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A Research about Colours Obtained from Some Important Plants Used for Plant Dyeing and Light and Friction Fastness Values of Those Colours

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Abstract: In Turkey, for dyeing of wool carpet and rug yarns, principally, madder (*Rubia tinctorium* L.), buckthorn (*Rhamnus petiolaris*), walnut (*Juglans regia* L.), onion (*Allium cepa* L.), grapevine (*Vitis vinifera* L.), garden sage (*Salvia officinalis*), quince (*Cydonia vulgaris*) and safflower (*Carthamus tinctorius* L.) and many other plants are used. In this research, 48 dyeing are realized from those plants by using dyeing method with mordant and without mordant. Colours obtained were evaluated and fixed for each plant. For those Colours, light and friction fastness values, which are important for wool carpet and rug yarns, were determined.

Key words: Natural dyeing, light fastness values, friction fastness values, plant dyeing, colours

INTRODUCTION

In Turkey, for wool carpet and rug yarns dyeing plants are used regionally. Those plants can be grown naturally as well as their cultivation can be made. The importance given to plant dyeing increases, since tourists prefer wool carpets and rugs dyed with plant dyes.

In this research, madder (*Rubia tinctorium* L.), buckthorn (*Rhamnus petiolaris*), walnut (*Juglans regia* L.), onion (*Allium cepa* L.), grapevine (*Vitis vinifera* L.), garden sage (*Salvia officinalis*), quince (*Cydonia vulgaris*) and safflower (*Carthamus tinctorius* L.) are used.

For Colours obtained from those plants light and friction fastness values, which are important for hand knotted carpets and rugs were determined.

Botanical features of plants used for dyeing are explained below according to their importance levels.

Madder (*Rubia tinctorium* L.): It is known that cultivation of madder that has important place for plant dyeing is made largely in Anatolia since Middle Ages. In 1700s, Turkey met world's madder need of 3/2 and the income level of madder that was only sold from Izmir harbor to foreign countries reached 500.000 gold liras.

It is multi-year, repent and climbing plant. It's rhizome are red and branched out. Its trunk is herbaceous, quadrilateral. On the corners of its trunks, there are strong hairs turned back and other surfaces have no hairs. Sometimes there are hairs on nodes. Leaves are strong, 4-6 leaves, circular comes from the same node. Size of leaves can be 30-115×8-25 mm and their forms can be different from lance-like to egg-like. Points are long and have short thorns, size of stalks are 15-29 mm. Main vein and its borders have thorn and hairs turned on base. Flowers are lax, very branched out; they carry many flowers and come together as pyramidal flower shape. Those can be on the point of trunk or leave borders. Longitude of stalks of flowers is 2-8 mm. Diameter of Calyx leave is 3.5-6, has pale green-like yellow and consists of united pieces that have funnel shape.

In May and August, it blooms. Mostly, it is common between hedges of fields and gardens, in Manisa, Demirci, Gördes, Konya, Aksaray, Nigde, Kayseri, KirSehir, Çorum, Yozgat, Malatya, Elazig, Adiyaman, Amasya, Ankara, Tokat, KahramanmaraS, Çanakkale, Mugla in Turkey. It is naturally common in South west and Middle Asia and the Himalayas. In West and Southwest countries, it is grown naturally. It is used for dye, but also animal feed (Makakli, 1972; Kayabasi *et al*., 1998).

Buckthorn (*Rhamnus petiolaris*): Buckthorn plant belongs to the family of Rhamnaceae of two-cotyledon (Dicotyladoneae) class.

Rhamnus petiolaris, which has roof or shrub shape, is grown on mountainous, hilly and rocky areas that are

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high as 100-1300 m and on sunny slopes, forest spaces, under or border of widely set or bright forests. Its longitude can reach about 3-4 m. Its reproduction is realized by being vaccinated or by the method of layering the vaccinated branches in to the soil. Its branches have thorn shape as being gray-brown metamorphosed mutually. Borders` branches are 4-5 cm and their young suckers are generally natural brown like red (Anonymous, 1991).

Although some kinds of Rhamnus do not shed leaves Rhamnus petiolaris shed its leaves. Their leaves are mutually for young suckers and for border braches they are together as bunches with 4-8 flowers (Davis, 1982).

