Extraction of natural dye from rose flower for dyeing cotton fabrics

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Abstract: Red rose is a one of the most important ornamental plant mainly growing in garden and rich in red and pink pigments. In the present study, the dyeing pigments present in flowers of red rose were extracted by using four different solvent extraction methods. The three different mordents were used to set isolate dye on cotton fabric by forming a co-ordination complex. The result revealed that, different shades of pink and yellow colour were obtained from the dye when subjected to mordent. Thus, the colour dye extracted from red rose flower can be used for coloration of cotton, silk, and wool fabrics.

Key wards- Natural dye, Red rose, Mordent, Cotton fabrics.

Introduction:

From recent past years, the use of synthetic dye exponentially increases in many important industries, such as textile, pharmaceutical, food processing etc. The synthetic dye are easy available and show superior fastness properties over natural dye. However, though synthetic dye exhibit superior fastness properties, it produces many side effects on human body causing allergic reaction. Synthetic dye is not easily degradable and bio-accumulated in natural environment. It has been estimated that, nearly 10, 00,000 tones of synthetic dye were used per annum [(1)]. The synthetic dye may cause pollution, skin diseases, health hazards to human and other important organisms [(2)]. Hence the use of ecofriendly and biodegradable dye has main concern in worldwide.

The natural dyes from plants were traced long time ago. In India 450 plants are found to be good source of natural dye. For the extraction of natural dye different plant parts are used such as seeds, flowers, leaves and barks. In the present study, an alternative dye yielding plant red rose flower were studied for its potentiality for obtaining natural dye. Red rose is a one of the most attractive and cut flower, which is mainly used as an ornamental flower.

Materials:

Source-

Fresh flowers of *Red rose* free from diseases were collected in clean and clear polythene bags from Botanical garden of K. B. P. College, Urun-Islampur, Dist- Sangli, Maharashtra.

Substrate-

The 100 % soft cotton fabric was used as substrate.

Chemicals-

The different chemicals such as Ferrous Sulphate ($FeSO_4$), Stannus Chloride ($SnCl_2$), Copper Sulphate ($CuSO_4$), 95 % ethanol were used and purchased from Merck.

Method:

Extraction of dye from petals-

Extraction of colour dye was carried out by four different methods.

Aqueous extraction method-

10 gm fresh petals of red rose were boiled in 100 ml distilled water at 100^0 C for 30 minutes. The decolorized petals were taken out from extraction solvent.

Alkaline extraction methods-

In alkaline extraction method, 10 gm fresh petals were boiled in 1 % Sodium hydroxide for 30 minutes. The decolorized petals were taken out from extraction solvent. Finally, filter the solution and used for further study.

Acidic methods-

In acidic extraction method, 10 gm fresh petals were treated with 1 % of acidic solution boil at 100^0 C for few minutes. Finally, filter the solution and used for further study.

Alcoholic Extraction methods-

In alcoholic extraction method, 10 gm fresh petals were boiled in 50 % alcohol for 30 min. filtrate was used for further study.

Scouring of cotton cloth-

Cotton cloths used for dyeing were boiled in 10 % NaOH solution for 10 min. to remove starch and other impurities from the cloth. The NaOH treated cotton cloths were then thoroughly washed with cold distilled water [(3)].

Dyeing and Mordanting-

The clean scouring cotton cloths were treated with different Mordent such as Ferrous Sulphate ($FeSO_4$), Stannous Chloride ($SnCl_2$) and Copper Sulphate ($CuSO_4$).

Result and Discussion:

The different colour shades were obtained from various extracts of red rose flower. The extracts shows variation in colour and which is mainly depends upon the extraction solvents. The Rating of fastness properties of dye and Mordent are given in the Table-1.

Table-1 Rating of fastness properties of dye and Mordent.

Sr. No.	Solvents	Cotton fabrics
1	Aqueous	Good
2	Alkaline	Good
3	Acidic	Good
4	Alcoholic	Good

The different shades of red and yellow were obtained from solvent extraction with combination of Mordent (Plate-1, 2 and 3).

