

**Man-made fibers
(semi-synthetic fibers)**

Regenerated Fibres
Natural Polymer Base Fibres

<https://clothingindustry.blogspot.com>

Cellulose Base

Protein Base
(Vicara-Zein of Corn,
Ardi-peanut fibre,
Casein-milk fibre)

Miscellaneous
(Alginate, Rubber etc.)

Regenerated Cellulose
(Viscose Rayan
Cupramonium Rayon
Polynosic HWM fibres)

Cellulose ester
(Acetate Rayon
Triacetate Rayon)

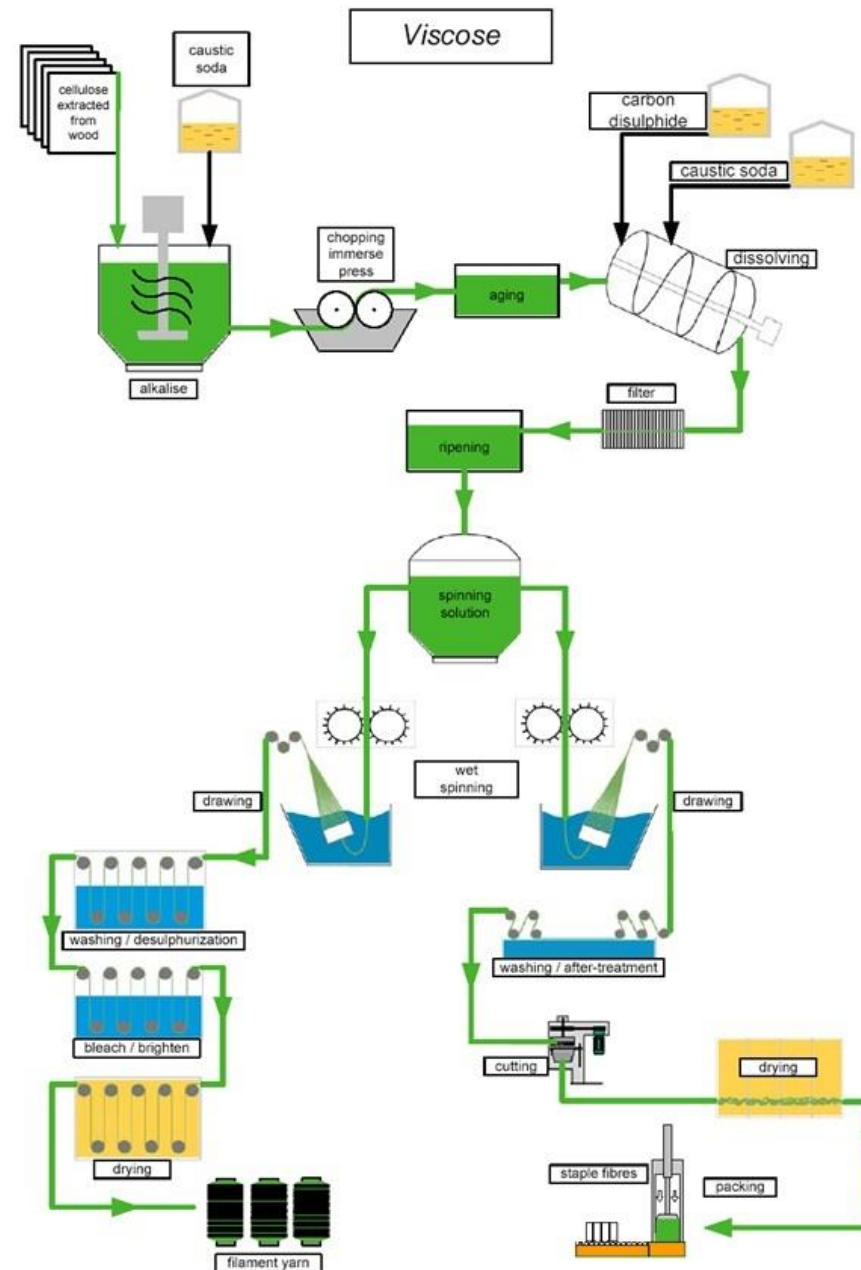
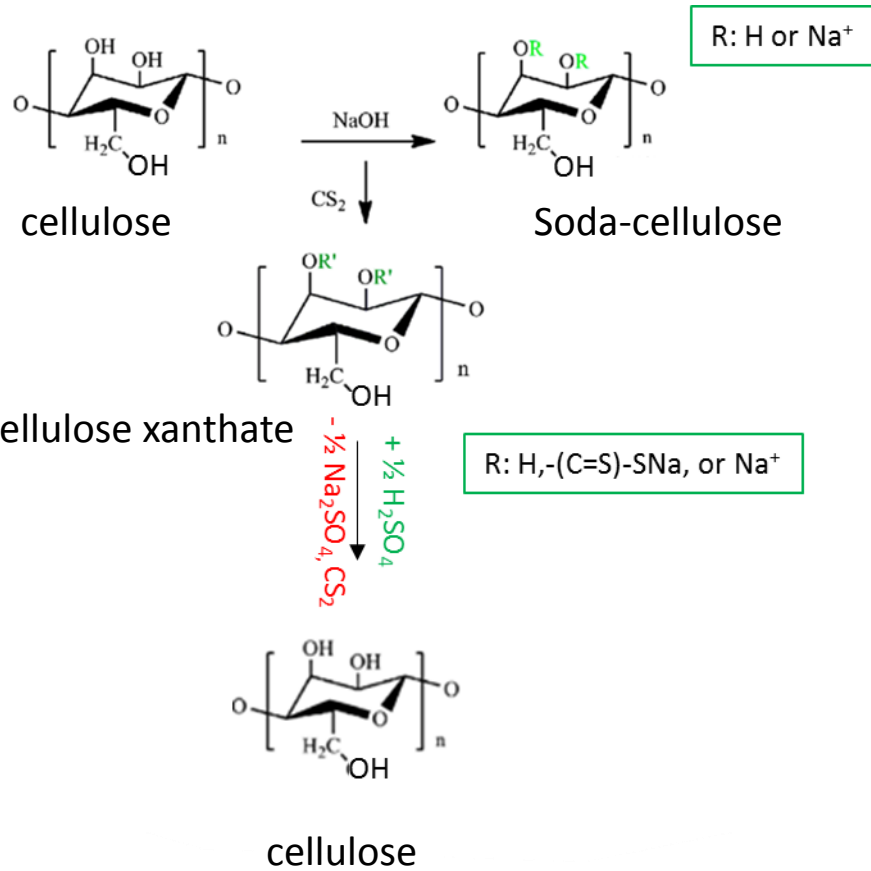
Regenerated cellulosic fibers