In May-June, it blooms small flowers with yellow-green Colours. The longitude of stalk of flowers is 5-8 mm. Flowers, which are together, are under the leaves.

Diameter of fruits of buckthorn is 6-7 and has dark green Colour and has no hair. Inside part of the fruit there are bright yellow 2 or 4 seeds.

Buckthorn is grown in Tokat (Erbaa-Zile), Çorum (Iskilip, Mecitözü), Amasya (Vezirköprü), Sivas, Kayseri, Ankara, NevSehir (Ürgüp), Nigde, Konya, Yozgat, MaraS, Gaziantep, Sinop (Boyabat), Afyon, USak, in Anotolia. *Rhamnus petiolaris* is grown mostly in Mersin Gülek Harbor, Ankara Keçiören (Haci Kadin) Dikmen, Amasya, Konya AlaSehir, Afyon Karamanoglu, Kayseri (Western part), Kükürt mountain, from NevSehir Göreme to Ürgüp, Nigde Ortakayaardi valley, Bingöl Murat river cost, MaraS Ahir mountain, Gaziantep (Davis, 1982; Brüggemann and Böhmer, 1982).

Buckthorn was also grown in France, Spain, Germany, Hungary, Greece and Iran (Kayabasi and Arli, 2001).

In past, buckthorn fruits were used to give them Colour for nutrition substances and laxative, in present it is used for medical production. But while it has atrasen substances, its ugarden sage for nutrition substances was prohibited in some European countries (Nelson, 1951; Baytop, 1984).

While buckthorn has pigments, it was being used commonly for yarn and tissue dyeing. In present, its garden sage continues rarely and locally in our some regions.

Buckthorn fruits have many pigment compounds. The proportion of those compounds changes according to the kind, age and collecting time of the plants. Buckthorn has mostly ksantoramin, which is a glycoside of ramnatin and ramnezin and quercetin pigments as glycoside (Öztig, 1959).

Walnut (*Juglans regia L.*): Walnut that is an important plant belongs to Juglans specie of Juglandaceae family of Juglandales team. It is mostly tree. It has glands, which is full of receiver and aromatic substances. Flowers bloom during or after leafing. Its fruits are generally seeded, watery and big.

In winter, it shed leaves and can reach to 20-30 m. Young walnut trunks have light ash Colour, old walnut trunks are thick and crack peeled. Its lumber is very valuable and used for making furniture and turning lathe. While its delicious fruits are eaten, its cultivation is made for a long time. Walnut is grown in almost each region of Anatolia and its *Juglans regia* L. and *Juglans nigra* L. kinds are used for dyeing. Dye is obtained from the stem, trunk peels, leaves and green out-peels of its fruit (Baytop, 1984; Anonymous, 1991).

Onion (*Allium cepa* L.): Onion belongs to Allium specie of Liliaceae family of Liliflorae (lily) team. It has multi-year herbaceous feature and they are plants with tuber, onion and rizom. Its leaves have different appearance and mostly they have shapes like ribbon, lance and egg. Its flowers are generally big, sweet scented, Colourful. On the point of its suckers leaves have shape like gleanings unique or bunch. It has fruits like capsule or grape.

It is almost grown in each region of Anatolia. Particularly, its agriculture is made largely as plant in Bursa, Balikesir, Manisa, Izmir, Tekirdag, Kocaeli, Kayseri, Nigde.

Its out peel of bulb is used for dyeing. Since past, onion peels are used for wool dyeing in Anatolia. In addition to pirokatesin and benzokatesin acids in out node peels, there are quercetin pigments (Anonymous, 1991).

Grapevine (*Vitis vinifera L.*): Grapevine belongs to Vitis specie of Vinacea family of Rahammales team. It's a zygodactylae and climbing plant. It climbs to the shrubs or bushes near it. Mostly, it shed leaves. Its longitude can be reach 30 m. Its fresh suckers have nature and soft hairs. Its leaves are 3-5 sliced and their longitude is 7-15 mm. There are round spaces between slices. Upper surface is bright and have no hair, lower surface has sometimes hair and sometimes it has no hair.

