water as an eluting agent, wherein the **simulated moving bed** comprises regions I-IV, each region comprises 1-6 chromatographic columns, the chromatographic columns of the region I and the region II are filled with strongly acidic **cation exchange resin**, and the chromatographic columns of the region III and the region IV are filled with **cation molecular sieves**; and (3) performing reduced-pressure evaporation and concentration on the obtained polyfructose solution to obtain the high-purity polyfructose. According to the invention, the purity of the obtained polyfructose is high, the total column efficiency is high, the consumption of a mobile phase is low, continuous operation can be realized, the utilization ratio of raw materials is improved, and the production cost is lowered.

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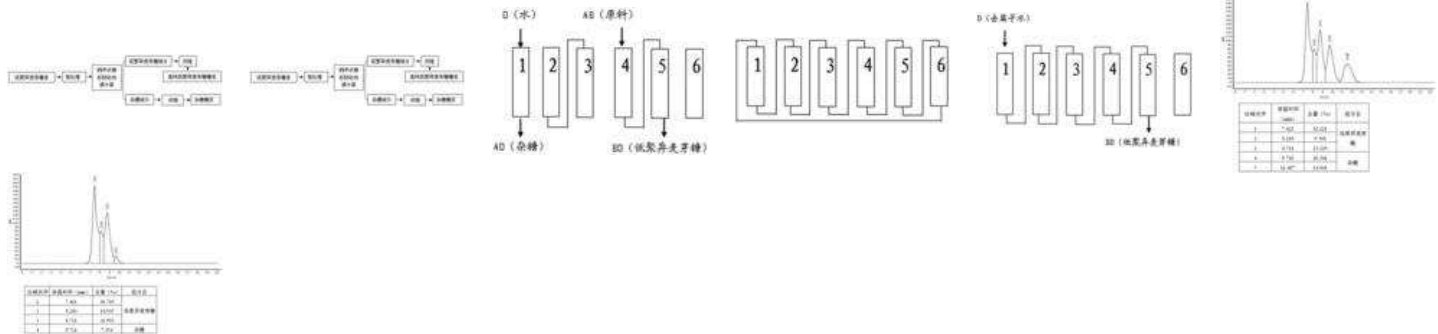
The present invention discloses an anhydrous **glucose** production processes. The present invention includes a conversion section, the liquefaction stage, the mashing stage, finishing stage, chromatographic separation and evaporation of the crystal for six major sections, a complete system is disclosed anhydrous **glucose** industrial manufacturing processes flow, through the conversion of a conventional adjusting, liquefaction, saccharification, finishing stage of processing parameters, the evaporating section increases the chromatographic separation prior to crystallization, **chromatography** techniques used to produce **glucose**, not only solves the crystalline **glucose** yield is low, the production cycle as long as the mother liquor drainage problems, but simplifies the crystallizing step, increasing the economic value.



