The art of dyeing and printing has played an important role in adding beauty and depth of colour that cannot quite be obtained with synthetic dyes. Natural dyes are biodegradable and very compatible with the environment. They have beauty and depth of colour that cannot quite be obtained with synthetic dyes. These dyes can be defined as those organic materials that have the ability to impart colour to any substrate which they must have affinity for. Natural dyes are biodegradable and very compatible with the environment. They have beauty and depth of colour that cannot quite be obtained with synthetic dyes. These dyes can be obtained either from plants, animals, and minerals. Until the mid 19th century, all dyestuffs were made from natural materials, mainly vegetables matter. But the invention of synthetic dyes in 1856 drove the use of natural dyes in oblivion.

**Key Words**: Screen printing, Kachnar bark, Mango kernel starch, Thickener, Visual evaluation, Fastness.
fixation. So, printed, dried samples were subjected to steaming treat-
ment in laboratory steamer at 100°C for half an hour.

After treatment: Printed samples were treated with alum (Alumini-
um potassium sulphate) for 30 min. at room temperature for dye fix-
atation.

Testing of printed samples

Visual evaluation of printed samples

The printed samples were got evaluated visually from ten experts for
depth of colour, evenness of print, sharpness of print and overall ap-
pearance.

Fastness properties of printed samples

Fastness properties of printed samples against washing, sunlight, rub-
binding (dry and wet) and perspiration (acidic & alkaline) were tested as
and IS:971-1956 methods respectively. Light fastness ratings were
given as per blue wool standards and washing, rubbing and persipa-
tion fastness grades were assigned for change in colour and degree of
staining on standard fabric with the help of grey scales.

Results and Discussions

Table: 1 Visual evaluation of samples printed with kachnar
bark dye

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Gum/ Mordant Conc.</th>
<th>Aggregate Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Guar gum 2.5%</td>
<td>4.22</td>
</tr>
<tr>
<td>2.</td>
<td>Mango kernel starch 2.5%</td>
<td>4.22</td>
</tr>
<tr>
<td>3.</td>
<td>CuSo₄ 1%</td>
<td>4.15</td>
</tr>
<tr>
<td>4.</td>
<td>FeSo₄ 1%</td>
<td>4.40</td>
</tr>
<tr>
<td>5.</td>
<td>Guar gum 5%</td>
<td>3.92</td>
</tr>
<tr>
<td>6.</td>
<td>Mango kernel starch 5%</td>
<td>4.22</td>
</tr>
<tr>
<td>7.</td>
<td>CuSo₄ 1%</td>
<td>4.37</td>
</tr>
<tr>
<td>8.</td>
<td>FeSo₄ 1%</td>
<td>4.47</td>
</tr>
</tbody>
</table>

The data regarding visual evaluation of screen printed samples pre-
Table-1 depicted that samples printed with 2.5% guar gum and
Mango kernel starch scored same i.e. 4.22. In case of printing with 5% guar gum and Mango kernel starch, the scores for visual evalua-
tion for Mango kernel starch were better i.e. 4.22 as compared
to guar gum printed samples i.e. 3.92. After mordanting with copper
sulphate and ferrous sulphate the scores for visual evaluation were
higher as compared to control sample. Hence, it can be concluded
that use of mordants in printing improved the visual appearance of
prints. The results are supported by Pruthi et.al. (2008) and Pruthi
et.al. (2011) as in their study they concluded that addition of metal-
lic salts/ mordants improve the visual appearance of dyed as well as
printed samples.

Table 2: Colour fastness of samples printed with kachnar bark dye

<table>
<thead>
<tr>
<th>Gum Conc.</th>
<th>Mordant Conc.</th>
<th>Colour Fastness Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Washing (CC) Dry (S) Wet (CC)</td>
</tr>
<tr>
<td>Guar Gum 2.5%</td>
<td>---</td>
<td>4/5 4 5 4/5 4 5/4 4/5 4/5 3/4 3/4 4 4 5/4 4 4</td>
</tr>
</tbody>
</table>

*Brightness improved

The data presented in Table 2 revealed that sunlight fastness of sam-
pies printed with 2.5% guar gum was excellent (5) whereas the fast-
ness grades for washing, rubbing and perspiration ranged between
fairly good to excellent (3/4 to 5). The data regarding screen printed
samples with 2.5% Mango kernel starch depicted that sunlight fast-
ness was excellent (5*) and colour became darker after exposure to
Sunlight. Grades for washing, rubbing and perspiration fastness tests
ranged between 3 to 5 i.e. fair to excellent. Hence, it can be conclud-
ed that both the thickeners produced same prints. After mordanting
slight change was observed in fastness properties against different
tests and the grades ranged from 2/3 to 5 i.e. fair to excellent, howev-
er, in case of few ferrous sulphate mordanted samples the brightness
of colour improved after subjecting to alkaline solution.

Screen printed samples using 5% guar gum thickener had very good
(4/5) fastness against sunlight whereas the results of other fastness
tests i.e. washing, rubbing and perspiration ranged between fairly
good to excellent (3/4 to 5). The data regarding fastness properties
of screen printed samples with 5% Mango kernel starch revealed that
sunlight fastness was excellent (5). Whereas, the results of other fast-
ness tests i.e. washing, rubbing and perspiration ranged between fair
to very good (3 to 4/5). After mordanting grades for fastness properti-
est against different tests were comparable with those of commercial
gum i.e guar gum and in case of few ferrous sulphate mordanted
samples the brightness of colour improved after subjecting to sun
light and alkaline solution. Agarwal et. al. concluded the same results
as use of mordants in printing improved the fastness properties of
printed samples.
Conclusions:
The results of the study revealed that Mango kernel starch can be successfully used for screen printing on silk fabric with Kachnar bark dye extract.

Printed fabric exhibited good to excellent colour fastness properties towards sunlight, dry and wet rubbing, washing and acidic and alkaline perspiration.

Plate – I Printed Samples

References