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Differences in Tamarind, Kandis Acid, and Starfruit Mordants in the Effect of Dyeing Kedondong Pagar (Lannea Nigritana) Bark Extract on Cotton Fabric

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ABSTRACT
The retentiveness of the color is influenced by the mordant. Mordant can be an corrosive. This ponder points to portray the contrast in mordant on the comes about of coloring kedondong pagar bark extricate on cotton fabric. This sort of investigate is exploratory inquire about. This consider employments essential information determined from 15 panelists, analyzed by the Friedman K-related Test test with the Factual Item and Benefit Arrangement application. The results of dyeing with tamarind mordant produced Clam Shell Pink color #D2AAA0. The color lightness is quite bright. Washing resistance in the first and second washes, the color has no change at all; in the third wash, the color changes slightly or decreases. The result of dyeing with the kandis acid mordant produces Clam Shell Pink color #E1B19F. The light darkness of the color is very bright. Washing resistance in the first and second washings, the color changes or decreases slightly; in the third washing, the color is seen to change or decrease. The result of dyeing with belimbing wuluh mordant produces warm brown color #D3A599. Light dark color. Washing resistance: in the first wash, the color has no change at all; in the second wash and the third wash, the color changes slightly or decreases. The comes about of the investigation of the Friedman K-related Test test for dim light color with the result that H_a is acknowledged and H0 is rejected, meaning there's a noteworthy distinction. washing resistance with the result that H_a is acknowledged and H_0 is rejected, meaning there's a noteworthy contrast. It can be concluded that there is a difference in the mordant of tamarind, kandis acid, and starfruit on the dyeing of kedondong pagar bark extract.

KEYWORDS

Tamarind Mordant, Candlenut Acid Mordant, Bark of Kedondong Pagar

INTRODUCTION

The textile industry is growing so rapidly that, slowly, natural coloring began to be abandoned, switching to the use of synthetic substances that are easily available. The use of synthetic substances is dangerous because synthetic substance waste contains chemical compounds (Rien Ana et al., 2017). Synthetic dye waste is difficult to decompose if disposed of in soil and rivers, so it has a bad impact and can pollute the environment (Fredecia & Adriani, 2024). Therefore, the many adverse effects caused by the use of synthetic substances, the textile industry should realize the importance of preserving the environment by looking for other alternatives, such as coloring that does not have

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a negative impact on the environment (Hasanah et al., 2017). Dyeing with natural dyes can be used as a substitute for synthetic substances.

Indonesia is rich in natural resources; various plants are found in Indonesia that can be used for natural coloring of textiles. The use of natural dyes is a solution to the use of synthetic substances because it will not pollute the environment, although it requires a long process in making natural dyes, but the manufacture of natural dyes is easy to do and very simple. Natural dyes, which are materials derived from nature and are environmentally friendly, can be obtained from various plants such as roots, stems, bark, leaves, fruit, flowers, fruit seeds, and even in land and sea animals (Putri & Adriani, 2023). The bark of kedondong pagar has never been used as a natural dye extract. The bark of kedondong pagar (Lannea nigritana) can be used as a natural dye because it contains tannins. The bark of kedondong pagar (Lannea nigritana) contains tannins and phenolic compounds (Addo et al., 2017). Plant kedondong pagar is usually used as a fence in the yard of the house, the edge of rice fields, and gardens (Rafiqah et al., 2019).

Textile coloring from the bark of kedondong pagar is done by a dyeing process. Coloring could be a step taken in giving color to material materials so that the color can be equally conveyed all through the surface of the texture (Oktarina et al., 2015). In dyeing, natural dyes are influenced by the type of textile material used; the selection of the right material can produce good dye absorption, such as natural materials such as cotton, wool, and silk (Nabila & Adriani, 2024). The fabric utilized in this coloring is cotton. cotton may be a fabric determined from cotton filaments with great color retention into the surface of the fabric (Sartika & Adriani, 2023).

specifically as a color generator (Cahya & Novrita, 2023). The mordants utilized are tamarind, candis corrosive, and starfruit. Tamarind Severe (Tamarindus Indica.Linn) includes a pH of 2.1-2.3 and produces a reasonably shinning color since the higher the corrosive pH, the brighter the color delivered (Adriani et al., 2016). Within the case of the Kandi's corrosive stringent, which encompasses a pH of 1.5-1.7, it produces shinning colors and level colors; the lower the pH esteem, the more progressively shinning and level colors are delivered (Almagita et al., 2017). Belimbing wuluh has an corrosive substance with a pH of 4.47; the higher the corrosive pH utilized, the compliment the coloring comes about (Alvina et al., 2016). Based on the comes about of inquire about conducted by the creator with tamarind severe, kandis corrosive, and starfruit on the comes about of coloring kedondong pagar (Lannea nigritana) bark extricate on cotton fabric utilizing room temperature with the post-mordanting strategy, diverse levels of color are delivered since they have different pH levels, based on the test results that the creator has done with 50 grams/L of stringent:

