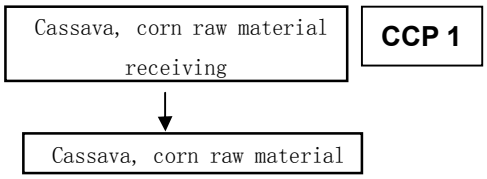
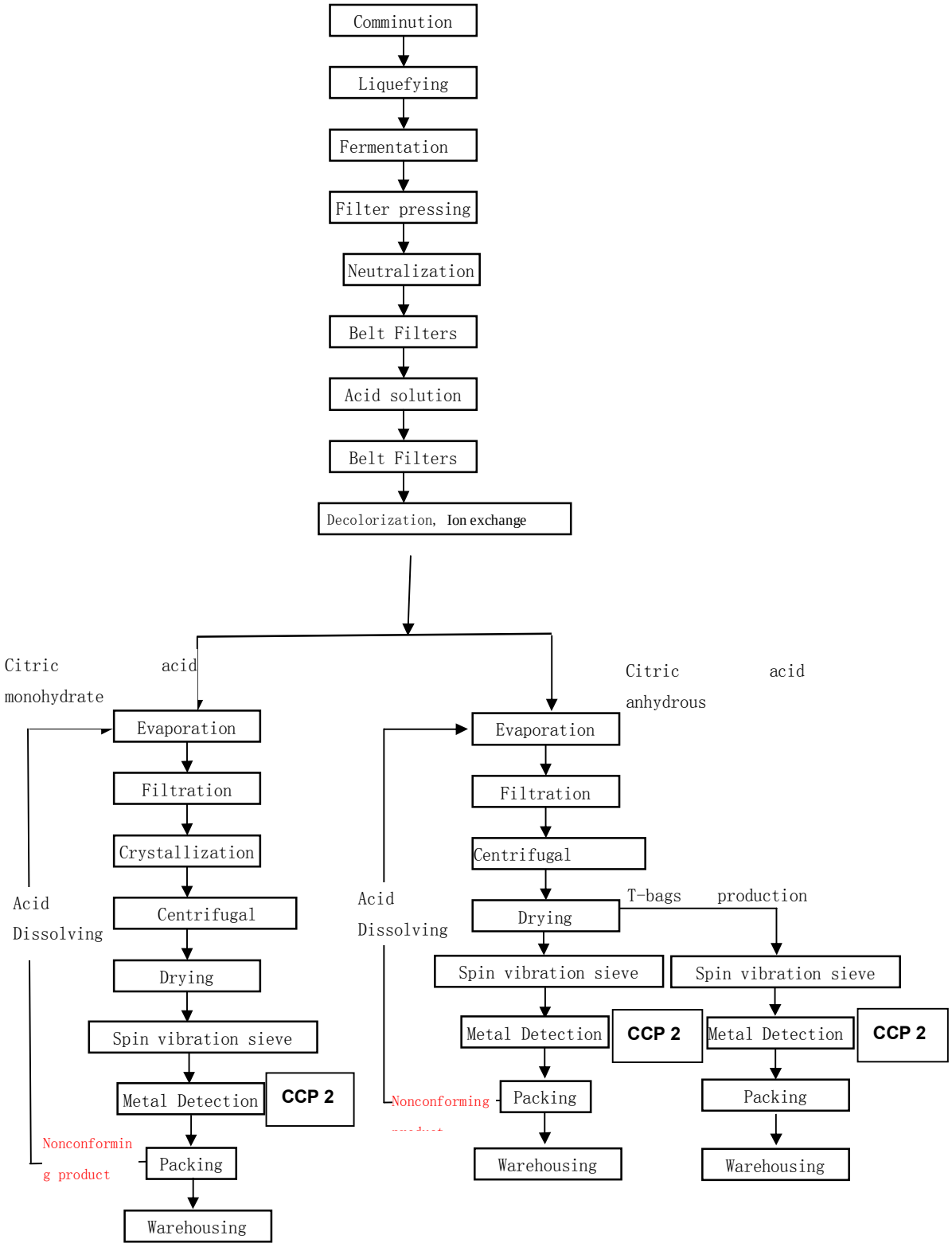
The brief description of citric acid flow chart and CCP

Cassava and corn are used as raw materials in citric acid production. This is the first critical control point, called CCP1 (see it in the below figure). It used to prevent the hazards of GMO and assure raw materials meet the standards of production. Cassava is ground into powder, and then liquefied. Cassava is converted into liquid glucose, and then liquid glucose will be sent to the fermentation tank. In the fermentation tank, the desired temperature is maintained, liquid glucose is converted into citric acid by deep fermentation, mycelium dregs will be filtered after fermentation. Fermentation liquor is sent into extraction and neutralization pot, to form calcium citrate crystals. The crystals are sent into acidolysis pot .Filtration will be held after reaction, solid calcium sulfate is removed and citric acid solution is sent to refine. First, the solution is decolored Then metallic ion and acid ion are removed by exchange column. And it will be sent into evaporator to heat and concentrate, solution of citric acid crystals will be obtained after third class vacuum evaporation concentration. Wet citric acid crystals will be obtained after centrifugal filtration. Then wet citric acid crystals are dried by hot wind through vibrated fluidized bed. Then, we use the metal detector to detect foreign materials, such as IRON, Non-iron etc. We call this step CCP2. Qualified products will be sent to packed, quantitative bagging is completed by automatic packaging machine, and then storage for sale

