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Suntar

三达膜术 点石成金

Vision 愿 景

To be a global leader in the development of advanced membrane technology for water purification,wastewater treatment and cleaner production.

成为应用先进膜技术发展水质净化、清洁生产与循环经济的全球领先企业

Mission 使 命

To clean the environment and generate the wealth for our future.

致力蓝天碧水事业，追求伟业光大目标

Philosophy 理 念

To partner our investors,staff and business partners through sharing our technology know-how for mutual benefit.

与股东、员工、合作伙伴共享成果、共创价值、共谋发展

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Founder / 创始人介绍

Dr. Lan Weiguang, an adjunct professor and doctoral supervisor of the National University of Singapore, Peking University, Xiamen University and Nanchang University, is a well-known membrane expert and is known as "Master of Membrane in China", "Father of Nanofiltration", etc by Chinese and foreign media. Dr. Lan was awarded the “Outstanding Young Chinese Entrepreneur in Asia” by Asia Weekly, the “Outstanding Alumni Award” by National University of Singapore, as well as the “Outstanding Entrepreneur Award” and the “Golden Bridge Award” by the Chinese government authorities.

蓝伟光博士是新加坡国立大学、中国北京大学、厦门大学及南昌大学兼职教授、博士生导师。蓝博士在膜技术领域深耕多年、享有盛誉，被中外媒体誉为“中国膜术师”、“技术成就膜王”，“纳滤之父”等。曾荣获《亚洲周刊》“亚洲杰出华人青年企业家奖”、新加坡国立大学“杰出校友奖”、中国国务院侨办“杰出创业奖”、中国技术市场协会“金桥奖”等多项荣誉。

About Suntar / 公司简介

Founded in 1996, Suntar is one of the first companies in China engaged with industrial membrane separation. It provides professional integrated solutions on filtration and purification for various industries, such as biological, chemical engineering, pharmaceutical, food and beverage, etc. It also provides water treatment solutions for different areas including industry, municipal administration and civil environmental protection, and so on to meet the various demands of different customers. The business of Suntar covers the whole membrane industry value-chain including process development, engineering design, equipment manufacturing, system integration and installation & commissioning.

Through years of research and practice, Suntar has developed a series of membrane application techniques and process to help our customers integrate and innovate the up- and down-stream of the processing, which result in clean production and energy saving. As a leading company in filtration and purification, Suntar supplies customers with core technology of most advanced separation and purification technologies. Suntar takes on the core technology for separation and purification process from different customers and becomes the “Hidden Champions” of membrane applications in Chinese pharmaceutical, food and beverage, and wastewater treatment industries.

With a total land area of 100000m^2, Suntar Technological Park is located in Zhongya Industrial Zone, Xinglin District, Xiamen City. The park includes the production line of membrane materials, design and manufacturing of membrane facilities, membrane office building, auxiliary and hospitality facilities, and so on. With the heavy investment in the R&D of advanced technology and attracting high-quality personnel and projects, the Suntar Technological Park will become the first Membrane Industrialization Base in China with membrane researches, membrane process development, membrane talents education, and membrane material and equipment production.

三达膜创建于1996年，是最早进入中国市场从事工业膜分离应用的公司之一。专业为生物、化工、制药、食品饮料等行业提供过滤及纯化综合解决方案，以及为工业、市政、民用环保等领域提供水处理解决方案，满足不同客户的高度差异化需求。业务领域集膜软件开发、工程设计、设备制造、系统集成、现场安装与售后服务为一体。

三达经过多年的研究与实践，成功开发出一系列膜应用技术与工艺，帮助客户进行生产工艺的上下游技术整合与创新，实现清洁生产、节能环保。三达作为中国过滤纯化的领军企业，为客户承担分离提纯工艺的核心关键技术，是中国制药、食品饮料、水处理膜应用行业的“隐形冠军”。

三达科技园位于厦门杏林，占地10万平方米。包括膜材料生产线，膜设备设计制造，膜科技大楼、生活配套设施等。三达科技园着力于技术、人才与项目的引进，正致力于建成中国首家集膜技术研究、膜工艺开发、膜人才培养、膜材料生产、膜设备制造于一体的膜产业基地。

R&D Capabilities / 研发实力

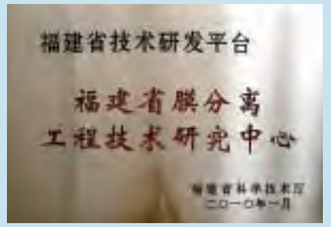
Suntar owns a Post-doctorial Research Centre and the Membrane Technology & Engineering Research center of Fujian, which are granted by Personnel Department of PRC. Suntar also makes collaborations with a lot of well-known domestic and overseas universities and institutions. The R&D centre of Suntar, equipped with complete experimental instruments and various membrane resources, has membrane separation lab, moving bed separation technology lab, environmental water treatment lab, analytical lab and electrical control lab. We have developed more than 1000 membrane separation technologies and processes and owns almost 100 patents and rights to the use of patents.

Membrane technology, a novel chemical separation technology, can only bring full benefits to our clients after integrating the up- and down-stream processes. Therefore, Suntar organizes specific lab and pilot scale tests based on the technical requirements of the clients to get through the critical process. Meanwhile the world leading industrial 3D design software is adopted for the design of industrial scale systems to stimulate the installation sites and operation of the clients. Moreover, the strong professional after-sales service team is powerful guarantees of sound, safe and efficient operation of the systems. The successful operation of more than 1000 Suntar's industrial systems has accumulated rich and valuable technical and engineering experiences.

三达旗下拥有国家人事部授予的博士后科研工作站和福建省膜分离工程研究中心，并长期与国内外多所著名高校及科研院所合作。三达研发中心建有膜分离实验室、移动床分离技术实验室、环保水处理实验室和化学分析实验室，电气控制实验室，配备了国内最齐全的实验设备和种类丰富的膜资源，先后开发出1000多项膜分离技术工艺，拥有近100项专利和专利使用权。

膜作为一种新兴的化工单元分离技术，需要整合客户上下游工艺才能发挥其独特效果，为此根据客户的需求组织严谨完善的小试、中试实验从而打通关键工艺，同时采用全球领先的三维设计软件进行方案设计，对设备与客户实地的安装现场进行模拟装配；强大的工程技术队伍为客户提供最及时周到的服务；数千套工业系统的运行维护，使三达积累了丰富的工程实施经验，保证设备安全高效运行。

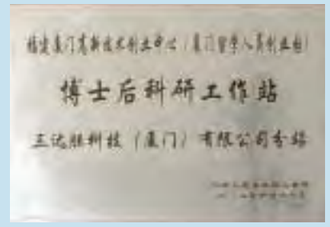
Fujian Membrane Technology & Engineering Research Center



Fujian Membrane Technology & Engineering Research Center, based on Suntar Membrane Technology (Xiamen) Co., Ltd., is an integrated research team with high-level and multi-principles, consisting of doctoral supervisors, doctoral and master students. To date, thousands of projects have been completed in this research centre and most of them have been successfully applied on a variety of areas, such as pharmaceuticals, dyestuff, seawater desalination, environmental protection, foodstuff, chemical engineering, metallurgy, water treatment, and so on. The project conversion rate is greater than 65%. So far, the Center has applied for 42 patents and 25 authorizations, 15 of which are authorized invention patent, 10 of which are utility models, and 6 of which are appraisals of scientific and technological achievements.

福建省膜分离工程技术中心是以三达膜科技（厦门）有限公司为依托，由博士生导师，博士和硕士研究生组成的一支高层次、多学科结合的科技队伍。中心成立至今，完成上千个项目工艺开发，并且大部分成功应用到医药、染料、海水淡化、环保、食品、化工、冶金、水处理等领域，项目转化率65%以上。至今，中心申请专利42项，授权25项，其中发明授权专利15项，实用新型10项，科技成果鉴定6项。

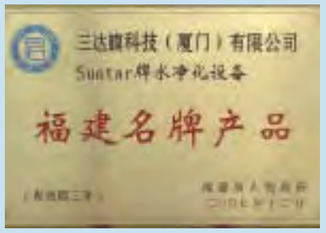
Suntar Postdoctoral Workstation was established in October 2002. With its management principles of standardized administration, strict requirement, making innovation, pursuing super excellence, the workstation is devoted to explore and develop different techniques and products, such as membrane separation technology, moving bed separation technology, MBR, membrane fouling, environmental water treatment, etc. To date, Suntar Postdoctoral Workstation has been in charge of or participated in 15 research projects and obtained 4 invention patents, 1 utility model. 10 academic articles ranked No.1 are published in various journals above the provincial level and 6 postdoctoral has been awarded.