Tamarind joins a pH of 3.3, kandis destructive contains a pH of 3.0, and starfruit consolidates a pH of 3.2. Typical pH contains a esteem of 7; on the off chance that the pH esteem > 7, it shows that the substance has antacid properties, whereas the pH esteem < 7 has causticity. pH shows a tall degree of sharpness, and pH 14 demonstrates the most noteworthy degree of basicity (Harvyandha et al., 2019). This implies that the candis corrosive severe contains a higher degree of corrosiveness compared to belimbing wuluh and tamarind. So that it'll be seen within the comes about of inquire about on contrasts in color heading, light obscurity, and color washing resistance coming about from coloring cotton materials utilizing kandis corrosive stringent, tamarind, and starfruit wuluh.

This research looks at differences in color names (hue). The color darkness (value) and washing resistance produced from tamarind, kandis acid, and starfruit mordants are not yet known from previous studies. Dyeing with kedondong pagar bark extract produces new colors that have never been studied before.

METHOD

This investigate strategy employments the test strategy. Agreeing to Sugiyono (2009:72), test investigate strategies can be translated as inquire about strategies utilized to discover the impact of certain medicines on others in controlled conditions. The question of this investigate is cotton fabric

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colored with extricate of kedondong pagar bark with tamarind severe and candis corrosive. The instrument in this inquire about is the title of the color, light obscurity, and washing resistance on the coloring of the bark of kedondong pagar (lannea nigritana) on cotton fabric with tamarind severe, kandis corrosive, and star fruit.

The research instrument was a questionnaire that was assessed by panelists. The panelists totaled 15 people, namely 3 lecturers who had taught textiles in the Family Welfare Science department of Padang State University. 12 understudies of the Office of Family Welfare of Padang State College who have passed the material course.

The survey information that has been collected is at that point prepared in unthinkable frame with appraisal categories for color names utilizing the colorblind right hand application. Information preparing utilizing Measurable Item and Related Test through the K-Friedman Related Test test.

RESULT AND DISCUSSION

1. Color Name

Tabel 1. Name of colors produced by dyeing Kendondong Pagar bark

Dyeing	Color	RGB & Color Code	Color name	F
No Mordant		R 200 G 145 B 130 #C89182	Dark Salmon Pink	15
Tamarind Mordant		R 210 G 170 B 160 #D2AAA0	Clam Shell Pink	15
Kandis Acid Mordant		R 225 G 177 B 159 #E1B19F	Clam Shell Pink	15
starfruit Mordant		R 211 G 165 B 153 #D3A599	Warm Brown	14

Based on the comes about of the ponder, the color created from the coloring of cotton fabric utilizing the extricate of the stem bark of kedondong pagar (lannea nigritana) without severe is Dim Salmon Pink, with color code #C89182, containing a esteem of 200 ruddy colors, 145 green colors, and 130 blue colors. On dyeing with tamarind mordant, Clam Shell Pink with color code #D2AAA0 contains a value of 210 red colors, 170 green colors, and 160 blue colors. In dyeing with the kandis acid mordant, Clam Shell Pink with color code #E1B19F contains 225 red, 177 green, and 159 blue colors. Whereas the coloring with starfruit severe is warm brown with color code #D3A599, containing a esteem of 211 ruddy, 165 green, and 153 blue. After the research, the extract of Kedondong Pagar (Lannea nigritana) stem bark can be used as a natural dye. The color produced without mordant is dark salmon pink, with the provision of tamarind mordant and kandis acid, which can produce different color levels.

