CHAPTER IV

RESULT AND DISCUSSIONS

This chapter deals with the objective wise findings of the study and the relevant discussion thereon, which are presented under the following subheadings

- Effect of natural dyes extracted from marigold flowers applied on cotton and silk fabric.
- Tests reagarding the colour fastness of the dyed fabric
- Effect of combination of different natural extracts for shade variation

➢ EFFECT OF NATURAL DYES EXTRACTED FROM MARIGOLD FLOWERS APPLIED ON COTTON AND SILK FABRIC.

It was observed that after dyeing the pure Cotton and degummed mulberry silk with marigold flower extracted dyes, a beautiful beige colour was obtained on cotton and muga colour in silk fabric. It is very well shown in the given fig: 4.1.

It was noticed that silk samples had acquired darker shades than that of cotton. This is in full agreement with the chemical structures of these examined samples. This finding may be attributed to the high polarity of silk in comparison to cotton. Moreover, the silk fabric has high porosity than that of cotton fabric. It is well known that the dye ability increases with the increase in porosity. In addition, the marigold dye is found to be acidic (pH 5) in nature which dyes the protein fibre silk efficiently, and hence it has low affinity towards the cellulose fibre cotton. It is known for silk protein fibres there are electrostatic attractive forces between the molecules of side chains having positive charges and the dye molecules

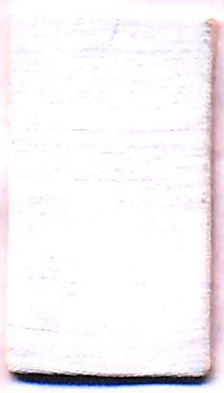
ORIGINAL		CONTROLLED	
COTTON	SILK	COTTON	SILK
			

Fig: -4. 1 THE ORIGINAL AND CONTROLLED SAMPLES OF COTTON & SILK FABRIC

COTTON		SILK	
BEFORE WASH	AFTER WASH	BEFORE WASH	AFTER WASH
			

Fig: -4. 2 WASH FASTNESS OF CONTROLLED COTTON & SILK FABRIC

may have negative charges. Whereas in the case of cotton fibre chains the nature of attraction is through van der Waals linkages with weak hydrogen bonding. These bonds are responsible for the adsorption in cotton dyeing , leading to lower dye-ability of cotton samples than silk samples at the same dye concentration.

- **TESTS REGARDING THE COLOUR FASTNESS OF THE DYED FABRIC**

As can be observed in fig:4.2, the wash fast ness of the cotton fabric without any mordant was found to be fairly good whereas, in case of silk fabric, it was found to be better. The fig:4.3 reveals the wash fastness of dyed cotton fabric using different mordants under three different conditions. It was found that simultaneous mordanting technique gave better colour fastness.

Whereas in case of silk fabric (fig:4.4), the colour fastness was somewhat better than cotton fabric.

In order to check the light fastness of the dyed fabric, they were exposed to direct sunlight, where it was found that the cotton controlled fabric had faded in comparison to the controlled silk fabric. (fig:4.5)

The fig:4.6 reveals the light fastness of dyed cotton fabric using different mordants under three different conditions. It was found that simultaneous mordanting technique gave better colour fastness.

Whereas in case of silk fabric (fig:4.7), the colour fastness was somewhat better than cotton fabric.

Overall, among the three methods of mordanting, the simultaneous mordanting technique gave best results. Good light fastness was observed in fabrics dyed with