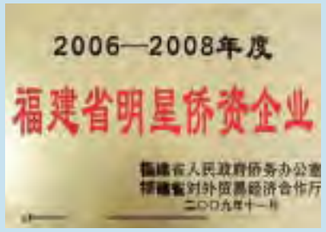


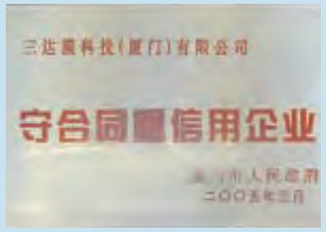
三达博士后科研工作站于2002年10月成立，以规范管理、严格要求、勇于创新、追求卓越为管理原则，致力于探索和研究膜分离技术、移动床分离技术、膜生物反应器、膜污染、环保水处理等技术与产品开发。至今，三达博士后工作站完成主持或参与的研发课题项目共有15个，取得发明专利4项，新型专利1项，在省级以上刊物发表排名第1的论文10篇，出站博士后6人。

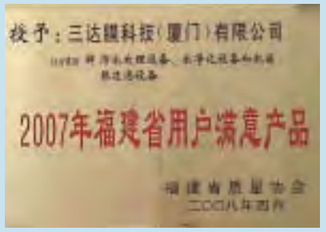
Suntar Postdoctoral Workstation

Our Honors / 企业荣誉









Core Technology / 核心技术

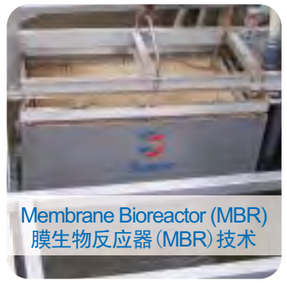
With the rich experience in developing and integrating processes, Suntar can provide comprehensive separation and purification solutions for clients according to different industries and corporations. Meanwhile, Suntar owns a strong professional engineering team, which can industrialize the results of pilot scale tests immediately and provide customers with personalized "turn-key" project.

三达丰富的工艺开发和工艺整合经验，可以根据不同行业、不同企业的情况为客户提供全面的分离纯化解决方案。同时，三达拥有专业的工程化队伍，能够将中试开发的成果迅速工业化，为客户提供个性化的交钥匙工程。


Flow-cel UF Membrane
Flow-cel板式膜分离技术


Ceramic Membrane
陶瓷膜分离技术


Spiral Wound Membrane
卷式膜分离技术


Membrane Bioreactor (MBR)
膜生物反应器（MBR）技术

Suntar


Tubular Membrane
管式膜分离技术


PP Membrane
PP膜固液分离技术


Continuous IX
连续离子交换技术


Chromatography
工业色谱分离技术

FLOW-CEL UF EQUIPMENT
三达板式膜设备

Suntar flow-cel membrane separation technology has broken through the bottleneck of traditional filtration and separation technology in fermentation industry. Our technology ensures better filtrate quality with lower running cost. Nearly 1000 sets of Suntar Flow-Cel UF systems with a total membrane area up to hundreds of thousands square meters have been sold and installed, with handling capacity over 500000 tons per day.

We believe that technology innovation and R&D are the driving force and guarantee for the long-term development of Suntar. Suntar upgraded the old flat membrane system and developed the new flow-cel system successfully. With novel template adopted, the effective membrane area has been increased by nearly 43% under constant hydraulic conditions, which reduces the client's investment cost significantly. The compatibility between the old and the new system is perfect. Customers can upgrade their old version without any system adaptations.

三达的板式膜分离技术彻底突破了发酵行业传统过滤分离技术的瓶颈，解决了滤液质量差、处理成本高等难题。现销售运行的系统近1000套，每天有膜面积达数十万平方米的三达板式膜系统在运行，日处理各种发酵液超过50万吨。

我们深知，技术创新与科技研发是三达长远发展的动力和保障。三达在原有板式膜系统的基础上不断升级，成功开发出Flow-cel系统。新系统选用新型膜板，膜元件有效面积大幅增加，比同等膜板规模的膜面积增大了43%，降低了客户的投资。该系统完全兼容原有设备，用户无须改动原有设备结构即可实现升级。

01 Principal Features

The molecular weight cutoff can be chosen from 10000 to 200000, and with high filtration accuracy and filtrate quality

Eliminating concentration polarization, strong fouling resistance and easy cleaning

Specially suitable for the treatment of high viscosity or high suspended solids containing fluids

Individual modules can be operated and standby independently or extended gradually, fully auto control is easy

The minimum membrane area for inspection or replacement is only 0.1m^2, allowing low membrane replacement cost for accidental damage

02 主 要 特 点

截留分子量从10000－200000，过滤精度高，滤液质量好

减轻浓差极化，抗污染能力强，易清洗

适合处理高粘度、高含固量料液

系统内各组件可独立运行或待机，也可逐级拓展，易实现全自动控制

检查和更换的最小单位面积为0.1m^2，意外损坏的更换成本最低

Technology & Application
三 达 工 程 应 用

CERAMIC MEMBRANE EQUIPMENT
三达陶瓷设备

Ceramic membranes are unsymmetrical porous membranes made from Alumina, Zirconia or Titania, with pore size ranging from 0.01 to 10 μm which covers microfiltration, ultrafiltration and nanofiltration. The membrane with different inner diameters can be selected according to the viscosity and the suspended solids content of the feed solution to achieve the requirement of specific clarification and separation.

Suntar's ceramic membrane core is superior to other similar products due to its higher operation flux (15% to 30%), lower filtration resistance, lower energy consumption and easy cleaning.

Allowing continuous feeding, permeating and concentrating, fully automatic control can be achieved by Suntar ceramic membrane systems. There are still some other advantages for these systems, such as accurate diafiltration process and periodic back pulse system, and so on.

陶瓷膜是以氧化铝、氧化铁、氧化锆等材料经特殊工艺制备而成的多孔非对称膜。过滤孔径一般为0.01微米-10微米，涵盖微滤、超滤和纳滤。可根据物料的粘度、悬浮物含量选择不同孔径的膜，以达到澄清分离的目的。

三达陶瓷膜芯与同类陶瓷膜芯比，运行通量高15-30%，过滤阻力小，能耗较低，易清洗。

三达陶瓷膜系统能够连续进料、连续出滤渣和滤液，实现全自动控制，具有精确的浓缩和加水洗涤、定期反洗等功能。

01 Principal Features

Applicable for filtration at high temperature

Mechanically strong, highly resistant to wide ranges of pH values, and resistant to organic solvents and strong oxidants

High concentration factor, low water consumption, and small waste discharge

Long service life, low operation cost and highly cost effective

02 主 要 特 点

耐高温，适用于高温过程过滤

耐酸碱、耐有机溶剂及抗氧化性好

浓缩倍数高，降低用水量，减少废水排放

膜芯使用寿命长

Technology & Application
三 达 工 程 应 用

SPIRAL WOUND MEMBRANE EQUIPMENT
三达卷式膜设备

Suntar provides spiral wound membrane systems with a variety of filtration accuracy for different requirements, including spiral wound MF membrane systems, spiral wound UF membrane systems, spiral wound NF membrane systems and RO membrane systems.

Spiral wound UF Membrane Systems, with molecular weight cutoff in the range of 1000 to 200000, the large molecular impurities are rejected while target products penetrate through the membrane. On the other hand, the target products can be rejected while water and other small molecular impurities penetrate to achieve decolorization, decontamination and product rating.

Spiral wound NF membrane systems with molecular weight cutoff in the range of 200 to 1000, can dialyze up to 90% of NaCl, which are suitable for desalination, reduction of monosaccharide and concentration processes, etc.

RO separation technology is widely applied in water treatment process by removing impurities including inorganic ions, bacteria, virus, organics and colloids, etc. from raw water to get pure water of higher quality.

Suntar, as one of the first companies engaged with extending membrane separation technology, has rich experiences in design, manufacturing, installation, operation and maintenance of spiral wound membrane systems.

三达提供各种过滤精度的卷式膜系统，根据不同的分离要求，可选择卷式微滤膜、卷式超滤膜、卷式纳滤膜和反渗透膜系统。

卷式超滤膜截留分子量1000-200000，将大分子杂质截留，透过目标产物；也可截留目标产物，透过水和小分子杂质达到脱色、除杂及产品分级的目的。卷式纳滤膜截留分子量从200-1000，能使90%以上的NaCl透析，适用于脱盐、脱单糖、浓缩等多种工艺。反渗透最普遍的应用便是在水处理工艺中，将原水中的无机离子、细菌、病毒、有机物及胶体等杂质去除，以获得高质量的纯净水。

三达作为中国最早从事膜分离技术推广的公司之一，拥有丰富的卷式膜系统设计、制造、安装、运行、维护经验。

01 Principal Features

Extremely high packing density of the membrane modules and low manufacturing cost per unit area

Low operating pressure, and low requirements on mechanical parts, e.g. pumps

Compact structure, small floor coverage, and low investment cost

02 主 要 特 点

膜芯填装密度高，单位面积膜造价低

操作压力低，对泵等机械部件要求低

结构紧凑，占地小，投资成本低

Technology & Application
三 达 工 程 应 用

MEMBRANE BIOREATOR（MBR）
三达膜生物反应器

MBR is a new waste water treatment process which integrates the advanced membrane separation technology with the traditional biological treatment process. It utilizes the microporous structure of the membrane to retain the aerobic and anaerobic bacteria in the reactor, and increases the degradation efficiency of COD, BOD via increasing the biomass concentration, extending the solid retention time (SRT). Meanwhile, the membrane can reject all the suspended solids, bacteria, and most of the soluble micro-molecular components. As a result, the effluent is very clear, the quality is stable. Hence the effluent can be recycled directly.