It is a culture plant that is grown for its fruits. It is grown easily in hot and warm regions of Anatolia on appropriate soil conditions. It is also grown in Europe, Asia, Mediterranean region, North America, South America, (Chile, Argentina) and Australia.

While grapevine leaves have sucrose, invert sugar and tanning substances as well as quercetin, quercitrin and carotin, it is used for plant dyeing (Baytop, 1984; Anonymous, 1991).

Garden sage (*Salvia officinalis*): Garden sage belongs to Salvia specie of Stachyoideae sub family of Labiatae

family. Garden sage is a multi-year, scented plant. Its longitude can reach to 60-100 cm. Its like a bush and has fringe stem. Its stems goes strongly very depth in to soil. Upper soil stalks is very branched. Its leaves have long stalk and change from long egg shape to narrow elliptic shape. Leaves have Colours from white gray to silver Colour and have hairs. Generally, border of leaves have teeth in very small depth and surface of leaf is wrinkled. In June-July, on the point of plant, blue-purple, pink, white or red flowers bloom. Flowers have also sweet-scent that is unique for its specie like other green parts of the plant.

There are many kinds of Salvia officinalis different from each other. But, to distinguish from each other many culture forms of those kinds is not easy.

The most important effective substance of garden sage is vaporizable oil in proportion of 0.5-2.5%. When the compound of vaporizable oils is examined, it is seen that the fundamental substance is Thujon as well as Cineol, kafur, Borneol, Linacol, Pinen and Bornylaoetat.

It is used mostly as a medicine plant. It is used for different aims as Karmintive (for preventing stomach and abdomen ach), antihidrotic (for preventing perspiration), diuretic (for urine discharging), nerve tranqualizing, preventing stomach and intestine enteritis, analgesic (for preventing aches), expectorant and disinfectant (to die microorganisms) (Makakli, 1972; Anonymous, 1991).

Quince (*Cydonia vulgaris*): Quince belongs to Cydonia specie of Pomoideae subfamily of Rosaceae family. In winter, it shed leaves and its longitude can reach 708 m. It is a small tree. Its young suckers have bud and hairs. Stalk of leaf hat that has a heart shape can be 5-10 cm has also hair Flowers of quince are single. Petal leaves of quince are pink. It is grown principally in Sakarya, Bursa, Bilecik, Kocaeli, Ankara, Antalya, Manisa and almost in each region in Turkey. It is also grown in Iran, Turkestan, South Arabia, Italy, Greece, Yugoslavia and Bulgaria.

Its fruit is used for nutrition substance. While its nucleus has pigment, it is used for make Colour for compote, jam and marmalade.

Quince leaves pigments are consisted of Ksantofil. Ksantofil, which is Dioksi- (Alfa) carotin, is called also lutein (Baytop, 1984; Anonymous, 1991).

Safflower (*Carthamus tinctorius* L.): Safflower belongs to Carthamus specie of Compositeae family. There is on or two year species of this plant. Its longitude can reach 60-70 cm In July-September, it blooms yellow, red and orange flowers according to its species. It is grown densely in Ankara, Afyon, Kütahya, EskiSehir, Çankiri, Isparta and Sanliurfa, in Anatolia. While seed of safflower has oil, it is used for the production of oil for meals, picture dyes, maquillage equipments and liquors to give them Colour and n wool yarns dyeing. Safflower has a pigment called Carthamin in its yellow, red and orange flowers. Chemically, there are three kinds of pigments in safflower flowers. Those pigments are safflower yellow that can be dissolved easily in water, Carthamin that cannot be dissolved easily and another yellow pigment that dissolves in alkali solutions (Anonymous, 1991). With those plants of which botanical features are given, wool carpet and rug yarns were dyed by using method with mordant and without mordant.

MATERIALS AND METHODS

Materials: The materials of this research are shoot of under soil of madder (*Rubia tinctorium* L.), the fruit of buckthorn (*Rhamnus petiolaris*), bark of fruit of walnut (*Juglans regia* L.), bulb's out peel of onion (*Allium cepa* L.), leaves of grapevine (*Vitis vinifera* L.), the whole of garden sage (*Salvia officinalis*), the leaves of quince (*Cydonia vulgaris*), yellow flowers of safflower (*Carthamus tinctorius* L.) and wool carpet yarns (2, 5 Nm and without dyed or white).