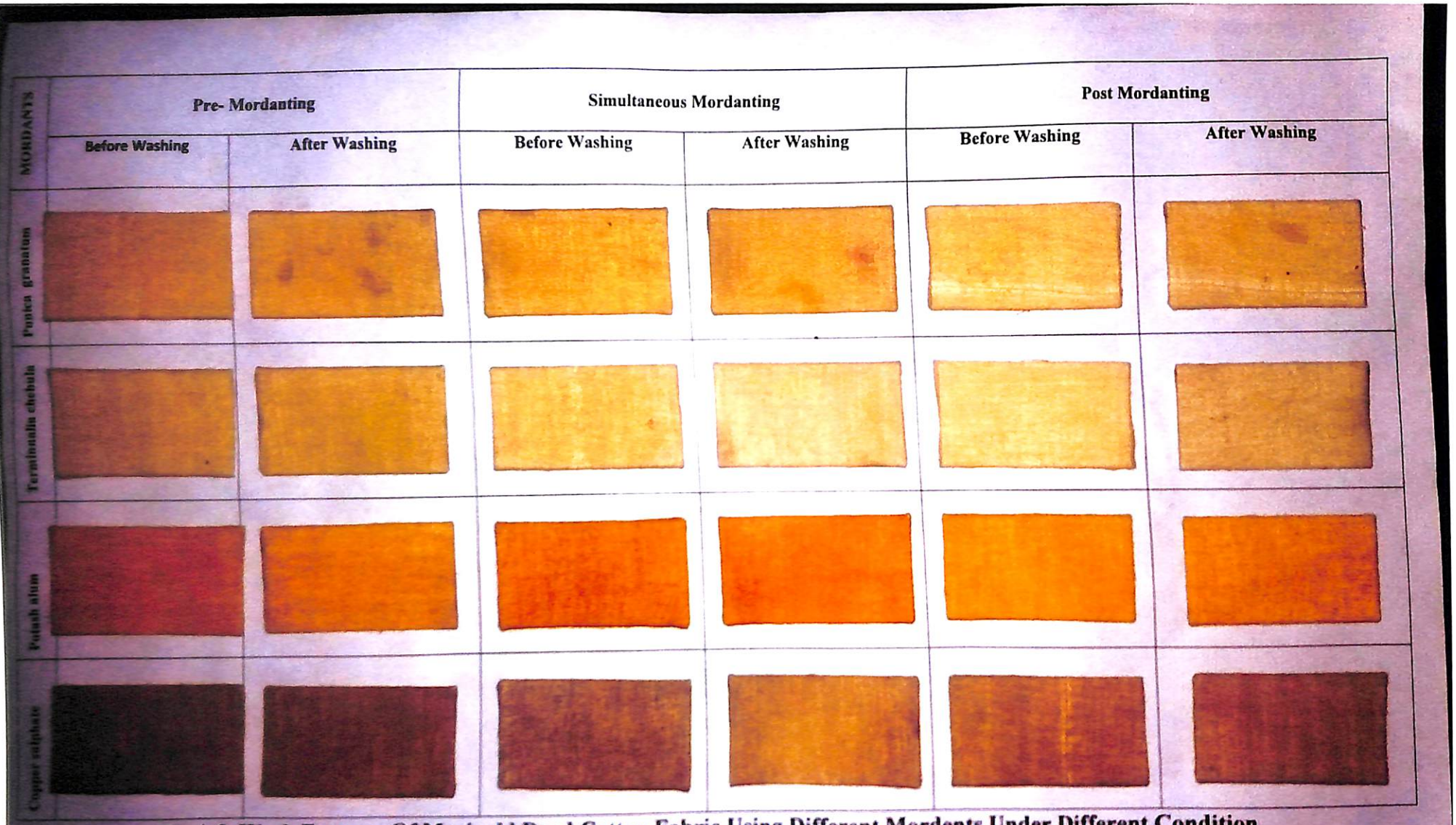


Fig4. 3 Wash Fastness Of Marigold Dyed Cotton Fabric Using Different Mordents Under Different Condition

