TECHNICAL TUESDAYS

PRE-TREATMENT OF DIFFERENT FIBERS – PART XII

REF: TT/ FEBRUARY 2021/ WK 2

BLEACHING OF COTTON

Bleaching of cotton fiber is a process in which the fiber is whitened by removing the natural color present in it. The natural coloring matter i.e. pigments present in the cotton fiber imparts a yellowish brown color to the fiber. The source of natural color is organic compounds; by bleaching the discoloration takes place by breaking the chromophore. The material appears whiter after the bleaching. The primary aim of bleaching is to remove this coloring matter and to enhance the whiteness of fiber. However, in addition to an increase in whiteness, bleaching also contributes towards improvement in absorbency, uniform coloring and finishing processes and total removal of trash. With time, use of bleaching agents (Substance which helps in decolorizing the coloring matter) and the bleaching processes has changed.
Normally, the following two agents are used for bleaching of Cotton.

1) Sodium Hypochlorite
2) Hydrogen Peroxide

1) Sodium Hypochlorite Bleaching - Sodium hypochlorite is an oxidative bleaching agent. It was substituted by bleaching powder because of the advantage i.e. sodium hypochlorite does not produce precipitation of calcium. Also bleaching powder gives harsh handle on the fabrics. Sodium Hypochlorite is a greenish-yellow; the chemical formula for Sodium Hypochlorite is NaOCl. Hypochlorite decomposes in alkaline solution and produces active oxygen. This oxygen decolorizes the pigment or the coloring matter present in the fiber.
The important parameters of hypochlorite bleaching are –

- **pH** – pH is the most important parameter of hypochlorite bleaching. At pH more than 10.0 and below 5.0, no bleaching takes place. At pH 5-8.5, rapid bleaching takes place, so the rapid degradation of fiber as well. Hence, the optimum pH for hypochlorite bleaching is 9.0-10.0.
- **Temperature** -The recommended temperature for hypochlorite bleaching is 37-40 deg C.
- **Water Quality** - Water for bleaching should be soft and should be free from Cu++ and Fe++ to avoid the catalytic degradation of the cellulose in the presence of copper and iron.
- **Antichlor treatments –** A distinctive chlorine odor is developed after hypochlorite bleaching. An antichlor treatment using sodium bisulphite and acetic acid is done to remove the residual chlorine from the fabric.

Drawbacks of chlorine bleaching

- Degradation of cellulosic fibers is high.
- Corrodes the machine parts.
- Unpleasant odor due to chlorine.

2) Hydrogen Peroxide Bleaching - Hydrogen Peroxide is the most commonly used bleaching agent. It is used to bleach most of the cotton and cotton blends, because of its advantages over other bleaching agents.

Benefits of Hydrogen Peroxide as bleaching agent -

1) Cellulose is not degraded even under maximum conditions
2) Greater absorbency
3) Produces a stable white color fabric.
4) Applicable for both open-width and rope for bleaching.
5) There is no risk of corrosion to the machine.
6) Eco-friendly process

Hydrogen peroxide liberates per hydroxyl ion (HO_2^-) in aqueous medium that behaves like a weak dibasic acid. The per-hydroxyl is highly unstable and in the presence of oxidizable substance (coloured impurities in cotton), it is decomposed and thus bleaching action takes place.
The bleaching of textile fabric with hydrogen peroxide is dependent on different process parameters such as pH, temperature, time, stabilizer type and presence of metallic impurities.

References:

1. https://textileinsight.blogspot.com
2. http://dyeingworld1.blogspot.com/
3. https://medcraveonline.com/

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

UNSCRAMBLE THE JUMBLE WORDS
HOREMOPCHRO
MUMOPTI
CHLANTIOR
ACHINGBLE

Last week`s Answers: 1) TEMPERATURE 2) BIOSCOURING 3) BIOLOGICAL 4) CLOUD POINT

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