- Regeneration of cellulose is performed with the denitrolation process of the filaments. Cellulose nitrate is a flammable polymer, and after the regeneration, it tansforms into less flammable cellulose.
- Methods for the regeneration:
 - A) nitro-rayon method
 - B) Viscose method
 - C) Cupramonium method

The basic process steps:

- Cleaning the natural raw cellulose material
- Preparation of a cellulose derivative to make the cellulose soluble
- Fiber forming the cellulose derivative solution from the spinneret
- Re-transforming the fiber into the cellulose

Viscose method



- i) cellulose is transformed to the alkaline cellulose (soda cellulose) by the treatment with 15-20% of NaOH solution at 25°C.
- ii) Then the soda cellulose is treated with CS₂ and air and compressed to obtain comminuted particles. Waited in the air to decrease the Dp value down to 250-500.
- iii) After the reaction with CS₂, sodium cellulose xanthate structure forms.
- iv) A wet spinning method is applied to the solution of sodium cellulose xanthate, and the solution of sodium cellulose xanthate is pressed into a regeneration bath containing diluted H₂SO₄ solution. With the help of these, the cellulose structure is again obtained.

Pros:

<<< the viscose rayon filaments can be produced in the desired length and diameter.

<<< the viscose rayon filaments have almost uniform diameter values.

<<< their degree of opacity can be controlled

<<< cheaper than cotton

<<< can be continuous filaments

<<< more lusture than cotton

Cons:

<<< low mechanical strength at wet state

<<< poor elasticity property

<<< higher water absorption

<<< higher swelling in water

<<< not to be resistive to the mercerization

cellulose derivative fiber

- The most common fibers known as cellulose derivative fibers are cellulose triacetate and cellulose diacetate.
- These fibers do not pass from regeneration steps. Consequently, the production steps of cellulose derivatives are similar with those of regenerated cellulosic fibers except, regeneration.

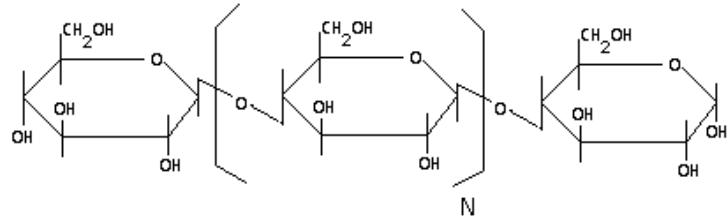
Process steps:

>>>Cellulose is crushed into small particles

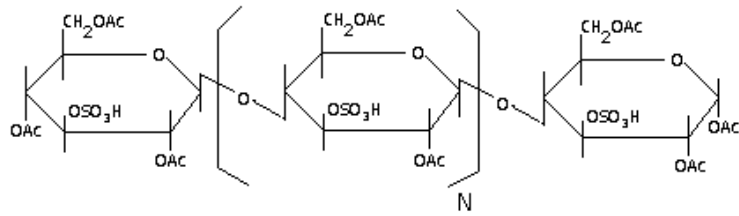
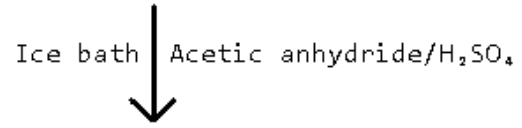
>>>Mixed with acetic acid. In the presence of less amounts of sulphuric acid, mixed with acetic acid-acetic anhydride mixture and the cellulose transformed to the acetylated cellulose

>>>The cellulose triacetate is removed by precipitation.

>>>Fiber produced with dry spinning method.



Cellulose



Cellulose acetate