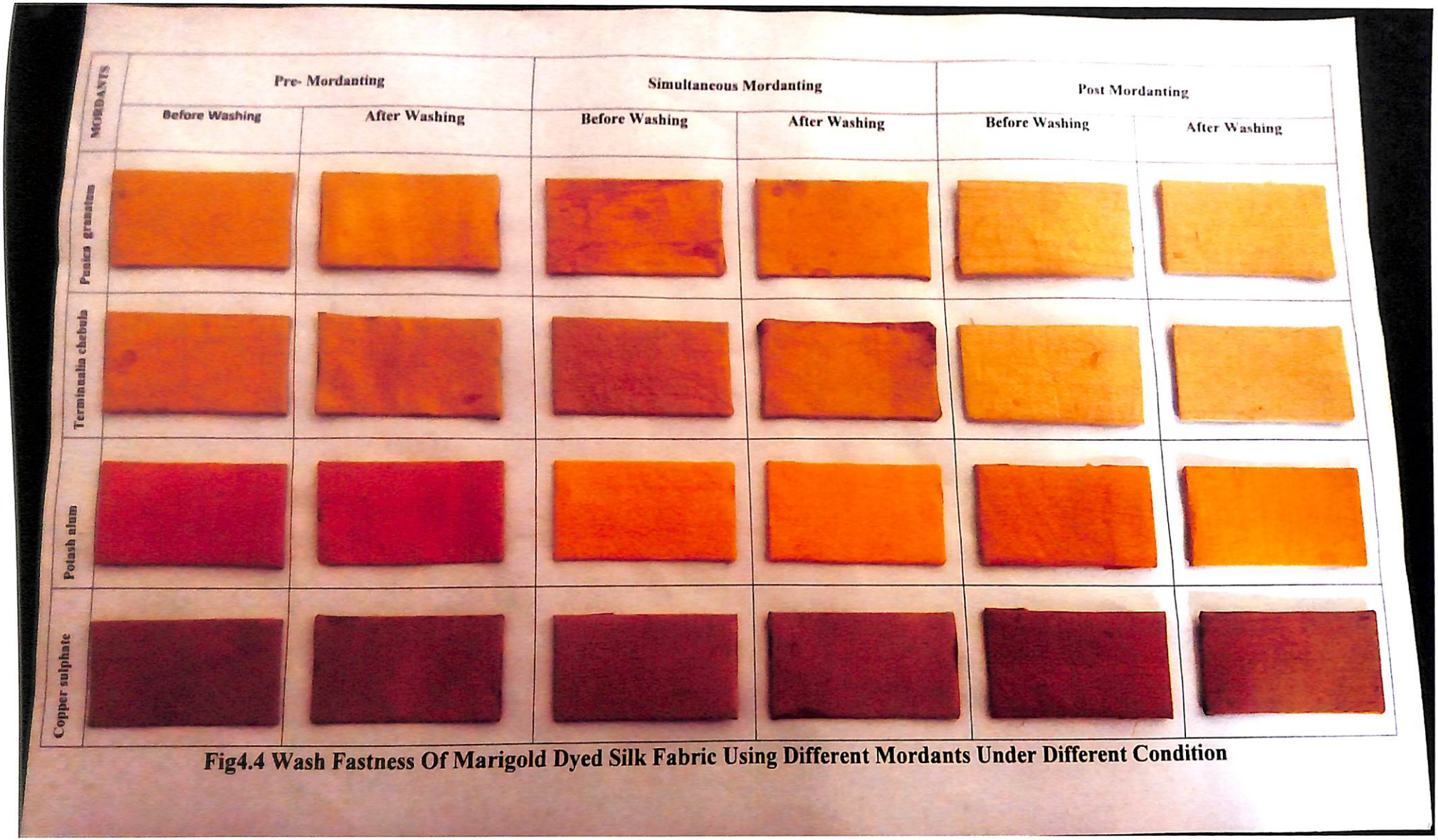


Fig4.4 Wash Fastness Of Marigold Dyed Silk Fabric Using Different Mordants Under Different Condition