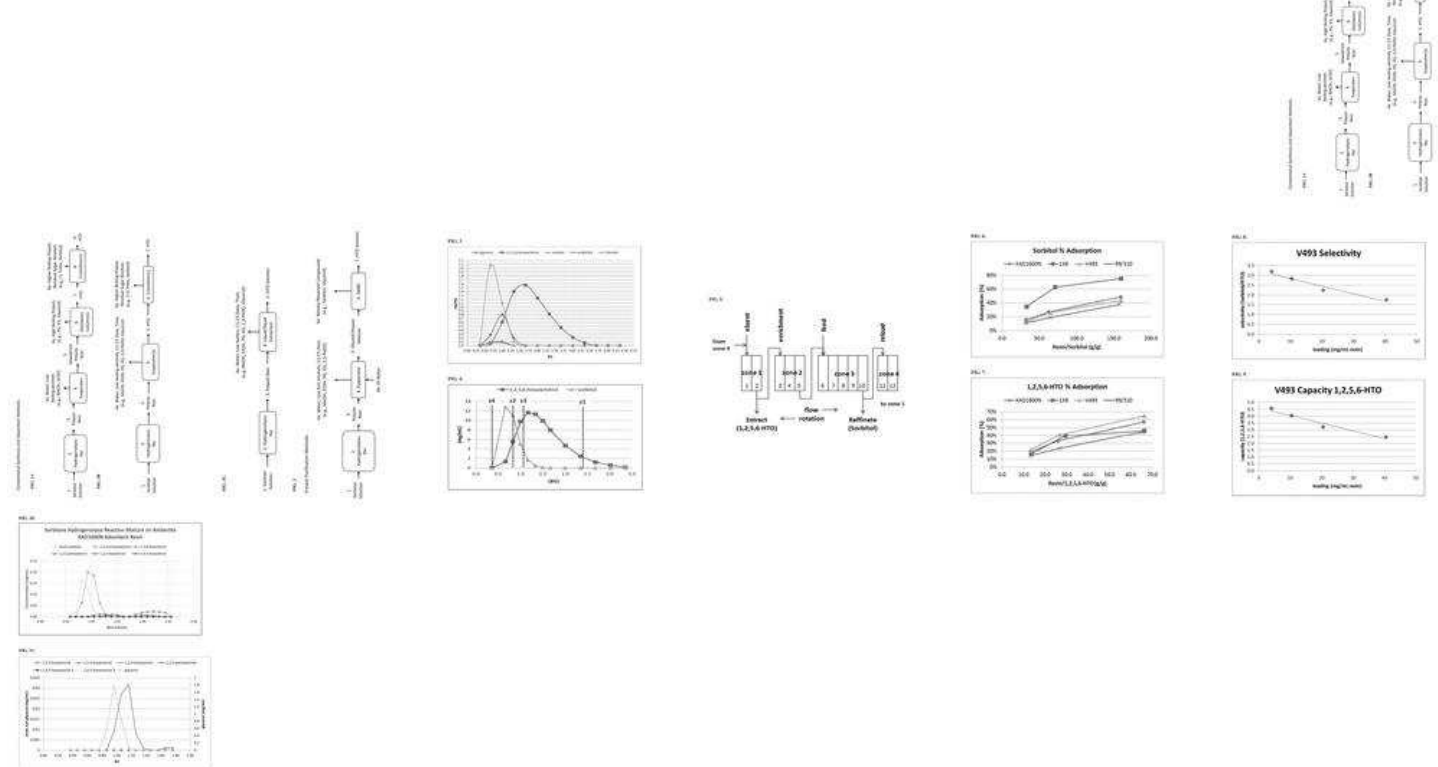
精制淀粉 (绝干)	1163 kg
Na ₂ CO ₃ 100%	1.1 kg
CaCl ₂ 100%	0.78 kg
HCl 100%	18.36 kg
NaOH 100%	12.56 kg
柠檬酸 100%	0.36 kg
NaHSO ₄ 100%	0.46 kg
耐高温α-淀粉酶	0.7 L
复合糖化酶	1.0 L
NaOH 100% (用于废水中和)	6.26 kg

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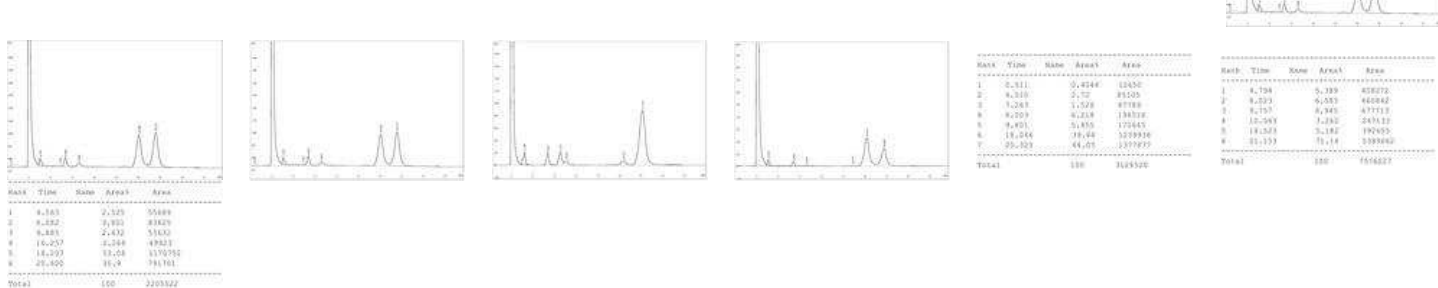
The invention relates to a method for purifying isomaltose hypgathar by virtue of sequential **simulated moving chromatography**, wherein preprocessed isomaltose hypgathar syrup is used as a raw material; isomaltose hypgathar is purified by adopting sequential **simulated moving chromatography** equipment; deionized water is used as the eluent; the working temperature is at 50-70 DEG C; sodium type strong acidic cationic gel **resin** is used as working **resin**; isomaltose hypgathar syrup with high purity is obtained; the higher yield is realized. The method disclosed by the invention is low in operation cost and production energy consumption, high in automation degree, continuous for production and high in production efficiency.