Within the coloring of cotton fabric utilizing extricate of kedondong pagar (lannea nigritana) stem bark without severe, the coming about color is Dim Salmon Pink with R 200 G 145 B 130 color code #C89182 and a rate of 100% of the number of panelists. In coloring utilizing tamarind severe, the coming about color is Clam Shell Pink with R 210 G 170 B 160 color code #D2AAA0 and a rate of 100% of the number of panelists. In investigate (Adriani et al., 2016), it was expressed that the coloring of Senduduk natural product with Tamarind severe created Popstar Ruddy Violet color with code # 7F4861, which has an R (Ruddy) esteem of 127 (49.8%), G (Green) 072 (38.2%), and B

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(Blue) 097 (38%). In coloring utilizing the kandis corrosive stringent, the coming about color is Clam Shell Pink with R 225 G 177 B 159 color code #E1B19F and a rate of 100% of the number of panelists. In investigate (Dahlia & Adriani, 2019), it was expressed that in coloring silk materials utilizing iler leaf extricate (Plectranthus scutellarioides L. Benth) with kandis corrosive stringent (Garcinia xanthochymus), the expansion of NaCl 130 grams delivered the color title (Tint) Dull Purple color code #5F1E5F, which has a esteem of R (Ruddy) 95 or 37.25%, G (Green) 30 or37.25%. , and B (Blue) 95 or 37.25%.In the coloring of kedondong pagar (lannea nigritaan) bark extricate, the color created with kandis corrosive stringent 80% of panelists expressed that it was exceptionally shinning, in differentiate to the comes about of investigate (Almagita et al., 2017), which expressed that the coloring of silk materials utilizing common colors of andong leaf extricate (Cordyline Fruticosa L. A. Cheval) utilizing corrosive severe expressed that it was shinning. This implies that there are contrasts within the severe of tamarind, kandis corrosive and starfruit wuluh due to the impact of pH, the higher the pH esteem of the corrosive, the darker the color heading can be seen from the RGB code that the ruddy color is less created by tamarind stringent since of the higher pH of tamarind which is 3.3 while kandis corrosive encompasses a pH of 3.0 so that the ruddy course of kandis corrosive is more. In line with investigate (Almagita et al., 2017), it was said that the results of dyeing with kandis acid mordant are brighter than dyeing with tamarind mordant because of the lower pH, so that more red color content is present.

2. Dark Light

Tabel 2. Darkness and Lightness of Colors Produced from Dyeing Kendondong Pagar Bark

No.	Dyeing	Dark Light Color (Value)		Ket
		Frequency	Percentaqe	
1	No Mordant	15	100%	Less Bright
2	Tamarind Mordant	12	80%	Bright Enough
3	Kandis Acid Mordant	12	80%	Very Bright
4	starfruit Mordant	11	73%	Bright

Based on the comes about of the ponder, the dull light of the color delivered from the coloring of cotton fabric utilizing kedondong pagar (lannea nigritana) stem bark extricate without severe is less shinning (100%), with tamarind mordant is quite bright (80%), and with kandis acid mordant is very bright (80%). While with starfruit, mordant is bright (73%).

Based on the comes about of investigate on the obscurity of the color (esteem) created on the coloring of cotton materials utilizing the extricate of the bark of Kedondong Pagar (Lannea Nigritana) with no severe, without stringent, 100% of the panelists expressed that it was less shinning. Within the coloring of the extricate of the bark of the fence mondong (lannea nigritaan), the color delivered with tamarind stringent was 80% of the panelists who expressed that it was very shinning, in differentiate to the investigate (Adriani et al., 2016) that expressed that the coloring of Senduduk natural product extricate (Melastoma Candidum. D.Don) with tamarind severe (Tamarindus Indica.Linn) delivered a fairly shinning color. Within the coloring of kedondong pagar (lannea nigritaan) bark extricate, the color created with kandis corrosive severe was 80% of the panelists who expressed that it was exceptionally shinning, in differentiate to the comes about of inquire about

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(Almagita et al., 2017), which expressed that the coloring of silk materials utilizing normal colors of andong leaf extricate (Cordyline Fruticosa L. A. Cheval) utilizing corrosive stringent was exceptionally shinning. Within the coloring of kedondong pagar (lannea nigritaan) stem bark extricate, the dim light of the color created with starfruit stringent was 73% of panelists who were shinning. In differentiate to the comes about of inquire about (Alvina et al., 2016), it is expressed that the coloring of silk materials utilizing characteristic colors, Kesumba Seed extricate (Bixa Orellana L.), with starfruit stringent on the dull light of the coming about color is exceptionally bright. This implies that there's a distinction in tamarind severe and kandis corrosive within the dull light of color due to the impact of pH; the lower the pH esteem of the corrosive, the lighter the coming about color, in understanding with the heading of color in tamarind severe and kandis corrosive, that kandis corrosive has more red content so that kandis corrosive in the dim light of color is categorized as exceptionally shinning. Whereas coloring with tamarind severe is categorized as light.