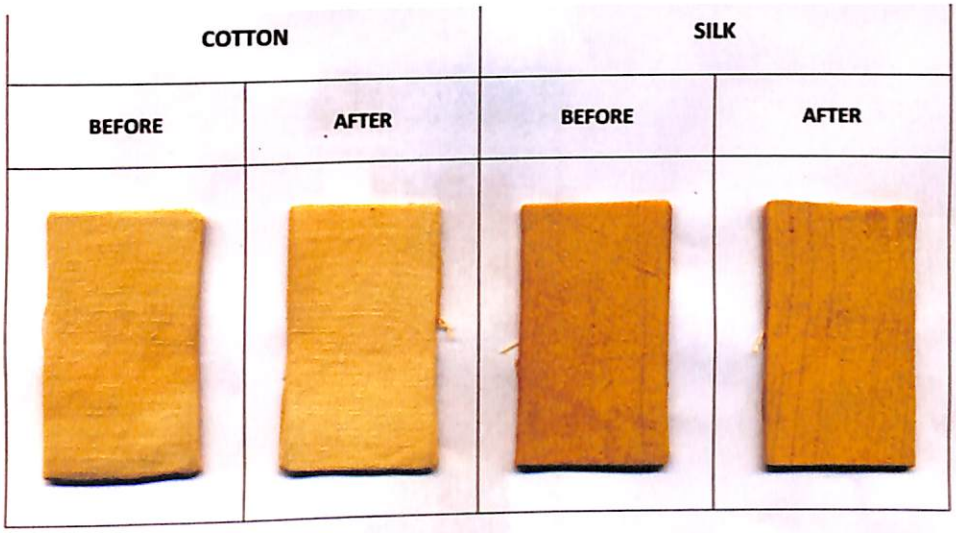


Fig: - 4.5 LIGHT FASTNESS OF CONTROLLED COTTON & SILK FABRIC

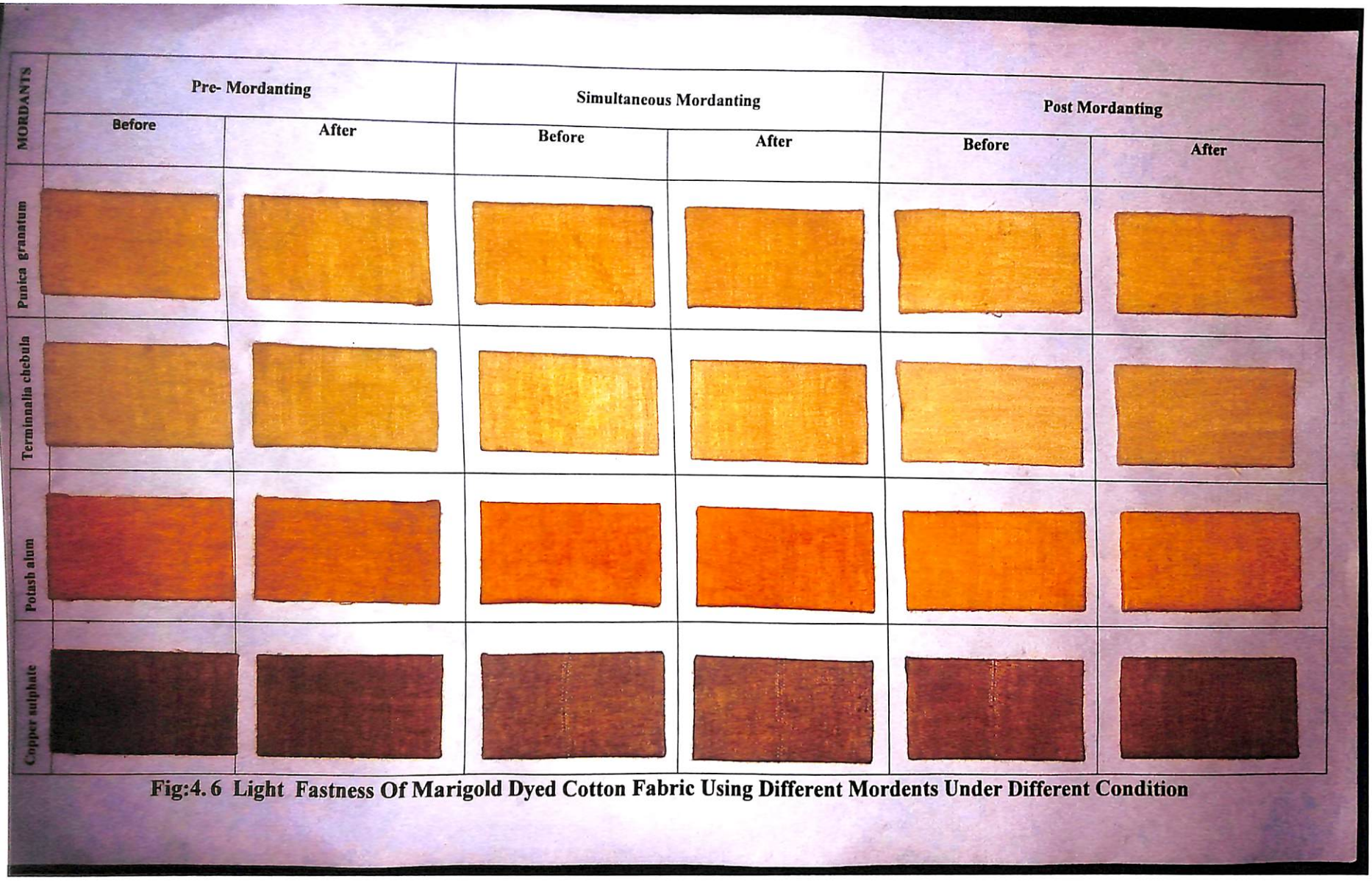


Fig:4. 6 Light Fastness Of Marigold Dyed Cotton Fabric Using Different Mordents Under Different Condition