Methods: For dyeing of wool carpet yarn with plants determined in material, mordanting and without mordanting methods were applied.

Preparation of dye extract: To obtain the penetration of dye matter to water, dried whole plants were broken up into small pieces. Whole plants were taken in accordence with wool weight at the rate of the 100%. Pure water was used in accordence with wool weight at the rate of the 1/50. And then plant pieces were boiled in this water for one hour. At the end of time plants remnants were filtered and putted away from the water. In this way dye extract was obtained.

Mordanting of wool carpet yarns: Firstly, wool carpet that was dyed was mordanted. For this action, in conformity with the weight of wool yarn that was dyed, 3% copper-sulfate, Ferrous sulfate, alum of aliminium, sodium clorur and potassium-bicromate mordants were taken and they were dissolved in water. Then, wool yarn that was mordanted was put in water and boiled during one hour. After one hour, wool yarn was ready for dyeing by wringing.

Dying without mordant: Previously damped wool yarn was boiled in dye extract for 1 h. During the boiling decreased water is added equal to vaporized amount. Then it was cooled, rinsed with cold water and dried at shading and airy place.

Dying with mordant: Mordanted wool yarn was boiled in the previously prepared dye extract for one hour. Then, it was cooled, rinsed with cold water and dried at shading and airyplace.

Naming the colours: Naming obtained colours was arranged subjectively. Obtained colours with these methods were named by the commission consisted of specialists of Ankara University Home Economics.

For the naming, dyed wool yarn samples were spreat on a white ground where the sunlight comes from the side and they formed into groups according to their colours and tone differences. And also Harmancioglu (1955) was considered for the naming of the colours.

Light fastness determination: Light fastness determination was done according to TS 867 prepared by TSE (For Dyed or Pressed Textiles Colour fastness Testing Methods-Colour Fastness Determination Methods Facing Sunlight) (Anonymous, 1984 a) and DIN 5033 (Farbmessung Begriffe der Fabrmetrik) (Anonymous, 1970).

For light fastness determination, (scale is bands by using different blue dyes that are leveled 1-8) blue wool scale was used with wool yarn samples. Blue scale was pasted on cardboard, its length is 1 cm and width is 6 cm They were pasted 1-8 in turns. Dyed wool yarn samples were wrapped parallels each other on cardboard with 1cm length and 6cm width. Bands were cut in 7 and 3 cm width and were put on each other and a volume was made. With wool yarn samples prepared as two parallels that were put on the cardboard before, blue wool scale were put on this volume. Wool yarn samples and half of the blue wool scale was closed as well as the other half of the scale were kept on the exposure of the sun light.

This scale was put before the sun light in angle of 45° and was controlled each day. In conformity with fading, wool yarn samples were evaluated.

Friction fastness determination: Friction fastness determination was done according to TS 717 prepared by TSE (For Dyed or Pressed Textiles Colour Fastness Testing Methods-Determination of Colour Fastness to Friction) (Anonymous, 1978) and TS 423 (Using Methods of the Gray Scale for Sum up the Staining "leaking of dye" and DisColouring "Chancing of Colour", in the Determination of Colour Fastness of Textiles) (Anonymous, 1984 b).

Dyed wool yarns were wrapped on each cardboard material in 14×5 cm in parallels and side-by-side. Cotton tissue with bezayagi that was cut in 5×5 cm and that was dry and without dye was put at the point of experiment device, dry samples which were prepared two parallels under the weightiness of 900 g, were made rub on a floor line in proportion of their 10 cm part during 10 sec in 10 times. Colour flow in to cotton tissue without dry was evaluated in conformity with gray scale and TS 423.

RESULTS AND DISCUSSION

Madder, buckthorn, walnut, onion, grape vine, garden sage, quince and safflower plants were taken in proportion of 100% according to the weight of yarn that was to be dyed, then mordanting dyeing were realized by using Alum of Aliminium without mordant, copper-sulfate, Ferrous sulfate, Potassium-bicromate and Sodium-cloride mordants in proportion of 3%. Totally 48 dyeing were obtained, 40 are with mordant and 8 are without mordant. Colours obtained as result of dyeing were fixed and given in Table 1.