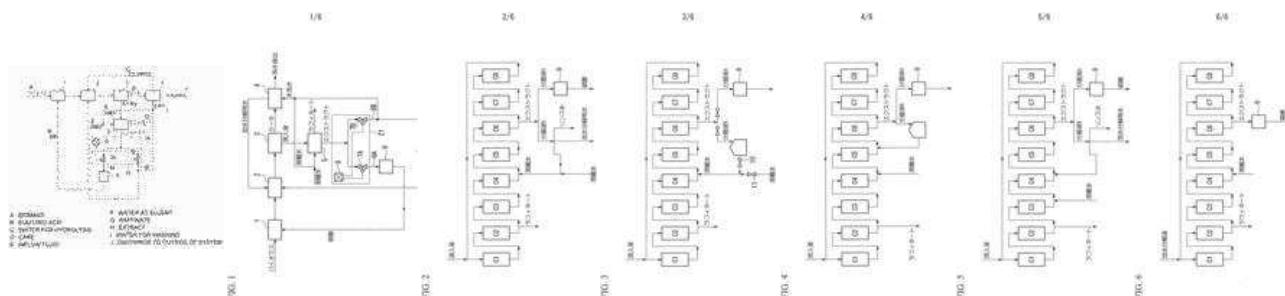
Disclosed herein are methods for synthesizing 1,2,5,6-hexanetetrol (HTO), 1,6 hexanediol (HDO) and other reduced polyols from C5 and C6 sugar alcohols or R glycosides. The methods include contacting the sugar alcohol or R-glycoside with a copper catalyst, most desirably a Raney copper catalyst with hydrogen for a time, temperature and pressure sufficient to form reduced polyols having 2 to 3 fewer hydroxy groups than the starting material. When the starting compound is a C6 sugar alcohol such as sorbitol or R-glycoside of a C6 sugar such as methyl glucoside, the predominant product is HTO. The same catalyst can be used to further reduce the HTO to HDO.



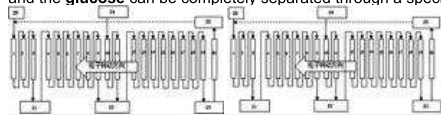
The invention discloses a method for preparing high-purity seaweed ketone liquid **glucose** by virtue of a new technology of a **simulated moving bed**. A solution containing seaweed ketone sugar and isomaltulose components is taken as a raw material, and is separated through the **simulated moving bed** after being diluted, decolored, hybridized and separated, so as to obtain a new product of seaweed ketone liquid **glucose** with the purity being greater than 70%; and meanwhile, an isomaltulose liquid in a raw material mother liquid is recycled, so that the additional value of the product is improved. The high-purity seaweed ketone liquid **glucose** prepared by the method has the advantages of high purity, high yield, low cost and good stability, and is suitable for industrialized production; equipment is simple and convenient to operate; and the method is a feasible way for achieving diversified comprehensive utilization of sugaring resources and research and development of new sugar products.



A. GENERATOR
B. FAULTED AREA
C. FAULT LOCATION
D. LINE
E. FAULT INDICATOR
F. FAULT LOCATION
G. FAULT LOCATION
H. FAULT LOCATION
I. FAULT LOCATION
J. FAULT LOCATION
K. FAULT LOCATION
L. FAULT LOCATION
M. FAULT LOCATION
N. FAULT LOCATION
O. FAULT LOCATION
P. FAULT LOCATION
Q. FAULT LOCATION
R. FAULT LOCATION
S. FAULT LOCATION
T. FAULT LOCATION
U. FAULT LOCATION
V. FAULT LOCATION
W. FAULT LOCATION
X. FAULT LOCATION
Y. FAULT LOCATION
Z. FAULT LOCATION



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$$0.975 T Q_n + (T_{n+1} - T^n) Q_n^* + 1.025 T Q_n \leq$$

$$0.975 \text{ T } Q_{\text{A}} + (T_{\text{A},1} - T_{\text{A}}^{(1)}) Q_{\text{A}}^* (1.025 \text{ T } Q_{\text{A}}) \quad 0.9975 \text{ T } Q_{\text{A}} + (T_{\text{A},1} - T_{\text{A}}^{(1)}) Q_{\text{A}}^* (1.0025 \text{ T } Q_{\text{A}}) \quad 0.975 \text{ T } Q_{\text{B}} + (T_{\text{B},1} - T_{\text{B}}) Q_{\text{B}} (1.025 \text{ T } Q_{\text{B}}) \quad 0.9975 \text{ T } Q_{\text{B}} + (T_{\text{B},1} - T_{\text{B}}) Q_{\text{B}} (1.0025 \text{ T } Q_{\text{B}}) \quad Q_{\text{H}} = \frac{C_1(Q_{\text{A}} + B) + C_2(Q_{\text{A}} + B - Z) + C_3(Q_{\text{A}} + B) + C_4 Q_{\text{A}}}{1}$$