Simple Process Flow and HACCP




Comminution
Liquefying
Fermentation
Filter pressing
Neutralization
Belt Filters
Acid solution
Belt Filters
Decolorization, Ion exchange
Citric monohydrate acid
Evaporation
Filtration
Crystallization
Centrifugal
Drying
Spin vibration sieve
Metal Detection
CCP 2
Packing
Warehousing
Acid Dissolving
Nonconformin g product
Citric anhydrous acid
Evaporation
Filtration
Centrifugal
Drying
T-bags production
Spin vibration sieve
Spin vibration sieve
Metal Detection
CCP 2
Metal Detection
CCP 2
Packing
Packing
Warehousing
Warehousing
Acid Dissolving
Nonconforming

The Recognition of Critical Control point

All significant hazards should be confirmed as the critical control point through the systemôs approach.

- When the significant hazards can be prevented, these points should be considered as critical control points, like, if the suppliers can not provide the Non-GMO certificate and need send the samples to make external inspection.

  The food safety team identifies the receiving raw materials as a critical control point.

- The point that can eliminate potential hazards is seen as a critical control point, for instance:

The foreign matter that havenôt been eliminated before the centrifugation process or been mixed during the whole process from centrifugation to the final packing, can be detected by the metal detector to eliminate the foreign hazards.

The metal detector is identified as another critical control point by Food Safety Team.

HACCP group sets two critical points in the entire production process of citric acid and its salts of this enterprise on the basis of the long-term production practice, the relevant theoretical knowledge and in reference to the related experience of the our same industry.

The company chooses the applicable monitoring parameters for each critical control point and these parameters should be clearly showed the control measures have been implemented in expectation

The determination of key limit on the critical control point

1. The determination principles and process of key limit.

The key limit information sources: Food safety team should collect the relevant contents of the recognized practice, scientific publications, regulatory guidelines and experimental results through media and all kinds of information collection channels, and analyze that to be as basis for establishing key limit.

i) Food safety team summarize and analyze the collected information on the basis of the companyôs actual production process technology, infrastructure construction, equipment, production environment ,the quality of personnel as well as the related parties requirements to determine a effective key limit to control ,alleviate and eliminate hazards finally . If the above information are not available, should choose an conservative numbers to guarantee the hygiene and safety.

ii) The critical limits based on subjective information, such as the visual test of product ,process and disposal method, should follow the guideline, standard and (or) need education and training support.

2. The key limited numbers in the critical control point should be approved by HACCP team, as detailed in the HACCP plan.

Correction and corrective action

1. Purpose:

To ensure HACCP systems are scientific and effective, and make HACCP system operate effectively.

2. Scope of Application:

Apply to the whole production and service process of citric acid and its salts product and especially to the situation when deviation happens on the critical control point.

3. Responsibility:

The HACCP group is responsible for implementing this procedure and other relevant departments should cooperate with it.

4. Procedure

4.1 Correct and eliminate the cause of deviation to control the key point in a normal condition.

a. HACCP group should organize relevant personnel to analyze the reasons of deviation.

b. Take measures to make the deviated parameters go back to the normal limit range.

c. Take precautionary measures to prevent the similar deviation recurrence.

d. HACCP group appraise the situation and think the deviation has been corrected, the reproduction can be started.

e. If the deviation happened frequently, the company should adjust process and revise the HACCP plan.

4.2 How to dispose the products manufactured in the deviation period.

a. Separate the products manufactured in the deviation period.

b. Identify the products whether there is safety hazard.

c. Organize relevant experts to assess the products.

d. Make the related physical and chemical test on separated products by QC department.

e. If the products have no safety hazard, they will be disposed as qualified.

f. If the products have potential hazards and can be reused, they will be sent to reprocess.

g. If the products have safety hazards but cannot be reused, they will be destroyed as defective products

4.3 Corrective measures of the critical control points

a. The rectification of raw materials acceptance procedure： Raw materials play an important role in the internal quality of citric acid and its salt products. Those defective raw materials should be replaced or rejected. The regular reviews should be made to the suppliers. If necessary, should change the disqualified suppliers to the qualified ones. To those products involved in defective raw materials, QC department should organize the relevant sections to appraise them and make reasonable disposal decisions

b. Metal detection is a critical link in production process and plays a key role to guarantee the external quality of citric acid and its salt products. Therefore, the operational training should be conducted strictly and the frequency of verification and test should be implemented rigorously in the production process. If the deviation happened, the workshop should report it to product department and handle it appropriately according to the actual situation. If the condition is more serious, it should be reported to Food Safety Team to decide the disposal methods.

4.4 If the deviation situation has happened frequently on some key production points, HACCP plan should be reassessed to find out the root deviation causes. If necessary, HACCP plan should be revised and the revision should be recorded.

5. The rectification process

The deviations that occurred throughout the production process should be rectified. The rectification measures should be implemented jointly by HACCP group, product department and workshop, QC department. The other sections involved in rectification should fully cooperate with the above departments and the rectification results should be approved by general manager.

6. Record

<The periodic on-site inspection checklist >

Verification： HACCP / Food Safety group

Period: Jan10th, 2012.