When Table 1 is examined, with madder plant and Alum of Aliminium bitter red pepper, with copper-sulfate tree stem, with Ferrous sulfate black brown, with Potassium-bicromate claret red, with Sodium-cloride sumac and dusty rose without mordant Colours were obtained. When the Colours are compared with the experiments made before, those Colours are similar to the Colours found in experiments made by Harmancioglu (1955) and Kayabasi *et al.* (1998).

From buckthorn plant, with Alum of Aliminium dry oak leaf, with copper-sulfate olive oil, with Ferrous sulfate bitter brown; with Potassium-bicromate tile red, with Sodium-cloride amber and light amber without mordant Colours were obtained. In this experiment, Colours obtained from buckthorn plant are similar to the Colours found by Harmancioglu (1955).

From walnut plant, with Alum of Aliminium light milky brown, with copper-sulfate green brown, with Ferrous sulfate dark soil; with Potassium-bicromate dirty beige, with Sodium-cloride brown and red brown without mordant Colours were obtained. In this experiment, Colours obtained from buckthorn plant are considerably similar to the Colours found by Harmancioglu (1955).

From onion plant, with Alum of Aliminium light mustard, with copper-sulfate dark cumin, with Ferrous sulfate black brown; with Potassium-bicromate dark cinnamon, with Sodium-cloride light cinnamon and cooked apple without mordant Colours were obtained. Colours obtained in the experiment made with onion lump peel by Kayabasi and Sanli (2000) are similar to each other.

From grape vine plant, with Alum of Aliminium dark straw yellow, with copper-sulfate mustard, with Ferrous sulfate dark green brown; with Potassium-bicromate dark

Table 1: The colours obtained from plants

Plant name	Plant ratio (%)	Name of the mordant	Mordant ratio (%)	Obtained from colours
Madder				
(*Rubia tinctorium L.*)	100	Alum of Aliminium	3	Bitter red pepper
		Copper-sulfate		Tree stem
		Ferrous sulfate		Black brown
		Potassium-bicromate		Claret red
		Sodium-cloride		Sumac
		Without mordant		**Dusty rose**
Buckthorn				
(*Rhamnus petiolaris*)	100	Alum of Aliminium	3	Dry oak leaf
		Copper-sulfate		Olive oil
		Ferrous sulfate		Bitter brown
		Potassium-bicromate		Tile red
		Sodium-cloride		Amber
		Without mordant		**Light amber**
Walnut				
(*Juglans regia L.*)	100	Alum of Aliminium	3	Light milky brown
		Copper-sulfate		Green brown
		Ferrous sulfate		Dark soil
		Potassium-bicromate		Dirty beige
		Sodium-cloride		Brown
		Without mordant		**Red brown**
Onion				
(*Allium cepa L.*)	100	Alum of Aliminium	3	Light mustard
		Copper-sulfate		Dark cinnamon
		Ferrous sulfate		Black brown
		Potassium-bicromate		Dark cinnamon
		Sodium-cloride		Light cinnamon
		Without mordant		**Cooked apple**
Grapevine				
(*Vitis vinifera L.*)	100	Alum of Aliminium	3	Dark straw yellow
		Copper-sulfate		Mustard
		Ferrous sulfate		Dark green brown
		Potassium-bicromate		Dark yellow
		Sodium-cloride		Dark beige
		Without mordant		**Light yellow**
Garden sage				
(*Salvia officinalis*)	100	Alum of Aliminium	3	Nile green
		Copper-sulfate		Leaking olive oil
		Ferrous sulfate		Soil
		Potassium-bicromate		Brine leaf
		Sodium-cloride		Dark milky brown
		Without mordant		**Light milky brown**
Quince				
(*Cydonia vulgaris*)	100	Alum of Aliminium	3	Red salmon
		Copper-sulfate		Light brown
		Ferrous sulfate		Red soil
		Potassium-bicromate		Dark dusty rose
		Sodium-cloride		Light dusty rose
		Without mordant		**Dusty rose**
Safflower				
(*Carthamus tinctorius L.*)	100	Alum of Aliminium	3	Light yellow
		Copper-sulfate		Light khaki
		Ferrous sulfate		Khaki
		Potassium-bicromate		Green yellow
		Sodium-cloride		Light yellow
		Without mordant		**Light straw yellow**

yellow, with Sodium-cloride dark beige and light yellow without mordant Colours were obtained. Colours obtained from grape vine in this experiment, are considerably similar to the Colours obtained by Kayabasi and Etikan (1999).

