

PRE-TREATMENT OF DIFFERENT FIBERS – PART IX

REF: TT/ JANUARY 2021/ WK 3

DESIZING (Continued.....)

There are different methods of Desizing of cotton. The most commonly used method is enzymatic desizing. Oxidative desizing method is another one which is also in use. Other methods are not used or rarely used because of the disadvantages associated with the process/chemicals and also due to environmental concerns. Acid steeping is a risky process and may result in the degradation of cotton cellulose while rot steeping, hot caustic soda treatment/alkali steeping and hot washing with detergents are less efficient for the removal of the starch sizes.

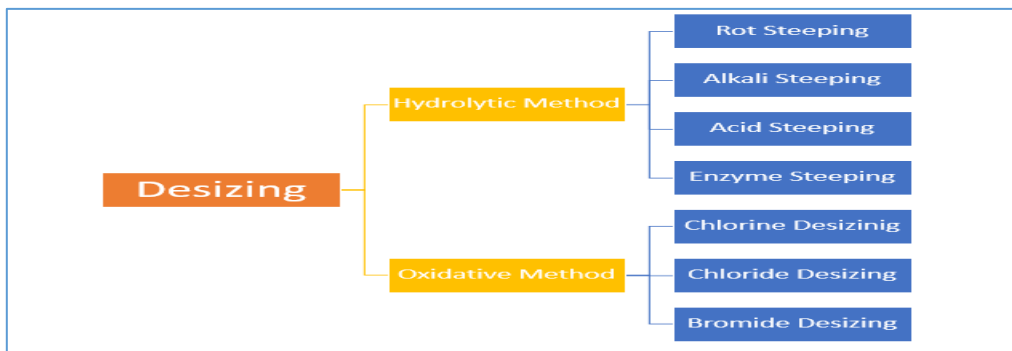


Fig 1.1 Different Desizing methods Ref: onlinetextilestudy.com

Enzymatic Desizing – Enzymatic desizing is the desizing process in which starch size on cotton fabrics is degraded using enzymes. Enzymes are complex organic, soluble bio-catalysts, formed by living organisms that catalyze chemical reaction in biological processes. Enzymes are quite specific in their action on a particular substance.

Desizing enzymes are of either Animal origin which are Vival, Degomma, etc or of Vegetable origin i.e. Malt extract: Diastator, diastase, malt ostase etc. and Bacterial: Rapidase, biolase, etc.

The product used for hydrolysis of the starch polymer requires a combination of enzymes, which include alpha-amylases, beta-amylases and iso-amylases. Alpha-amylase hydrolyses linkages in a random fashion and leads to the formation of linear and branched oligosaccharides, while the other amylases attack the substrate and forms oligosaccharides and monosaccharides. Either both oligo and mono saccharides are formed or anyone. Alpha-amylases are found in microorganisms, plants and animals. The pH and temperature of the alpha-amylases depends upon the origin of the enzyme.



Alpha-amylases degrade starch to shorter polymeric fragments, known as dextrans and maltose, a disaccharide, which contain two glucose residues. This further degrades to monosaccharides i.e glucose.

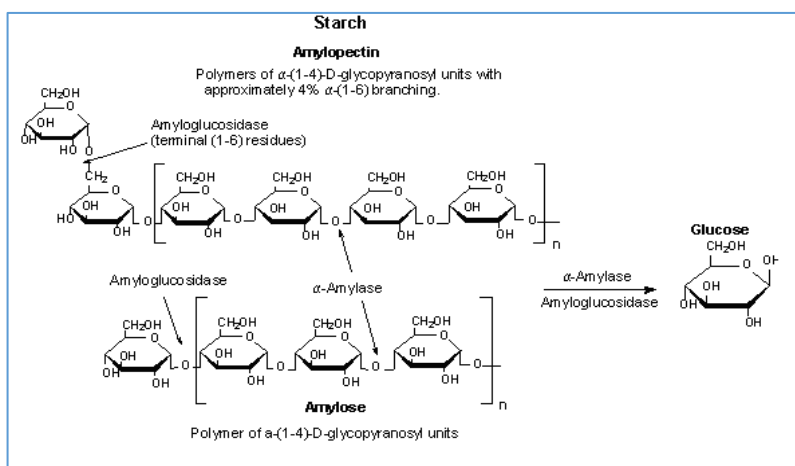


Fig 1.2 Starch hydrolysis by alpha amylase enzyme Ref: starchhydrolysis.weebly.com

Enzymatic desizing consists of three main steps: application of the enzyme, digestion of the starch and removal of the digestion products. The enzymatic desizing bath consists of:

- Amylase enzyme
- pH stabilizer
- Chelating or sequestering agent
- Salt
- Surface active agents or Surfactants

The enzymes being active within a specific pH range, it needs to be maintained by a suitable pH stabilizer. Heavy metals present in water are injurious to the enzymes, hence sequestering agents are used. Certain salts are used to enhance the temperature stability of enzymes. Surfactants help improve the wettability of the fabric and improve the size removal.

References:

1. www.fibre2fashion.com
2. <https://indiantextilejournal.com/>
3. <https://nptel.ac.in/>
4. <https://onlinelibrary.wiley.com/>

.....To be continued.....

UNSCRAMBLE THE JUMBLE WORDS
TIVEOXIDA
LASEAMY
ALTMOSE
RIDESSACCHAMONO

Last week`s Answers: 1) CHAFF 2) SINGEING 3) DESIZING 4) STARCH

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