3. Wash Resistance

Based on the comes about of the washing resistance inquire about created on the coloring of cotton materials utilizing extricates of kedondong pagar (Lannea nigritana) stem bark without severe, specifically within the to begin with wash the color has no change at all, within the moment wash the color changes somewhat or diminishes, and within the third wash the color changes marginally or diminishes. The washing resistance delivered on the coloring of cotton fabric utilizing the extricate of the stem bark of kedondong pagar (Lannea nigritana) with tamarind severe is as takes after: within the to begin with wash, the color does not change at all; within the moment wash, the color does not alter at all; and within the third wash, the color changes slightly or diminishes. Washing resistance was delivered on cotton material dyeing utilizing kedondong pagar (Lannea nigritana) stem bark extricate with kandis acid severe. Within the to begin with wash, the color marginally changes or diminishes; within the moment wash, the color somewhat changes or diminishes; and within the third wash, the color does not show up to alter or diminish. Washing resistance was delivered on cotton coloring utilizing extricates of the stem bark of the kedondong pagar (Lannea nigritana) with belimbing wuluh stringent. Within the to begin with wash, the color has no change at all; within the moment wash, the color changes somewhat or decreases; and within the third wash, the color changes somewhat or diminishes.

Based on the comes about of the investigate on washing resistance created on cotton fabric coloring utilizing extricates of kedondong pagar (Lannea nigritana) stem bark without stringent, specifically within the to begin with wash the color has no change at all, within the moment wash the color changes somewhat or diminishes, and within the third wash the color changes somewhat or diminishes. In inquire about (Sari et al., 2013), it was expressed that washing resistance utilizing cotton fabric at an electrolyte concentration of 50 grams within the to begin with and moment washes appeared no change in color on the texture; within the third wash, the color changed marginally; and within the fourth and fifth washes, the color appeared to diminish or alter. Washing resistance with tamarind severe: within the to begin with wash, the color has no alter at all; within the moment wash, the color has no change at all; and within the third wash, the color changes marginally or diminishes. In investigate (Fredecia & Adriani, 2024), washing resistance on cotton utilizing cassava takes off and utilizing lerak cleanser for the primary wash of the color category looks no alter at all; the comes about of the moment wash of color ketegoti see no alter at all, and the comes about of the third wash of the color category see changed or diminished. Washing resistance with the kandis corrosive stringent: within the to begin with wash, the color changes slightly or decreases; within the moment wash, the color changes slightly or diminishes; and within the third wash, the color does not show

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up to alter or diminish. Washing resistance on cotton in investigate (Isnain & Adriani, 2024) states the comes about of washing resistance from coloring characteristic colors of Sablo leaf extricate (Acalypha wilkesiana) utilizing alum mordant on cotton fabric, specifically within the first and moment washings there's a slight change/reduction, and in the third and fourth washings there's a change/reduction. Within the fifth wash, the color looks very changed/reduced. Washing resistance with belimbing wuluh severe: within the to begin with wash, the color has no alter at all; within the moment wash, the color changes marginally or diminishes; and within the third wash, the color changes marginally or diminishes. In research (Arsa & Adriani, 2024), the results of the washing resistance of Japanese papaya leaf ecoprint on cotton material that utilizes whiting mordant show that when the first wash gets a score of 80, the second wash gets a score of 65, and the third and fourth washings get scores of 56 and 45. Then the percentage of the total final score is 68.33% with a good category.

4. Data Analysis

Table 3. Descriptive Statistics of Color Lightness (Value) Data resulting from Dyeing Cotton Materials Using extracts of kedondong pagar (lannea nigritana) stem bark.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
No Mordant	15	1	1	1.00	.000
Tamarind Mordant	15	2	3	2.20	.414
Kandis Acid Mordant	15	3	4	3.80	.414
Belimbing Wuluh Mordant	15	2	4	3.13	.516
Valid N (listwise)	15				

Based on table 3, it can be clarified that from the consider of 15 panelists, the cruel esteem without stringent was 1.00, tamarind mordant was 2.00, kandis acid was 3.80, and belimbing wuluh was 3.13.

Table 4. Friedman K-Related Sample Test Results Dark Light Color (Value)

Test Statisticsa

N	15
Chi-Square	41.400
df	3
Asymp. Sig.	.000

a. Friedman Test

In table 4 over, it can be clarified that the Friedman test K-related test dull light color (esteem) on cotton coloring utilizing kedondong pagar (lannea nigritana) stem bark extricate with no mordant, tamarind severe, kandis corrosive stringent, and starfruit mordant, gotten a centrality esteem of 0.000 which is littler than the centrality level of 0.05 or 0.000.