There are two main models for MBR: Hollow Fiber and Flat Sheet. Based on the outstanding R&D strength of the group and its German subsidiary in the field of MBR, Suntar has developed a novel model of MBR: Sheet MBR. This module combines the advantages of both Hollow Fiber and Flat Sheet modules and overcomes the shortcomings of hollow fiber and flat sheet MBR, such as aeration area and membrane broken existed in the former as well as low packing density and high cost for the later.

Suntar Sheet MBR has obtained the national patent.

膜生物反应器是一种把先进膜分离技术和传统生物处理技术集成一体的新型废水处理工艺。它利用膜将微生物截留在反应器中，提高了反应器内的污泥浓度，从而大幅提升降解效率；同时膜能截留所有的悬浮固体、细菌和大部分可溶性大分子物质，出水澄清，水质稳定，可直接回用。

MBR主要有中空纤维膜与平板膜两种组件形式，三达依托集团及旗下德国公司在MBR领域卓越的研发实力，开发出新一代的薄板MBR膜组件。该组件兼并中空纤维膜MBR和平板膜MBR的优点，克服了中空纤维膜MBR存在曝气死区、膜丝易断裂以及平板膜MBR装填密度小、成本高的缺点。

三达薄板MBR已获得国家专利。

01 Principal Features

High biomass concentration（12000mg/l－14000mg/l) and treatment efficiency

Extremely high quality of effluent offers the possibility for the water reuse

Small footprint due to omission of the secondary clarifier and short retention time

Less activated sludge production, no sludge explanation impact

Fast start-up, modular system design, easy modification and upgrade

02 主 要 特 点

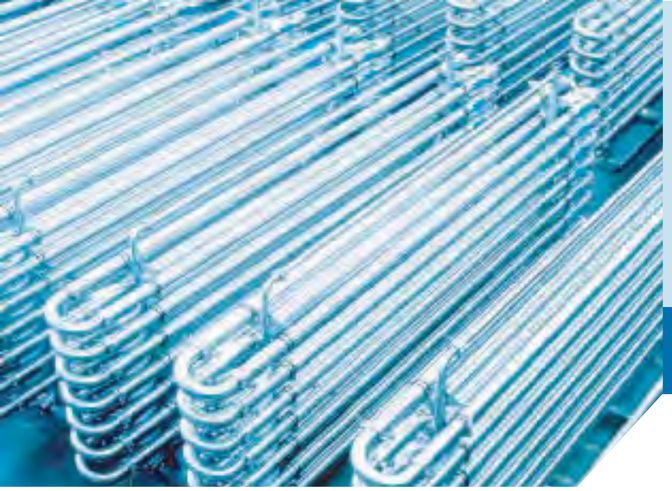
污泥浓度高（12000mg/l－14000mg/l），处理效率高

出水水质极高，澄清透明，实现中水回用

无需设置二沉池，停留时间短，系统占地小

与其他好氧工艺相比污泥产量少，不受污泥膨胀影响

流程启动快，系统模块化设计，升级改造容易



TUBULAR MEMBRANE EQUIPMENT
三达管式设备

The tubular membrane equipment has similar applications with spiral wound membrane facilities. However, the cost and energy consumption are higher than spiral wound membrane technology. Hence it is mainly applied on the treatment of fluids with high SS content, high viscosity and high DS, which are difficult to be handled with spiral wound membrane units.

Due to the special superiorities on the easy replacement of membrane cartridges and strong & robust housing with long life-cycle, A19 tubular UF systems have occupied over 50% share of the juice clarification market.

Tubular NF technology is an excellent solution to concentrate fluids with high DS, high viscosity and high SS. It is widely applied in the production of active, acid and direct dyestuffs as well as fluorescent whiteners, etc.

管式膜设备与卷式膜设备的应用范围相似，但投资、能耗比卷式膜设备高，一般应用在卷式膜难以处理的高含固量、高粘度、高悬浮物料液。

A19管式超滤系统的最大特点是简单快速更换膜芯，坚固耐用的外套可以保留，降低使用成本。目前，A19管式超滤设备以其独特的优势占领了50%以上的果汁澄清市场。

管式纳滤技术为高含固量、高粘度、高悬浮物的料液浓缩提供了优良的解决方案，广泛应用于活性染料、酸性染料、直接染料及荧光增白剂等产品。

01 Principal Features

- Allowance of high SS fluid due to the wide flow channels with simple pretreatment
- High membrane flux, high concentration factor and high solids content
- Simple cleaning process and long lifecycle of membrane cartridges
- Lower packing density and higher cost per unit area than the spiral wound configuration

02 主 要 特 点

- 料液流道宽，允许高悬浮物含量的料液进入膜组件，预处理简单
- 膜通量大，浓缩倍数高，达到较高含固量
- 膜清洗简单，膜芯使用寿命长
- 膜填装密度低、单位膜面积造价相比卷式膜高

Technology & Application
三 达 工 程 应 用

PP/PE MEMBRANE EQUIPMENT
三达固液分离设备

PP and PE membranes are MF membranes applicable for fluids with high solids content and/or high SS. The inner flow channel is around 5mm and effective membrane pore sizes are 0.2 μm and 1 μm, respectively.

Due to the excellent resistance against abrasion, PP membrane is specific for the separation of hard particles from liquids, where abrasive particles can damage the active layer of the hard membrane materials within a short operating time, such as ceramic membranes and metal membranes.

PP/PE膜是一种适合处理高含固量、悬浮物料液的微滤膜。具有5毫米宽的内径流道，有效膜孔径分别为0.2微米和1微米。

PP膜具有优异的耐硬颗粒性能，特别适合从液体中分离硬颗粒（而对于一些硬质膜材料，比如陶瓷膜和金属膜对硬颗粒尤其敏感，一些磨蚀性颗粒可在很短的运行时间内破坏它们的活性层）。

- PP/PE膜组件具有良好的化学稳定性，这两种膜组件尤其适合化学工业
- PP/PE管式膜的两端密封采用焊接方式，无需其它密封部件

01 Principal Features

- Welded modules, no additional sealing compounds
- Symmetric membrane structure with excellent abrasive resistance
- Completely trap of bacteria, colloids and solids
- Excellent chemical stability within the pH range from 0 to 14
- Resistant against abrasive substances due to a symmetrical membrane structure
- Optimal use of the membrane area by well defined flow conditions
- The most effective cleaning of the membrane by back flushing
- Practically no dead zones on the concentrate side
- Long life time, high operational safety

02 主 要 特 点

- 两端密封采用焊接方式，不再需要其它密封部件
- 对称的膜结构，有非常优良的耐磨损性能
- 完全截留细菌，胶体和固体颗粒
- 可以耐受所有Ph值范围(0-14)，化学稳定性好
- 规范的流体状态，最优的使用膜面积
- 采用最有效的膜清洗方法——反冲洗
- 在实际运用中，浓缩侧不存在死区
- 使用寿命长，操作安全性强

CONTINUOUS IX EQUIPMENT
三达连续离交设备

Continuous IX Technology is a complete innovation of separation technology, which is different from traditional fixed bed, pulsed-bed, simulated moving bed techniques. Continuous IX system consists of resin column sets and porous distributed rotary valves. According to the technology design, the resin columns can be distributed into several functional areas. Once the raw material entered the system, the switching of rotary valves ensures the sequential processes of adsorption, washing, resolving and regeneration by each resin columns with different function. As a result, the traditional process with regular intervals is changed to continuous process.

Suntar continuous IX system adopts advanced design concepts and exquisite production technology, which can be applied in various areas with easy operation. The system can be flexibly adjusted according to different separation requirements. So far Suntar has successfully developed several sets of continuous IX systems for different areas in China.