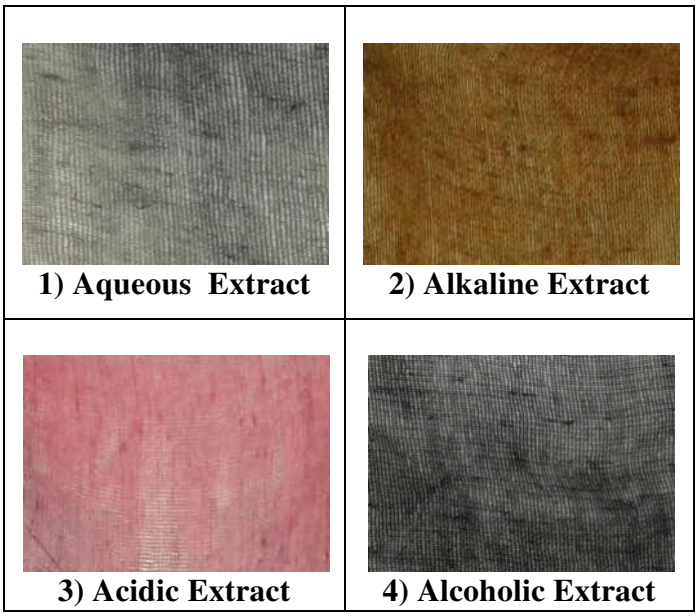

Plate- 1) Application of Ferrous Sulphate ($FeSO_4$) with different extracts on cotton fabric

Plate- 2) Application of Stannous Chloride ($SnCl_2$) with different extracts on cotton fabrics

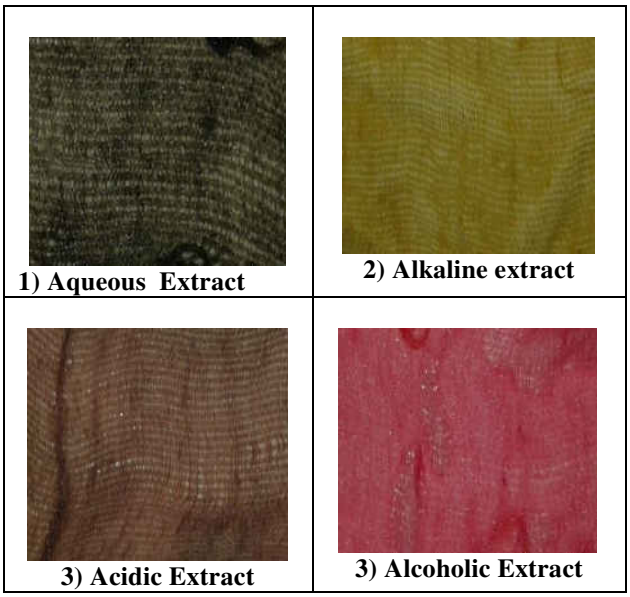

Plate- 3) Application of Copper Sulphate ($CuSO_4$) with different extracts on cotton fabric

The colour strength also depends upon use of Mordent [4]. Mordents are the metals salts having tendency to co-ordinate with dye and fibers [5]. The aqueous extract gives gray colored shade with combination of Mordent such as $FeSO_4$, $SnCl_2$ while, in combination with $CuSO_4$ gives dark black colored shade on cotton fabrics. The brown, yellow and Spanish olive colour shades were obtained in alkaline extract with $FeSO_4$, $SnCl_2$ and $CuSO_4$ Mordent respectively. The acidic extract with $FeSO_4$, $SnCl_2$ and $CuSO_4$ mordant gives pink, dark red and copper colored shades respectively. While, alcoholic extract gives Black colour with $FeSO_4$, violet with $SnCl_2$ and dark pink shade with $CuSO_4$ Mordent. Our results showed close conformity with findings of Neha Grover and Vidya Patni [3]. They obtained various colour shades with three different Mordent viz. $FeSO_4$, $SnCl_2$ and $CuSO_4$.

Conclusion:

Thus, results obtained from present investigation revealed that, the red rose flower has the dying potential as a source for cotton dying. Dyes obtained from red rose flower can be used as cost effective and economically commercial for various industries such as textile, cosmetics, leather, food and pharmaceuticals.

Acknowledgment:

The authors are thankful to Principal of K. B. P. College, Urun- Islampur; Dist- Sangli for providing research facilities.

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