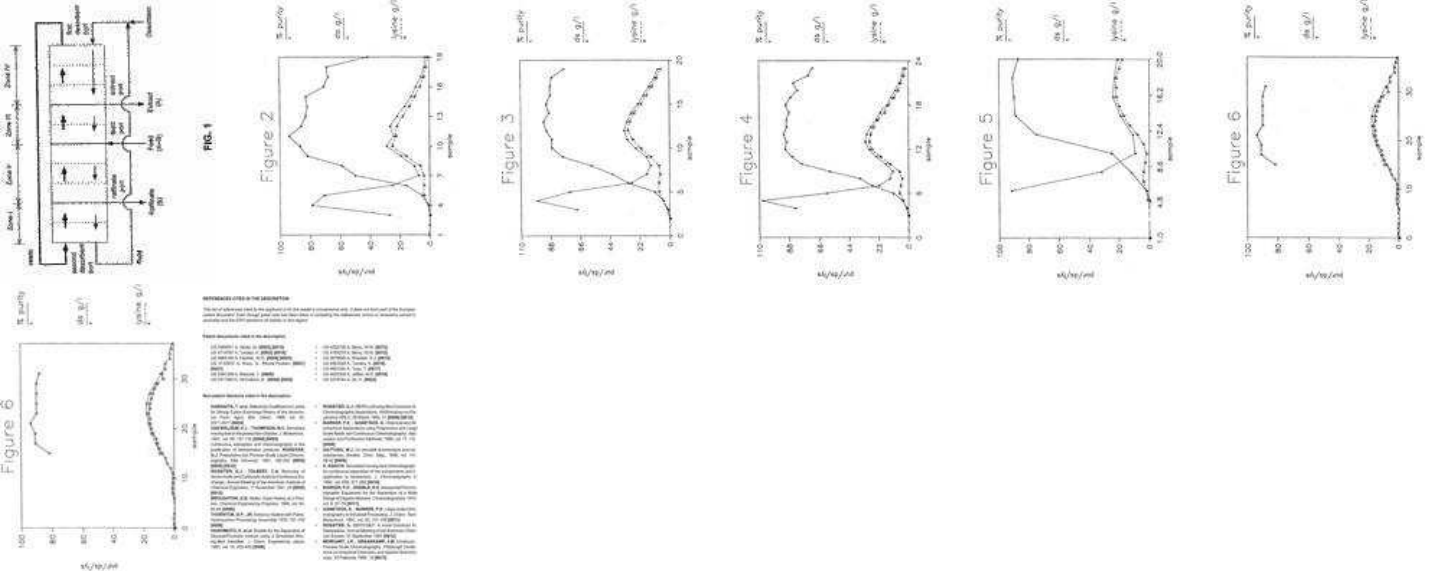
$$n = \sum_{i=1}^4 C_i$$

$$Q_0 \cdot T = Q_0' \cdot (T_{1-2} - T^1)$$

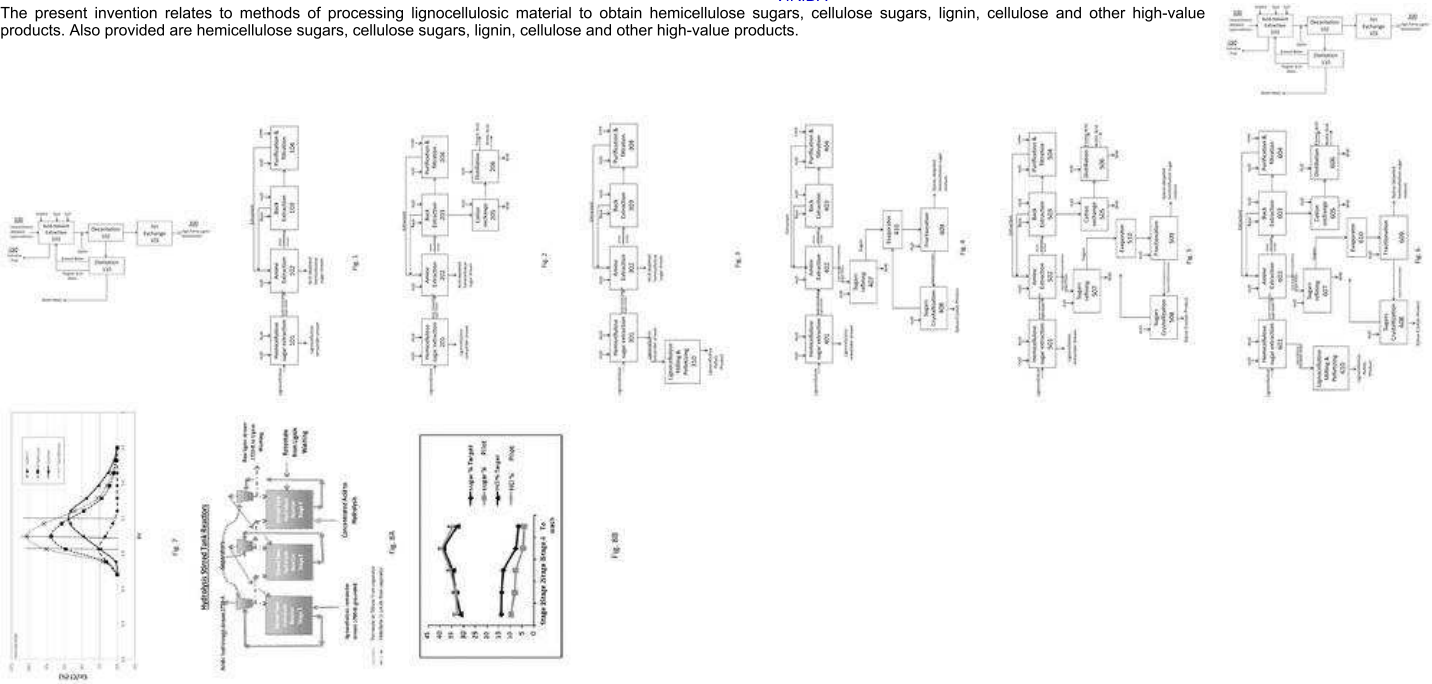
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$$Q_1 \geq Q_2 \geq Q_3 \geq Q_4 \begin{cases} E \geq Ch \Rightarrow Q_1 \geq Q_3 \Rightarrow R \leq S \\ R \geq Ch \Rightarrow Q_2 \geq Q_4 \Rightarrow E \leq S \end{cases}$$

This invention relates to a method for separating an amino acid from a solution containing said amino acid and impurities, wherein the means for said separating is **simulated moving bed chromatography** with a strong **cation** exchange chromatographic material. Preferably, the method comprises (a) selecting a **simulated moving bed** chromatographic apparatus comprising one or more chromatographic columns connected in series, said column or columns containing a strong **cation** exchange chromatographic material, and sequentially comprising a first desorbent port, an extract port, a feed port, a raffinate port and a second desorbent port; and (b) simultaneously: (i) contacting, through said feed port, said feed solution with said strong **cation** exchange chromatographic material; (ii) contacting, through said first desorbent port, a basic aqueous eluant with said strong **cation** exchange chromatographic material; (iii) withdrawing, through said second desorbent port, a solution comprising water; and (iv) withdrawing, through said extract port, an aqueous solution comprising said basic amino acid and a lower level of said impurities than in said feed solution. <IMAGE>



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.



The invention relates to a method for separating and purifying oligo-xylose by using a **simulated moving bed**. The method comprises the following steps of: performing preprocessing such as decolorization, deinoning, condensation and the like on feed liquor obtained by performing enzyme hydrolysis on feed solution, namely hemicellulose; filtering and deoxidizing the preprocessed hemicellulose hydrolysis liquid with high purity water for later use; feeding the preprocessed hemicellulose hydrolysis liquid into a chromatographic separation device of the **simulated moving bed** to perform separation so as to obtain oligo-xylose crude liquor which is rich in oligo-xylose components; and performing reduced pressure evaporation concentration or excipient spray drying on the oligo-xylose crude liquor obtained by the separation to obtain oligo-xylose syrup or powder. In the method, the chromatographic separation device of the **simulated moving bed** (SMB) is used to extract the oligo-xylose, a plurality of adsorption posts is connected in series to form a closed loop, the positions of the inlet and outlet of each strand of materials are changed by continuously switching valves, and the relative movement of solid and liquid phases is realized, so that different components are separated and extracted. The method not only has the advantage of simple absorption operation of a fixed **bed** but also has the continuous operation capability of the **moving bed**, so that the method is suitable for large-scaled industrialized production.