连续离子交换技术是一种完全革新的分离工艺技术，不同于传统的固定床、脉冲床、模拟移动床等工艺。连续离子交换系统由树指柱系列和多孔分配旋转阀构成，根据工艺设计可把树脂柱系列分为几个功能区，物料进入系统后，通过旋转阀切换使每根树脂柱依次经过各个功能区实现同时吸附、水洗、解析、再生等全部工艺过程，从而把传统固定的间歇过程变成连续的过程。

三达连续离子交换系统采用了先进的设计理念和精湛的制作工艺，用途广泛，操作方便，可以根据不同产品分离要求灵活调整工艺。目前三达已在国内不同行业成功的开发应用了数十套系统。

01 Principal Features

Stable product components and concentration

Resin used can be decreased by 50-90%, the rinse water consumption can be lowered by up to 50-70%

Consumption of chemicals such as regenerant and eluant can be decreased by 30-60%, operation cost and wastewater discharge are greatly decreased

Compact structure, easy to be installed at any location, easy to be integrated with existing processes and equipments

Full-automatic and preprogrammed control ensures the stable and reliable operation and avoids man-made operating mistakes

02 主 要 特 点

保持料液中产品的成分和浓度稳定

树脂用量减少50-90%，洗涤水用量最高节约50-70%

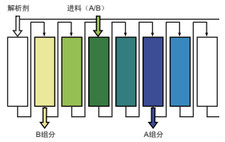
再生剂和洗脱剂等化学品消耗也可降低30-60%，大幅度降低运行成本和污水排放量

设备紧凑，易于安装在任何位置，易与旧的生产过程和设备匹配

全自动化运行，保证了连续稳定的生产

Technology & Application
三 达 工 程 应 用

CHROMATOGRAPHY EQUIPMENT
三达工业色谱设备



Chromatography technology is an advanced separation method based on intermolecular affinity differences. It is one of effective strategies to separate materials with similar physical and chemical properties. Due to the slight differences between various constituents, the interactions between different constituents and molecular in the stationary phase are different. Hence the velocities are different and the compounds can be separated. The utilization of multi-unit design and automatic switching ensures the continuous flow and extension of the total separation phase. As a result, higher resolution and efficiency are achieved.

Suntar chromatography system is a kind of continuous chromatography separation technology. It is designed on the basis of tradition fixed-bed chromatography separation to achieve continuous production and exploit the advantage of chromatographic separation technology with fully and rationally utilization of the stationary phase. Therefore, the whole system has high quality, high efficiency, good stability and low energy consumption.

工业色谱技术是基于分子间亲和力差异的先进分离手段，是分离物理及化学性质比较相近的物质的有效方法之一。是利用了不同组分之间性质上的微小差异，使不同组分与固定相分子之间作用力差异从而导致不同组分在固定相中的移动速度不同而实现分离。其采用多个小单元设计，通过自动切换机构实现物料的连续，延长分离总柱床的长度从而达到更高的分离度和更好的分离效果。

三达工业色谱系统是一种连续色谱分离技术，是在传统固定床色谱分离的基础上经过科学设计，充分合理的利用固定相，从而实现连续生产、充分发挥色谱分离技术的优点，而达到优质、高效、稳定、节能降耗的工艺效果。

01 Principal Features

Stable product components and concentration

Selectively separate substances with similar properties

Consumption of resins and eluents can be reduced by more than 50% and 70% respectively

Effectively improve product purity and concentration, and save the cost for subsequent processes

Compact structure, require small floor space

Multi-column system ensures the flexible change of production process according to different requirements

Full-automatic and preprogrammed control system ensures the stable and reliable operation and avoids man-made operating mistakes

02 主 要 特 点

保持料液中产品的成分和浓度稳定

可有选择性的分离性质相近的物质

可以节省50%以上的树脂用量和70%以上的洗脱剂用量

可以有效提高产品料液的纯度和浓度，节省后续工艺成本

设备紧凑，占地空间小

采用多柱系统，可根据生产需要灵活变更生产工艺流程

全自动、程序化的操作控制，运行稳定，避免人工操作失误

Tailor-made integrated solutions for you

为您量身度作的综合解决方案

Suntar

—— Antibiotics
抗 生 素

抗生素是由微生物（包括细菌、真菌、放线菌属）或高等动植物在生活过程中所产生的具有抗病原体或其它活性的一类物质。自1943年以来，青霉素应用于临床，现抗生素的种类已达几千种。在临床上常用的亦有几百种，其主要是从微生物的培养液中提取的或者用合成、半合成方法制造。

我国抗生素主要生产技术水平已位居世界前列。国内抗生素发酵与提纯自动化控制、基因工程菌种选育高产菌株、中间体酶法合成等高新技术相继产业化。在发酵技术上，头孢菌素C产生菌头孢霉菌基因改造产能力提高了一倍；提取技术方面，6-APA、7-ACA酶法直通车工艺广泛普及。

6-APA、7-ACA酶法直通车工艺的实现，实际上是以膜技术的应用为基础的。与传统工艺相比，直通工艺对滤液质量提出了更高的要求，而以膜技术为核心的提取工艺的革新正是保障滤液质量的关键。

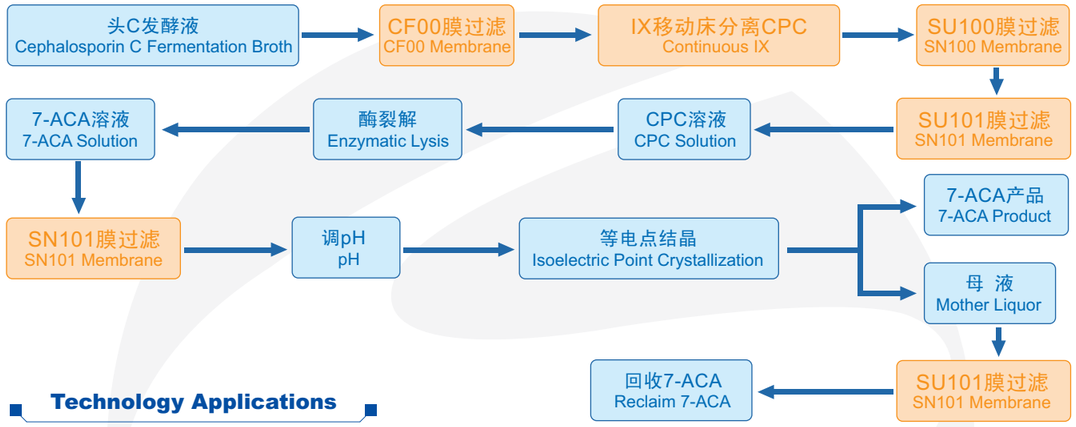
以膜过滤、移动床分离技术为核心技术的新工艺在抗生素行业的应用还有红霉素……

三达改变中国——我们所使用的抗生素背后有三达的功劳

1999年，三达突破头孢菌素生产的重大关键技术，成功开发基于膜分离过程的7-ACA生产。中国人每天所接触到的抗生素等药片，医院里面所用的各类药品，大部分都同三达有关。三达在中国的医药领域膜技术应用市场占有率50%。

工 艺 应 用

- 酶法直通生产，避免了挥发性溶媒的使用，实现清洁生产，大幅降低成本
- CUF200膜过滤，滤液澄清，可除去菌体及大部分大分子杂质，为树脂分离CPC创造良好工作条件，延长树脂的使用寿命
- SU200膜过滤，可进一步除去色素及多肽类物质，提高滤液质量，为酶法裂解提供合格的料液
- SN101膜浓缩，可提高滤液中CPC或者7-ACA的浓度，提高裂解、结晶收率，通过SN101膜过滤，还可以回收结晶母液中残留的7-ACA
- IX移动床系统取代固定床用于CPC的分离，可大幅提高树脂的利用率，减少酸碱及水消耗



Technology Applications

- Direct production with enzymatic method avoids the consumption of volatile solvents, achieves clean production and lowers the manufacturing cost
- Filtration with CUF200 membrane ensures the transparency of filtrate, thallus and most of the macromolecular impurities can be removed, which creates good working conditions for resin separation of CPC and extends the life of resin.
- Filtration with SU200 membrane is able to further remove pigment and polypeptide, which improves the quality of filtrate and provides qualified feed for enzymatic lysis
- Concentration with SN101 membrane can improve the concentration of CPC or 7-ACA in filtrate, and improve the yields of lysis and crystallization; filtration with SN101 membrane can also reclaim residual 7-ACA in crystallized mother liquor
- Instead of fixed bed, IX moving bed system, used for the separation of CPC, is able to improve utilization rate of resin significantly and reduce the consumption of acid-base and water

Tailor-made integrated solutions for you

为您量身度作的综合解决方案

—— Vitamin

维 生 素

维生素——维持生命的元素

维生素被称为万年产品，是维持动物机体生命活动必须的一类有机物质，也是保持机体健康的重要活性物质。维生素在体内的含量很少，但不可或缺。同时大多数的维生素，机体不能合成或合成量不足，不能满足机体的需要，必须经常通过食物中获得。因此维生素需求长期稳定。从长期看，维生素市场将保持稳步增长趋势。

维生素市场

由于维生素的市场需求具有长期稳定性，20世纪80年代，少数几家跨国生产企业垄断着全球维生素的生产与销售。2001年，欧盟经过两年半立案调查后，对比利时、德国、法国、日本等国的8家维生素制造商提出了高额的罚款。其后，国外维生素巨头罗氏等全世界范围内洗牌，中国维生素C厂家从50多家锐减为7家，最后仅仅剩下江山制药等4家。