From garden sage plant, with Alum of Aliminium Nile green, with copper-sulfate leaking olive oil, with Ferrous sulfate soil; with Potassium-bicromate brine leaf, with Sodium-cloride dark milky brown and light milky brown without mordant Colours were obtained. Colours obtained from garden sage by using various mordanting methods made by Ölmez and Kayabasi (2002). are considerably similar to the Colours obtained in this experiment.

From quince plant, with Alum of Aliminium red salmon, with copper-sulfate light brown, with Ferrous sulfate red soil, with Potassium-bicromate dark dusty rose, with Sodium-cloride light dusty rose and dusty rose

Table 2: Light and friction fastnesses value of the colours obtained from plants

Plant name	Plant ratio (%)	Name of the Mordant	Mordant ratio (%)	Light fastness value	Friction fastness value
Madder					
(*Rubia tinctorium L.*)	100	Alum of Aliminium	3	4	2
		Copper-sulfate		6	2
		Ferrous sulfate		8	2
		Potassium-bicromate		6	3
		Sodium-cloride		4	2
		Without mordant	3	2	
Buckthorn					
(*Rhamnus petiolaris*)	100	Alum of Aliminium	3	3	2-3
		Copper-sulfate		3	3
		Ferrous sulfate		7	2-3
		Potassium-bicromate		4	2-3
		Sodium-cloride		2	3-4
		Without mordant	2	3	
Walnut					
(*Juglans regia L.*)	100	Alum of Aliminium	3	6	3-4
		Copper-sulfate		5	3
		Ferrous sulfate		5	3
		Potassium-bicromate		6	3
		Sodium-cloride		5	3
		Without mordant	5	3	
Onion					
(*Allium cepa L.*)	100	Alum of Aliminium	3	2	2-3
		Copper-sulfate		6	3
		Ferrous sulfate		8	1-2
		Potassium-bicromate		4	3
		Sodium-cloride		3	3
		Without mordant	5	3	
Grapevine					
(*Vitis vinifera L.*)	100	Alum of Aliminium	3	4	2-3
		Copper-sulfate		5	3
		Ferrous sulfate		4	1-2
		Potassium-bicromate		5	3
		Sodium-cloride		6	3-4
		Without mordant	5	3	
Garden sage					
(*Salvia officinalis*)	100	Alum of Aliminium	3	2	3
		Copper-sulfate		5	3
		Ferrous sulfate		4	2-3
		Potassium-bicromate		4	3
		Sodium-cloride		2	3-4
		Without mordant	2	3-4	
Quince					
(*Cydonia vulgaris*)	100	Alum of Aliminium	3	4	3-4
		Copper-sulfate		5	2-3
		Ferrous sulfate		5	1-2
		Potassium-bicromate		5	3-4
		Sodium-cloride		3	3
		Without mordant	4	2-3	
Safflower					
(*Carthamus tinctorius L.*)	100	Alum of Aliminium	3	1	3
		Copper-sulfate		4	2-3
		Ferrous sulfate		4	1-2
		Potassium-bicromate		2	3-4
		Sodium-cloride		2	4-5
		Without mordant	2	4	

without mordant Colours were obtained. In the experiment realized by Arli *et al*. (2003) Colours obtained from quince leaf are considerably similar to the Colours obtained in this experiment.

From safflower`s yellow flowers, with Alum of Aliminium light yellow, with copper-sulfate light khaki, with Ferrous sulfate khaki; with Potassium-bicromate green yellow, with Sodium-cloride light yellow and light straw yellow without mordant Colours were obtained. Colours obtained from safflower are considerably similar to the Colours obtained by the experiment made by Kizil and Kayabasi (2001).