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Table 5. Friedman K-Related Sample Test Results of washing resistance

Test Statisticsa

N	15
Chi-Square	83.162
df	11
Asymp. Sig.	.000

a. Friedman Test

In table 5 over, it can be clarified that the Friedman K-related test test of washing resistance on cotton coloring utilizing kedondong pagar (lannea nigritana) bark extricate with no mordant, tamarind stringent, kandis corrosive mordant, and star natural product mordant gotten a importance esteem of 0.000, which is littler than the centrality level of 0.005, or 0.000 < 0.005. This implies that there's a significant contrast within the utilize of tamarind stringent, candis corrosive mordant, and star natural product stringent on color washing resistance in cotton coloring. This means that there's a noteworthy contrast within the utilize of tamarind mordant, kandis corrosive mordant, and starfruit stringent on color washing resistance in cotton coloring.

Table 6. Friedman Test K-related Sample Dark Light Color and Washing Resistance

No.	Test Statistic	Dark Light Color (Value)	Resilience wash
1	N	15	15
2	Chi-Square	41.400	83.162
3	Df	3	11
4	Symp.Sig	.000	.000

Based on the inquire about comes about from the Friedman K-related Test test for color haziness (esteem), the importance esteem < importance level = 0.00 < 0.05, with the result that H_a is acknowledged and H0 is rejected. Where H_a states that there's a significant contrast within the lightness/darkness of color (esteem) due to contrasts in tamarind severe, kandis corrosive, and belimbing wuluh on cotton coloring utilizing kedondong pagar (lannea nigritana) stem bark extricate.

The comes about of the Friedman K-related Test test for washing resistance are importance esteem < importance level = 0.00 < 0.05, with the result that H_a is acknowledged and H_0 is rejected. Where H_a states that there's a noteworthy contrast in washing resistance due to distinctive mordants of tamarind, kandis corrosive, and belimbing wuluh on cotton coloring utilizing kedodong pagar (lannea nigritana) bark extricate.

In this way the contrast in color delicacy and washing resistance in this think about appears that there's a significant contrast within the comes about of the contrast in tamarind severe and kandis corrosive severe and belimbing wuluh by utilizing kedondong pagar (lannea nigritana) stem bark extricate on cotton fabric.

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CONCLUSIONS

The title of the color delivered on cotton coloring utilizing kedodong pagar (lannea nigritana) stem bark extricate without severe is Dull Salmon Pink #C89182. In dyeing using tamarind mordant, the resulting color is Clam Shell Pink #D2AAA0. On dyeing using the kandis acid mordant, the resulting color is Clam Shell Pink #E1B19F. In dyeing using belimbing wuluh mordant, the resulting color is Warm Brown #D3A599. The results of dyeing cotton materials using kedodong pagar (lannea nigritana) stem bark extract. The color produced by dyeing without mordant is darker than with tamarind, kandis acid, and starfruit mordant, namely in the less bright category with a percentage of 100%, while tamarind is in the bright enough category with a percentage of 80%, and then the kandis acid mordant is in the very bright category with a percentage of 80%. and starfruit mordant in the bright category with a percentage of 73%. Results of 1x washing resistance. In the dyeing of Kedondong pagar bark without mordant and by using tamarind mordant and belimbing wuluh mordant, there is no color change at all, while in the case of the kandis acid mordant, the color changes slightly or decreases. 2 x washing resistance in the dyeing of Kedondong pagar bark without mordant and by using kandis acid mordant and belimbing wuluh mordant produces a slightly changed or reduced color, while in tamarind mordant the color does not change at all. Then the washing resistance of 3 x on the dyeing of Kedondong pagar bark without mordant and by using kandis acid mordant and belimbing wuluh mordant produces a slightly changed or reduced color, while in kandis acid mordant the color looks changed or reduced. The result of the examination of the Friedman K-related Test test for color haziness (esteem) may be a importance esteem < the centrality level = 0.00 < 0.05, with the result that H_a is acknowledged and H_0 is rejected. Where H_a states that there's a noteworthy distinction within the lightness/darkness of color (esteem) due to the distinction in tamarind severe, kandis corrosive stringent, and belimbing wuluh on cotton coloring utilizing kedondong pagar (lannea nigritana) stem bark extricate. The investigation result of the Friedman K-related test test for washing resistance could be a centrality esteem < noteworthiness level = 0.00 < 0.05, with the result that H_a is acknowledged and H_0 is rejected. Where H_a states that there's a noteworthy distinction in washing resistance due to different mordants of tamarind, kandis corrosive, and belimbing wuluh within the coloring of cotton fabric utilizing kedondong pagar bark extricate.

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