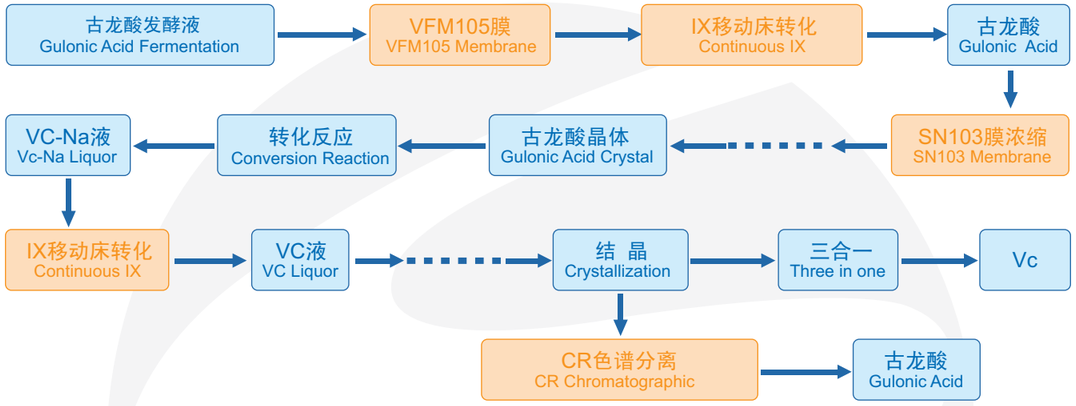
三达改变中国——帮助中国制药企业实现生产技术领先全球的梦想

三达运用膜技术对维生素工艺过程进行革命性的改造，成功开发基于膜分离与移动床分离技术的维生素C生产工艺，使生产成本大幅度降低，更实现了中国维生素C从黄色的“古巴糖”到“白糖”质的飞跃。

如今，中国的维生素C企业由于技术革新，反败为胜。中国成为世界维生素C大国与强国。

工 艺 应 用

- 提供一整套的分离纯化解决方案，为VC的生产提取设计最安全适用的工艺，技术水平国际领先
- VFM105膜过滤切割分子量精确，滤液质量好，可有效除去发酵液中的菌丝体及大分子杂质
- SN102膜可节约蒸汽消耗，大幅降低运行成本
- IX移动床系统取代传统的固定床，为VC的转换过程节约树脂用量，大幅度降低水耗与酸碱消耗，实现清洁生产
- CR移动床可对结晶母液处理，分离杂质重新获得价值高的古龙酸



Technology Applications

- To provide an integrated solution for separation and purification, and design the most suitable and safe process for VC extraction and production with world-leading technology
- Filtration with VFM105 membrane, resulting in precise molecular weight cutoff and high quality filtrate, can remove mycelium and macromolecular impurities effectively
- SN102 membrane can reduce the steam consumption, which largely reduces operating cost
- Using IX moving bed system instead of traditional fixed bed reduces resin consumption during VC conversion process, as well as water and acid-base consumption so as to realize clean production
- CR moving bed can treat the crystallization mother liquor and separate impurities so as regain high value gulonic acid

Tailor-made integrated solutions for you

为您量身度作的综合解决方案

Suntar

—— Amino Acid 氨基酸

氨基酸是含有氨基和羧基的一类有机化合物的通称，是在生物体内构成蛋白质分子的基本单位，与生物的生命活动有着密切的关系。它在抗体内具有特殊的生理功能，是生物体内不可缺少的营养成分之一，是生命的物质基础。

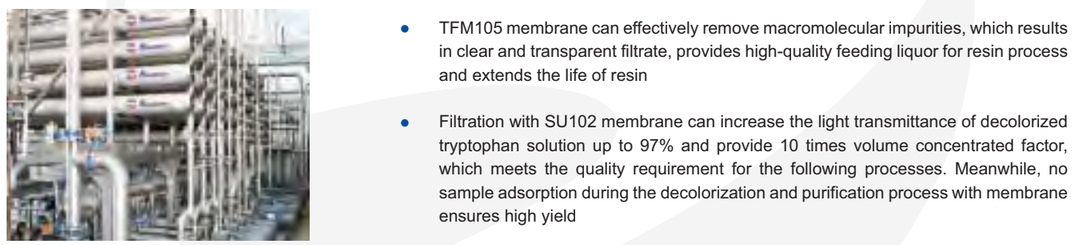
色氨酸在动植物体内均具有重要的作用，对于植物，它是体内生长素生物合成的重要前体物质，其结构与IAA相似，在高等植物中普遍存在，植物可以通过色氨酸合成生长素；同时它又是人体和动物生命活动中必需的氨基酸之一，对人和动物的生长发育、新陈代谢起着重要的作用，被称为第二必需氨基酸，广泛应用于医药、食品和饲料等方面。在生物体内，从-色氨酸出发可合成5-羟基色胺等激素以及色素、生物碱、辅酶、植物激素等生理活性物质，可预防和治疗糙皮病，同时具有消除精神紧张、改善睡眠效果等功效。色氨酸代谢失调会引起糖尿病和神经错乱，因此在医学上被用作氨基酸注射液和复合氨基酸制剂。另外，由于色氨酸是一些植物蛋白中比较缺乏的氨基酸，用它强化食品和做饲料添加剂对提高植物蛋白质的利用率具有重要的作用，它是继蛋氨酸和赖氨酸之后的第三大饲料添加氨基酸。

色氨酸的生产最早主要依靠化学合成法和蛋白质水解法，但是随着对微生物法生产色氨酸研究的不断深入，这种方法已经走向实用并且处于主导地位。微生物法大体上可以分为直接发酵法、微生物转化法和酶法。其中酶法（或称为半发酵法）是指使用色氨酸酶或含有色氨酸酶的菌体将其他化学或生物工艺生产的吲哚和丝氨酸催化反应生成色氨酸，该工艺的优点是产品转化率高，生成产品纯度较高，缺点是所使用的原料相对贵重；直接发酵法指通过筛选合适的菌体或构筑基因工程菌，使菌体能够直接利用玉米等物质发酵生产色氨酸，该工艺的优点是可以利用廉价的生产原料，但是其缺点是发酵产酸水平不高、发酵产物复杂。但是随着发酵技术的提高以及基因工程等生物工程优化技术的应用，直接发酵法产酸水平在不断的提高，正逐渐取代酶法生产工艺。

以膜过滤、移动床分离技术为核心技术的新工艺在氨基酸行业的应用还有赖氨酸、苏氨酸和蛋氨酸……

工 艺 应 用

- TFM105膜可将大分子杂质有效分离，滤液澄清透明，为树脂工序提供高品质料液，保护树脂的使用寿命
- 使用SU102膜过滤，可将色氨酸脱色液的透光最高提高到97%以上，体积浓缩倍数达到10倍。完全可以满足后续生产工艺的质量要求，同时膜脱色除杂过程中，不吸附产品，保障了脱色除杂工序的收率
- SN103膜可以脱除工艺过程中产生的盐分，减少树脂用量，并且在脱盐的过程中还可以对色氨酸进行浓缩，提高色氨酸浓度，为后续蒸发浓缩大幅降低能耗。通过加水透析，可将色氨酸的脱色液电导由8000 μs/cm 以上降低至4000μs/cm，色氨酸浓缩倍数可达5倍左右



Technology Applications

- TFM105 membrane can effectively remove macromolecular impurities, which results in clear and transparent filtrate, provides high-quality feeding liquor for resin process and extends the life of resin
- Filtration with SU102 membrane can increase the light transmittance of decolorized tryptophan solution up to 97% and provide 10 times volume concentrated factor, which meets the quality requirement for the following processes. Meanwhile, no sample adsorption during the decolorization and purification process with membrane ensures high yield
- SN103 membrane can eliminate salts formed during processing and reduce the consumption of resin. At the same time, tryptophan can be further concentrated during the desalinization process. The enhanced concentration of tryptophan leads to the significantly decrease in energy consumption. Through dialysis with water, the conductivity of decolorized liquor can be reduced from 8000 to 4000 μs/cm, and the cycle of tryptophan concentration can reach about 5 times

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Suntar

—— Organic Acid

有机酸

有机酸是指一些具有酸性的有机化合物。最常见的有机酸是羧酸，其酸性源于羧基(-COOH)。磺酸(-SO_3H)、亚磺酸(RSOOH)、硫羧酸(RCOSH)等也属于有机酸。

柠檬酸是有机酸中第一大酸，无色晶体，常含一分子结晶水，无臭，有很强的酸味，易溶于水。由于物理性能、化学性能、衍生物的性能，是广泛应用于食品、医药、日化等行业最重要的有机酸。

我国是世界上柠檬酸的生产大国，柠檬酸年总产量居世界第一，产品在国际市场上具有一定的竞争力。我国以薯干为原料的深层发酵技术具有独创性，发酵指数处于世界前列，但提取工艺和设备却比较落后，生产单耗高，收率低，产品质量不高，规模效益差。