Wool carpets and rugs that are weaved by working very hard are art products should be protected against the

outside effects. Thus, light and friction fastness (it is a grading of the resistances against outside effects) values of carpet and rug yarns should be very good. So, light and friction fastness values of plants used in this experiment were fixed and given in Table 2.

When Table 2 is examined, it is seen that Colours` obtained by mordant and without mordant methods from madder, light fatness values are between 3-8. Dyeing without mordant gave minimum value as 3; Ferrous sulfate mordant gave maximum value as 8. Friction fastness values are between 2-3. Dyeing made by potassium-bicromate gave maximum value as 3, all other dyeing gave the value as 2.

Light fastness values obtained from buckthorn plant by using mordant and without mordant methods change between 2-7. Dyeing made by Sodium-cloride and dyeing without mordant gave minimum value as 2, Ferrous sulfate mordant gave maximum value as 7. Friction fastness values change between 2-3 and 3-4. Dyeing made by Alum of Aliminium, Ferrous sulfate and Potassium-bicromate gave minimum value as 2-3 and Sodium-cloride mordant gave maximum value as 3-4.

Light fastness values obtained from out peel of Walnut by using mordant and without mordant methods change between 5-6. Alum of Aliminium and Potassium-bicromate gave maximum value as 6; all dyeing gave minimum value as 5. Friction fastness values change between 3 and 3-4. Dyeing made by Alum of Aliminium gave maximum value as 3-4, for all other dyed yarns minimum value found as 3.

Light fastness values obtained from out peel of onion lump by using mordant and without mordant methods change between 2-8. Dyeing made by Alum of Aliminium gave minimum value as 2; Ferrous sulfate gave maximum value as 8. Friction fastness values change between 1-2 and 3. Dyeing made by copper-sulfate, Potassium-bicromate and Sodium-cloride mordants and dyeing without mordant gave maximum value as 3 and Ferrous sulfate mordant gave minimum value as 1-2.

Light fastness values obtained from grape vine plant leaves by using mordant and without mordant methods change between 4-6. Alum of Aliminium and Ferrous sulfate mordant gave minimum value as 4; Sodium-cloride mordant gave maximum value as 6. Friction fastness values change between 1-2 and 3-4. Sodium-cloride mordant gave maximum value as 3-4 and Ferrous sulfate mordant gave minimum value as 1-2.

Light fastness values obtained from garden sage plant by using mordant and without mordant methods change between 2-5. Alum of Aliminium and Sodium-cloride mordant and dyeing without mordant gave minimum value as 2; copper-sulfate mordant gave maximum value as 5. Friction fastness values change between 2-3 and 3-4. Ferrous sulfate mordant gave minimum value as 2-3 and Sodium-cloride mordant and dyeing without mordant gave maximum value as 3-4.

Light fastness values obtained from quince leaves by using mordant and without mordant methods change between 3-5. Sodium-cloride mordant gave minimum value as 3; copper-sulfate, Ferrous sulfate and Potassium-bicromate mordants gave maximum value as 5. For friction fastness values, minimum value was found as 1-2, maximum value was found as 3-4. Ferrous sulfate mordant gave minimum value 1-2, Alum of Aliminium and Potassium-bicromate gave maximum value 3-4.

Light fastness values obtained from safflower flowers by using mordant and without mordant methods change between 1-4, friction fastness values change between 1-2 and 4-5. For light fastness values, Alum of Aliminium mordant gave minimum value as 1, copper-sulfate and Ferrous sulfate mordants gave maximum value as 4. For friction fastness values, Ferrous sulfate mordant gave minimum value as 1-2; Sodium-cloride mordant gave maximum value as 4-5.

In this research, Colours obtained from madder, buckthorn, walnut, onion, grape vine, garden sage, quince and safflower plants were compared with the researches about this subject. However, while there are no enough experiments about this subject light and friction fastness of those Colours were not discussed.

Finally, if Colours obtained from plants used for this research and fastness values of those Colours are considered, their garden sage for hand weaved carpets and rugs is appropriate.

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