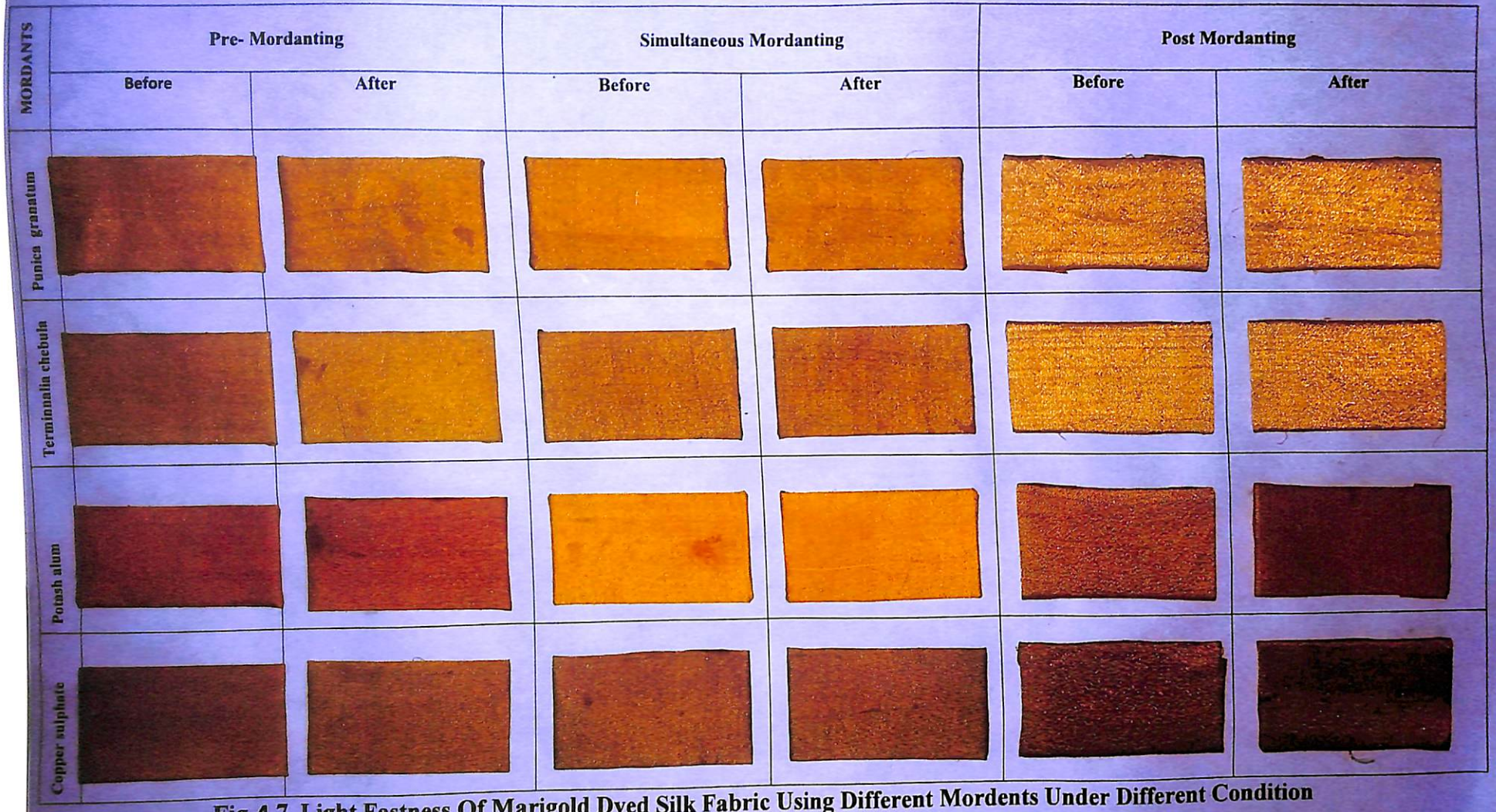


Fig :4.7 Light Fastness Of Marigold Dyed Silk Fabric Using Different Mordents Under Different Condition

natural marigold dyes. This is due to the formation of complex with the metal which protects the chromophore from photolytic degradation. Wash fastness of the dye is influenced by the rate of diffusion of the dye and state of the dye inside the fibre. The fabrics dyed with marigold dye showed moderate wash fastness.

- **Effect of combination of different natural extracts for shade variation**

The shade variation obtained by using various mordants under different conditions such as pre-mordanting, simultaneous mordanting and post-mordanting is revealed in the following table.

Table: 1. Colours obtained on cotton & silk Marigold Dyed fabric using different mordants

Sl. No.	*Mordant*	*Control*	*Pre-mordanting*		*Simultaneous Mordanting*		*Post-mordanting*	
			Cotton	Silk	Cotton	Silk	Cotton	Silk
1	*Punica granatum*	Olive Green (Cotton)	Light Olive	Light Avocado	Brass	Dark Brass	Brass	Dark Brass
2	Terminnalia Chebula	Avocado Green (silk)	Light Brass	Brass	Bullet shell	Oak Brown	Ginger Brown	Golden Brown
3	Potash alum		Cookie Brown	Orange Gold	Saffron	Orange Gold	Light golden	Bright gold
4	Copper sulphate		Tan	Raven Gold	Bronze Green	Metallic Gold	Brown Beize	Bronze