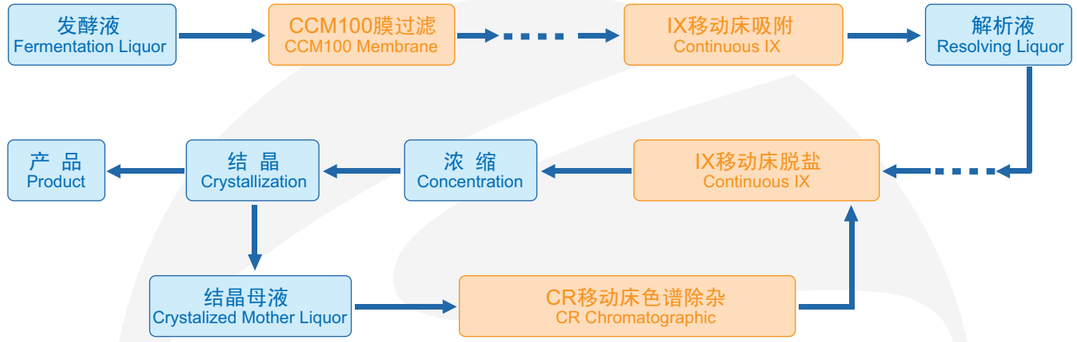
传统工艺中存在的问题在于，提取柠檬酸的传统方法是钙盐沉淀法，即用板框过滤发酵，用石灰中和柠檬酸生成柠檬酸三钙沉淀，用尽可能少量的高温水洗涤沉淀，然后用浓硫酸溶解柠檬酸钙，得到柠檬酸溶液并生成废渣硫酸钙沉淀。由于板框过滤精度低，得到的滤液含有大量有机杂质，造成废中和液COD极高。同时，滤液质量差还给后续工艺带来了难题。

三达根据多年来的膜应用及工程经验，开发出的一系列膜技术结合移动床分离技术在柠檬酸清洁生产中的应用，为革新柠檬酸传统生产工艺带来了契机。

以膜过滤、移动床技术为核心技术的新工艺在有机酸行业的应用还有乳酸、衣康酸……

工 艺 应 用

- 膜过滤取代板框过滤，提高滤液质量，确保树脂工序的吸附效果及树脂的使用寿命，并大幅度减少废水的排放
- IX移动床取代固定床系统，在柠檬酸吸附工序可以大幅度提升树脂使用效率，减少水耗、提高柠檬酸解析液的浓度
- IX移动床取代固定床阴阳床脱盐，提高树脂使用效率，降低用水量、酸碱消耗，并能一定程度上提高柠檬酸产品液的浓度
- CR移动床色谱技术可高效分离柠檬酸与杂质，能从废弃的柠檬酸结晶母液中回收柠檬酸



Technology Applications

- Instead of plate-frame filtration, membrane filtration improves the quality of filtrate, ensures the adsorption effect during resin process and reduces wastewater discharge remarkably
- Instead of fixed bed system, IX moving bed system improves resin utilization rate dramatically during citric acid adsorption process, reduces water consumption and improves the concentration of citric acid resolving liquor
- Desalinization with IX moving bed instead of fixed bed, improves resin utilization rate, decreases water and acid-base consumption, and increases the concentration of citric acid product to a certain extent
- CR moving bed chromatographic technique can separate citric acid and impurities effectively and reclaim citric acid from deserted crystallization mother liquor

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Suntar

—— Sugar Alcohol
糖　醇

糖醇是一种多元醇，含有两个以上的羟基。糖醇虽然不是糖但具有某些糖的属性。目前开发的有山梨糖醇、甘露糖醇、赤鲜糖醇、麦芽糖醇、乳糖醇、木糖醇等，这些糖醇对酸、热有较高的稳定性，不容易发生美拉德反应，成为低热值食品甜味剂，广泛应用于低热值食品配方。

国外已把糖醇作为食糖替代品，广泛应用于食品工业中。用糖醇制取的甜味食品称无糖食品，糖醇因不被口腔中微生物利用，又不使口腔pH降低，反而会上升，所以不腐蚀牙齿，是防龋齿的好材料。糖醇对人体血糖值上升无影响，且能为糖尿病人提供一定热量，所以可作为糖尿病人提供热量的营养性甜味剂。糖醇现在已成为国际食品和卫生组织批准的无须限量使用的安全性食品之一。

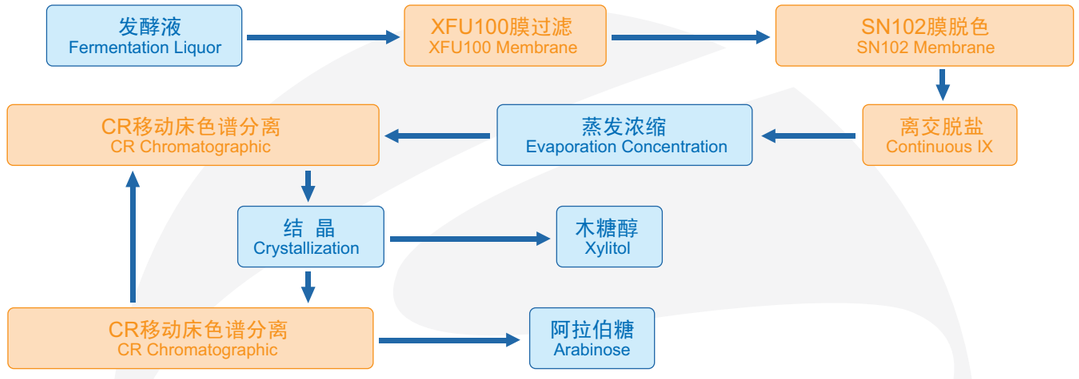
木糖醇是一种天然五碳糖醇，具有预防龋齿、作为糖尿病患者食物中蔗糖的替代品、消除血酮症及改善肝功能等功效，广泛应用在食品、医药、炸药、塑料及化工等领域。目前工业化生产木糖醇主要是通过化学法，此法成本高、工艺复杂、副产物多、分离提纯较困难。半纤维素水解物微生物发酵法制备木糖醇，可以降低生产成本，简化工艺流程，提高产品纯度。因此，目前利用生物转化的方法生产木糖醇已成为国际上研究的热点。

在发酵法生产木糖醇的工艺中，膜技术及移动床分离技术以其高效的分离特性得到了广泛的应用，为生物发酵法木糖醇的提取提供了有力的技术保障。

以膜过滤、移动床分离技术为核心技术的新工艺在糖醇行业的应用还有赤藓糖醇……

工 艺 应 用

- 采用发酵法把木糖转化成木糖醇，替代传统的催化加氢法，获得高纯度的木糖醇
- 微生物专一转化木糖醇，而阿拉伯糖等不被影响，可以得到高价值的阿拉伯糖副产品
- 采用膜法过滤发酵液，可彻底去除菌体及大部分大分子杂质，以保障后续色谱分离树脂的安全性
- 采用SN102膜过滤，可有效脱除色素等杂质，为后续色谱分离减轻负担
- 采用CR移动床色谱技术分离木糖醇，可获得高品质的木糖醇，木糖醇结晶母液通过CR移动床色谱技术进一步分离，可回收母液中的木糖醇，还可以获得阿拉伯糖副产品



Technology Applications

- Conversion of xylose to xylitol with fermentation method instead of traditional catalytic hydrogenation method, can gain high purity product
- Xylitol is converted by microorganism specifically, while arabinose etc. is not influenced. The valuable byproduct of arabinose can be obtained.
- Adopting membrane method to filtrate fermentation liquor can remove thallus and most of the macromolecular impurities to ensure the safety of resin used in the following chromatographic separation
- Filtration with SN102 membrane can remove impurities such as pigment and lighten the burden on the following chromatographic separation
- Utilizing CR moving bed chromatographic separation technique to isolate xylitol ensures the high quality of the product. The xylitol crystallization mother liquor can be further separated by this technique to reclaim xylitol and obtain the byproduct of arabinose

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Suntar

Stevioside

甜菊糖

甜菊糖——新一代的甜味剂

甜菊糖甙是从菊科草本植物甜叶菊中精提的新型天然甜味剂。它的甜度是蔗糖的200-300倍，热值仅为蔗糖的1/300。经常食用甜菊糖甙可预防高血压、糖尿病、肥胖症、心脏病、龋齿等病症，是一种可替代蔗糖非常理想的甜味剂。

2008年12月，甜菊糖甙获得美国FDA认证，允许其作为食品甜味剂使用。目前，欧盟的认证也正在审批之中，预计2011年春季获得许可。美国和欧盟市场的认可为甜菊糖产业提供了广阔的发展空间，成为甜菊糖产业快速扩张壮大的契机。

