Experiment No. 7: Identification of Textile Fibers.

Aim: To identify different textile fibers by physical and chemical tests.

Introduction: The identification of textile fibers is an important step in textile industry. A number of methods are available for characterization of the structural, physical and chemical properties of the fibers. Various methods are used for fiber identification like microscopic methods, solubility, heating, burning method, density and staining *etc*.,

In this experiment few fibers of both natural and synthetic fibers are given.

1. **Test for Cotton**

Sl. No.	Experiment	Observation	Inference
1.	**Physical Test**		
a	**Microscopic Test** i. Lengthwise Appearance ii. Cross Section	 Fully Mature flat ribbon like, twisted at some end. Smooth surface with central hallow space Kidney/bean shaped	
b	**Burning Test**	The yarn does not shrink while approaching the flame and ignite upon contact, burns rapidly. Smell of burning paper. Residue is pale gray.	
2.	**Chemical Test**		
	i. Concentrated H_2SO_4 + Sample at room temperature ii. Concentrated H2SO4 + sample and boil on a flame	Colour changes to light yellow Dissolves	
	i. Concentrated HCl + sample at room temperature ii. Concentrated HCl + sample and boil on a flame	Colour changes to light yellow Dissolves	

	i. Concentrated HNO_3 + sample at room temperature ii. Concentrated HNO_3 + sample and boil on a flame	Colour changes to light yellow Partially dissolves	
	i. Concentrated Acetic acid + sample at room temperature ii. Concentrated Acetic acid + sample and boil on a flame	Unchanged Unchanged	
	i. Concentrated Acetone + sample at room temperature ii. Concentrated Acetone + sample and boil on a flame	Unchanged Unchanged	
	i. 5 % NaOH + sample at room temperature ii. 5 % NaOH + sample and boil on a flame	Unchanged Unchanged	Cotton is Confirmed

2. Test for Wool

Sl. No.	Experiment	Observation	Inference
1.	**Physical Test**		
a	**Microscopic Test** i. Lengthwise Appearance ii. Cross Section	Surface with overlapping scales. The individual fibers are greatly thicker tapered at the ends. Slightly elliptical, sometimes circular.	
b	**Burning Test**	The yarn curls away from the flame while approaching the flame. It slowly ignites, burns slowly on flame and extinguished when removed from the flame. Odor similar to that of hair burn. Residue is irregular and crushed easily.	
2.	**Chemical Test**		
	i. Concentrated H_2SO_4 + Sample at room	Colour changes	

	temperature ii. Concentrated H2SO4 + sample and boil on a flame	 Dissolves	
	i. Concentrated HCl + sample at room temperature ii. Concentrated HCl + sample and boil on a flame	Colour changes to yellow Colour changes brown to violet brown	
	i. Concentrated HNO_3 + sample at room temperature ii. Concentrated HNO_3 + sample and boil on a flame	Colour changes to yellow Dissolves	
	i. Concentrated Acetic acid + sample at room temperature ii. Concentrated Acetic acid + sample and boil on a flame	Unchanged Unchanged	
	i. Concentrated Acetone + sample at room temperature ii. Concentrated Acetone + sample and boil on a flame	Unchanged Unchanged	
	i. 5 % NaOH + sample at room temperature ii. 5 % NaOH + sample and boil on a flame	Unchanged Unchanged	Wool is Confirmed

3. Test for Silk

Sl. No.	Experiment	Observation	Inference
1. Physical Test			
a	**Microscopic Test** i. Lengthwise Appearance ii. Cross Section	 Smooth, transparent, length is continuous. Round or rounded triangle	
b	**Burning Test**	The yarn shrinks away from the flame while approaching and burns slowly. The odor is similar to hair or feather	

		burning. Residue is round shiny black beads that can be crushed easily.	
2. Chemical Test			
	i. Concentrated H_2SO_4 + Sample at room temperature ii. Concentrated H2SO4 + sample and boil on a flame	Colour changes Dissolves	
	i. Concentrated HCl + sample at room temperature ii. Concentrated HCl + sample and boil on a flame	Dissolves Dissolves	
	i. Concentrated HNO_3 + sample at room temperature ii. Concentrated HNO_3 + sample and boil on a flame	Colour changes to light yellow Dissolves	
	i. Concentrated Acetic acid + sample at room temperature ii. Concentrated Acetic acid + sample and boil on a flame	Unchanged Unchanged	
	i. Concentrated Acetone + sample at room temperature ii. Concentrated Acetone + sample and boil on a flame	Unchanged Unchanged	
	i. 5 % NaOH + sample at room temperature ii. 5 % NaOH + sample and boil on a flame	Unchanged Fiber becomes smooth and shiny	Silk is Confirmed

4. Test for Acrylic

Sl. No.	Experiment	Observation	Inference
1. Physical Test			
a	**Microscopic Test** i. Lengthwise	Bright, straight, smooth and	

	Appearance ii. Cross Section	having a feel of wool. Round	
b	**Burning Test**	Fiber melts when it approaches the flame. When it is on the flame it shrinks, fuses and burns. Residue is black, irregular beads. Odor is like burning thermocoal.	
2.	**Chemical Test**		
	i. Concentrated H_2SO_4 + Sample at room temperature ii. Concentrated H2SO4 + sample and boil on a flame	Dissolves Dissolves	
	i. Concentrated HCl + sample at room temperature ii. Concentrated HCl + sample and boil on a flame	Dissolves Dissolves	
	i. Concentrated HNO_3 + sample at room temperature ii. Concentrated HNO_3 + sample and boil on a flame	Colour changes to light yellow Dissolves	
	i. Concentrated Acetic acid + sample at room temperature ii. Concentrated Acetic acid + sample and boil on a flame	Unchanged Unchanged	
	i. Concentrated Acetone + sample at room temperature ii. Concentrated Acetone + sample and boil on a flame	Unchanged Unchanged	
	i. 5 % NaOH + sample at room temperature ii. 5 % NaOH + sample and boil on a flame	Unchanged Unchanged	Acrylic is confirmed

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