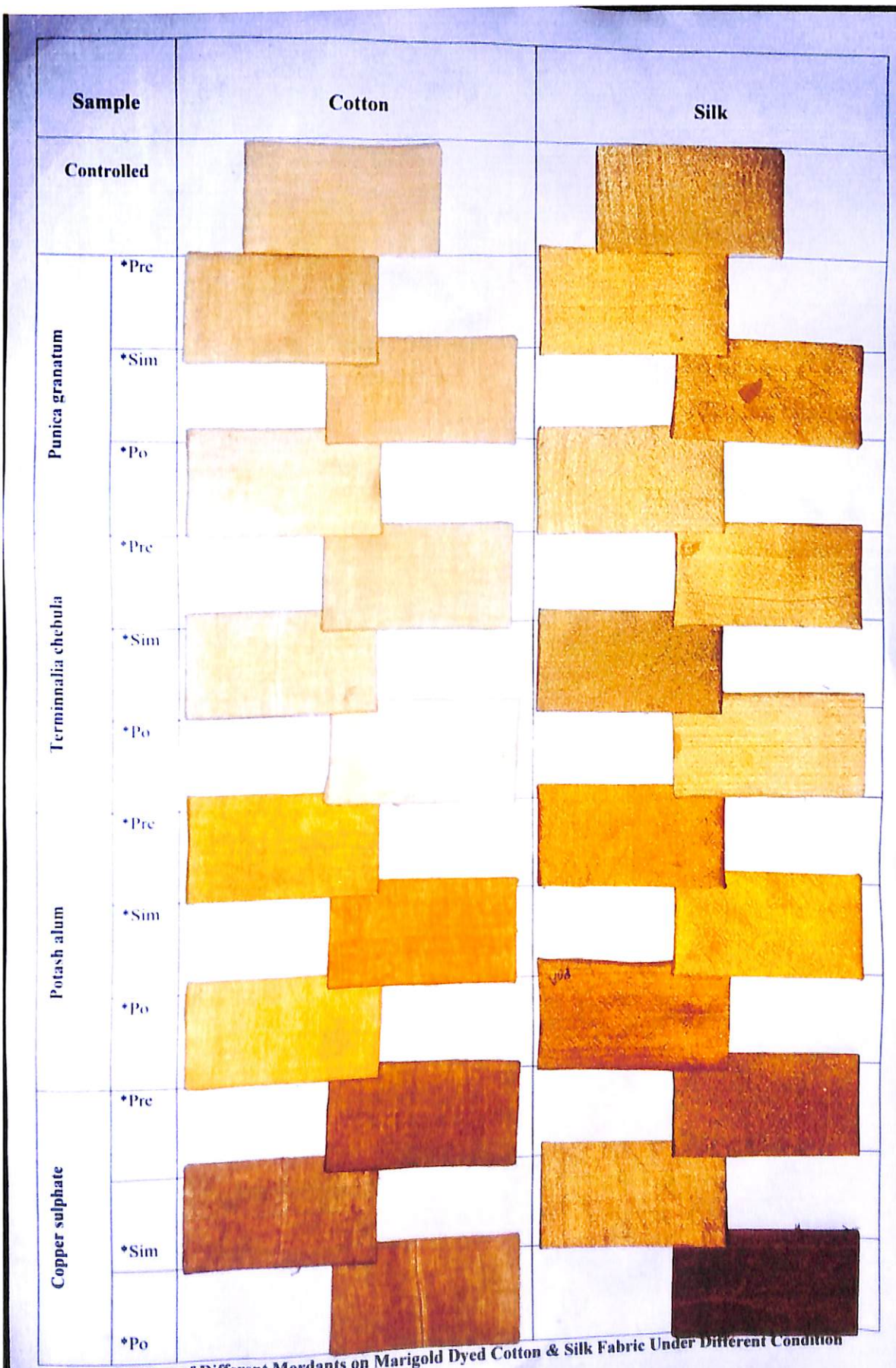


Fig:4. 8 Effect of Different Mordants on Marigold Dyed Cotton & Silk Fabric Under Different Condition

***Pre - Pre Mordanting; *Sim - Simultaneous Mordanting; *Po – post Mordanting**

The overall observation is that the fabrics dyed with marigold flower extract gave different shades of brass with *Punica granatum,* golden brown with myrobolan, bright gold with potash alum and bronze with copper sulphate. Mordants play very important role in imparting colour to the fabric. Better colour strengths are dependent on the metal salt used (Kamel et. al., 2009) . Strong coordination tendency of copper enhances the interaction between the fibre and the dye, resulting in high dye uptake (Cristea, 2006) . This is in conformity with our result that with ferrous sulphate as mordant comparatively dark fern green shades are obtained.

COMPARISON AMONG THE EFFECTS OF DIFFERENT MORDANTS ON MARIGOLD DYED FABRIC

The following figure 4.8 shows the comparison of the various shades obtained after using different mordants on cotton and silk fabric.

Fig:4.9 ARTICLES DESIGNED BY RESEARCH TEAM USING NATURAL DYES.