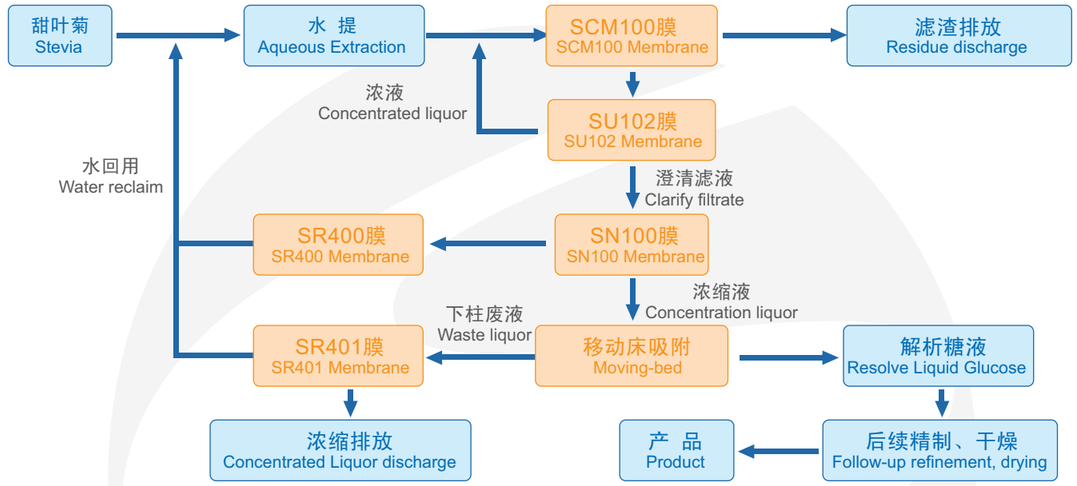
我国自八十年代开始加工生产甜菊糖，目前国内大部分企业仍然使用絮凝、板框过滤，大孔树脂吸附等传统提取工艺。传统工艺的生产环境差，废水排放量大，成了企业扩大生产规模、通过各种认证的瓶颈。随着甜菊糖产业与国际接轨，企业选择一种新的清洁生产工艺是大势所趋。

三达根据十多年在分离纯化领域积累的工程应用经验，结合甜菊糖清洁生产的需求，引入先进的膜过滤及移动床技术，与甜菊糖生产厂家一起开展中试研究，成功开发出一条切实可行的甜菊糖生产新工艺。

以膜过滤、移动床技术为核心技术的新工艺还可应用在植物提取、中药分离浓缩领域……

三达改变中国——为甜菊糖产业添砖加瓦

- 使用膜过滤取代传统的絮凝板框工艺，大大改善甜菊糖生产环境，使得清洁生产在甜菊糖行业中变为现实，满足各种认证需求
- 膜过滤在除杂的过程中避免了引入外源物质，絮凝剂的取消，降低了料液中盐分含量，为后续阴阳离子脱盐减轻负担
- SN100浓缩膜的应用，不仅提高了树脂吸附的效率，而且显著降低了整个甜菊糖生产工艺中的废水排放，环保处理成本大幅度减少。透析液可直接排放，也可进一步处理，回用工艺用水
- 由于整体工艺应用膜过滤，各工序的废水处理变得更为简单，膜滤液以及树脂吸附过程的下柱废液可通过反渗透膜全面回收，整体生产工艺可基本实现零排放



Technology Applications

- Compared with traditional resin column, it has compact structure and small floor coverage
- Compared with fixed bed, the resin consumption can be reduced by 50% to 90%, also the resolving agent and flush water consumption is reduced substantially
- Continuous running ensures the stabilities of the component concentration and the quality of stevioside product
- Due to the decrease in resolving agent consumption, the concentration of stevioside liquor is largely improved which eases burden on the following desiccation and dehydration processes

移 动 床 优 势

- 与传统树脂柱相比，其结构紧凑，占地面积小
- 与固定床相比其树脂用量减少50-90%，解析剂、冲洗水用量大幅度减少
- 由于是连续运转，产品的成分浓度基本保持稳定，甜菊糖质量稳定
- 因解析剂使用量的减少，甜菊糖液的浓度可大大提高，为后续干燥脱水工序减轻了负担

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Suntar

—— Tea Beverage
茶饮料

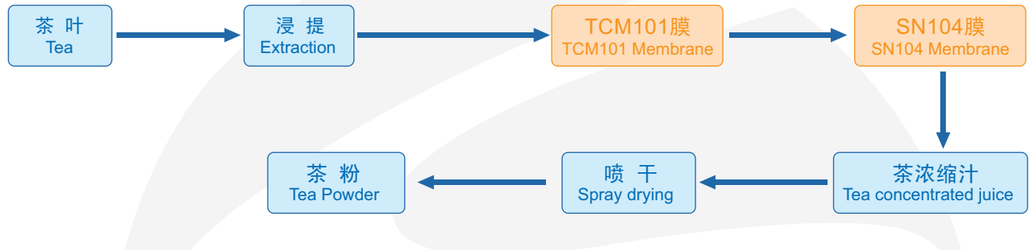
茶是具有悠久历史沉淀的文化产物，茶浓缩液、茶粉等茶类提取物在国外被称为“中间体”产品，在国内则被称为食品添加剂，是目前茶叶深加工领域最前沿的技术。这种技术兴起于美国，在日本得到全面发展之后，进而推广到欧美、港台以及中国大陆。

茶类提取物的应用原理与可口可乐极为相似，都是制作标准化的浓缩液或茶粉，然后由工厂加工生产出成品饮料。因此，把茶这种传统产业直接推向工业化，在某种程度上，茶类提取物的加工技术可以说是茶业史上的一次变革。

由茶叶到茶浓缩液或者茶粉，虽然冲制的过程更为简便，但是如何能保证茶汤原有的芳香和色泽，并且不出现沉淀物，却是一个食品加工业上的技术难关，而膜技术的出现，正是解决这些难题的最有效手段。

工 艺 应 用

- TCM101膜可有效除去茶叶提取液中的悬浮物、胶体等杂质，可确保茶浓缩汁澄清透明
- SN104膜可有效浓缩茶汁，保留茶汁中的风味物质，并可耐受高温下的过滤与清洗灭菌，目前已大规模应用于王老吉的生产加工
- 膜系统卫生型设计，满足健康食品生产要求，达到美国3A标准



Technology Applications

- TCM101 membrane can remove impurities such as suspended solids, colloid, etc. in the tea extracts effectively and ensure the transparency of concentrated tea juice
- SN104 membrane can concentrate tea juice effectively and preserve tea flavor components, which can tolerate filtration and washing & disinfection under elevated temperature. It is currently used on a large scale in the production of tea beverage such as Wong Lo Kat
- Sterile design of membrane system meets the requirement of healthy food production and can meet 3A standard in the US

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Suntar

—— Dairy
乳　品

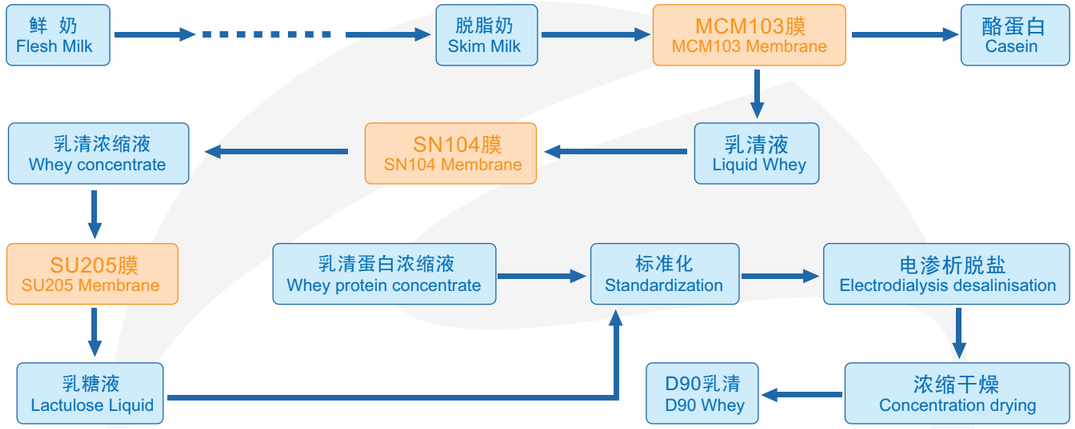
牛乳是人们日常生活中喜爱的饮食之一，喝牛乳的好处如今已越来越被大众所认识，牛乳的化学成分很复杂，经证实至少有100多种化学成分，但主要由水、脂肪、蛋白质、乳糖、维生素、酶类、无机盐等物质组成，牛乳中含有丰富的钙、维生素D等，包括人体生长发育所需的全部氨基酸，消化率可高达98%，是其他食物无法比拟的。目前最普遍的是全脂、低脂及脱脂牛奶。市面上牛奶的添加物也相当多，如高钙低脂牛奶，就强调其中增添了钙质。

膜技术在乳品工业中的应用已有多年，且其在食品工业中的应用仅次于饮料业。国外将膜技术应用于食品工业首先就是从乳品加工开始的。膜分离技术因其具有对环境污染小、能量消耗低、无需使用添加剂、避免产品的热破坏，而且过滤的同时将物料浓缩或分离等优点，使得它在乳品加工中显示出越来越多的实用价值和广阔的应用前景。

膜分离技术应用于乳品工业中，可简化生产工艺，降低能耗，减少废水污染，提高乳品综合利用率。目前膜技术在乳品工业中的应用主要有：乳品灭菌及浓缩、乳品的标准化、乳蛋白浓缩、乳清的回收与加工利用、废水处理等。

工 艺 应 用

- MCM103膜过滤，可将酪蛋白与乳清蛋白分离，获得奶酪与乳清产品
- 乳清经过SN104膜过滤，可实现浓缩与脱盐的双重功效，乳清不损失
- 乳清由SU105膜过滤，可帮助实现乳清蛋白和乳糖的分离，实现乳清蛋白的标准化
- 膜系统卫生型设计，满足健康食品生产要求，达到美国3A标准



Technology Applications

- Filtration with MCM103 membrane can separate casein from whey protein and get cheese and whey product
- Filtration of whey with SN104 membrane can achieve the effects of concentration and desalinization without loss of whey
- Filtration of whey with SU105 membrane can help achieve the separation of whey protein and lactose and realize the standardization of whey protein
- Sterile design of membrane system meets the requirement of healthy food production and can meet 3A standard in the US

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为您量身度作的综合解决方案

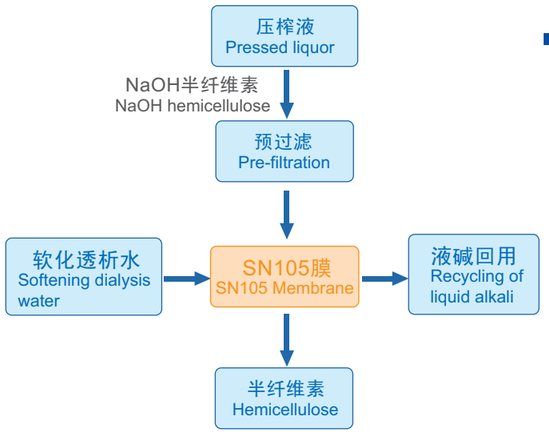
Suntar

—— Chemical Industry 化工行业

Alkali Reclaim 碱回收

在粘胶纤维的生产中，普遍使用NaOH对棉浆泊或者木浆泊浸泡，然后进行压榨。浆泊成份较为复杂，有效成份是纤维素，含量一般大于85%以上。纤维素分子通式是$(C_6H_{10}O_5)n$，其中n>150的称为α-纤维素，在室温下不溶于17.5%的氢氧化钠；15<n<150的称为β-纤维素，室温下能溶于17.5%的氢氧化钠；n<15的称为γ-纤维素，室温下能溶于17.5%的氢氧化钠，β-纤维素和γ-纤维素统称为半纤维素。

浆泊用200-210g/L氢氧化钠浸渍，主要目的是纤维素与氢氧化钠反应，生产碱纤维素，但随之也产生了大量的浓碱液。浓碱液中含有溶解的半纤维素，如果采用膜过滤技术，则可使NaOH与半纤维素分离，实现回收液碱的目的。



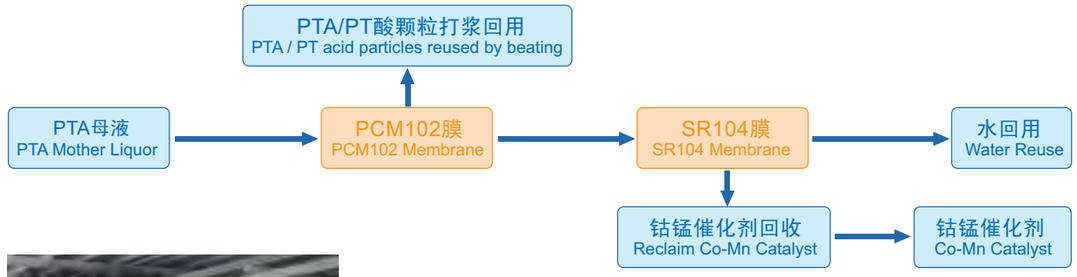
工 艺 应 用

- 传统透析工艺是以半渗透膜的两侧浓度差作为推动力来完成的，但传质速率十分低下。SN105膜过滤的效率相当于传统透析工艺的10倍以上
- 透析设备所得碱净液，平均浓度仅为100g/L左右，大大低于浸渍碱原液浓度，因此需要蒸发浓缩操作，或用大量的浓碱进行调配。SN105膜滤出液的碱液浓度可与浸渍碱浓度相当
- 经过膜过滤回收的碱液一次回收率最高达85%以上，可直接进入浸渍工序，视不同生产工艺需要可加最少量水进行二次碱回收，二次回收的碱液浓度不低于100g/L。并且由于膜技术滤出的氢氧化钠浓度要比透析工艺高，因此滤出液的质量要比透析法净液好

- Traditional dialysis process is completed by the driving force from concentration gradient between the two sides of semipermeable membrane, but the mass transfer rate is very low. Filtration efficiency of SN105 membrane is over 10 times than that by traditional dialysis process
- The average concentration of alkaline liquid obtained by dialysis is only around 100g/L, which is significantly lower than that of alkali steeping liquid. As a result, the process of evaporation concentration or adjustment with concentrated alkali is needed. The filtrate of SN105 membrane has nearly equivalent alkali concentration with alkali steeping liquid
- The reclaimation rate of alkali liquor using membrane filtration technology reaches up to 85% and the liquor can be directly used for steeping process. According to the requirement of different process, the rest alkali liquor can be reclaimed for the second time by adding a little water and the concentration of the product alkali liquor is not lower than 100g/L. And the concentration of NaOH filtered out is higher than that by dialysis, so the quality of filtrate is higher than that by dialysis

PTA Mother Liquor Reclaim PTA母液回收

PTA（精对苯二甲酸）生产企业在生产过程中，会产生大量的PTA母液，此母液由于含有催化剂及未反应的单体而使得其处理成为了各生产企业的难题，三达从为客户解决问题的角度出发，研发了PTA母液处理回用新工艺，不但能将水回用，解决企业的环保问题，而且能将水中的有用物质回收，取得了变废为宝的良好效果，在解决了环保问题的同时还为企业生产降低了生产成本，实现了经济效益与环保效益双赢的局面。



工 艺 应 用

- 母液中的PT酸 / PTA颗粒被过滤下来再打浆作为反应物料
- 溶解的钴锰催化剂被吸附返回生产
- 透析水可回用

- PT acid/ PTA particles in mother liquor, retained after filtration, are beaten as material supplies
- Dissolved Co-Mn (cobalt and manganese) catalysts are adsorbed and returned for production
- Dialysis water can be reclaimed

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Metallurgy Industry
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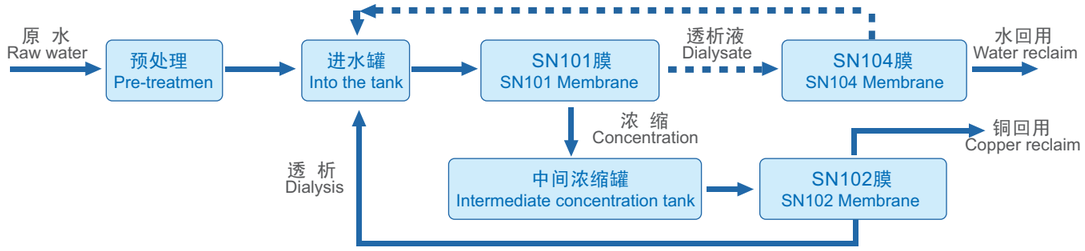
Copper Mine Acid Wastewater Treatment 铜矿酸性废水处理

在金属王国里，铜的导电性仅次于银，一半以上的铜用于电力和电讯工业。铜矿石一般是铜的氧或硫化物，与硫酸反应生成蓝绿色的硫酸铜。

铜矿在浮选和冶炼的过程中会产生大量酸性废水，废水水质随季节波动大，具有较强的酸性，各种金属离子含量多。目前铜矿的酸性废水一般采用石灰中和、混凝沉淀的工艺来处理。传统方法处理需要消耗大量的碱，同时产生大量含金属污泥，年运行费用上千万。如果采用膜法截留废水中的铜离子，浓缩到萃取回收的浓度，则可回收废水中的铜离子，同时透过液铜含量较低，可减少石灰中和用量，甚至可直接可排放或回用。



Technology Applications

- Requiring combination of multi-unit process, the typical membrane separation system for industrial materials
- Favorable flow regulation and reasonable pre-treatment help with the stability of follow-up systems
- There is a strong tendency of scale pollution during the process of membrane concentration. The safety operation of membrane system is ensured by using appropriate membrane modules and taking scale inhibition measures
- Cupric ion can be effectively reclaimed from wastewater and the membrane filtrate can be directly discharged or recycled for other production processes

工 艺 应 用

- 处理需多单元工艺组合，属于典型的工业物料膜分离系统
- 良好的进水调节和合理的预处理有助于后续系统的稳定
- 膜浓缩过程中有强烈的结垢污染倾向，该工艺选用合适的膜组件及阻垢措施，保障膜系统的安全运行
- 可有效回收废水中的铜离子，膜的出水可直接排放或者回用于其他生产工序中

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鲁抗制药 · 哈药集团 · 华北制药 · 丽珠医药 · 日本明治 · 扳倒井酒

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Reference 合作伙伴

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