Abstract

This paper presents the information on the treatability of raj-koroi (Albizia richardiana). The feasibility test was performed by soaking method in the present study. In this study, 24 samples of rajkoroi were soaked with 10% CCB (copper-chrome-boron) solution (2:2:1). Every sample was sized into 50.8 cm X 5.08 cm X 2.54 cm. Four different time periods were applied to evaluate the depth of penetration and the amount of retention of the applied preservative chemicals. The study revealed that both penetration and retention of CCB preservatives significantly increased with the rising time periods. Highest penetration and retention were recorded 4.60 cm and 16.88 Kg/m3 respectively after 28 days. It can be decided that preservative treatment on rajkoroi can be executed with a view to using it for fabricating wood related products.

Key words: Albizia richardiana, Soaking method, copper-chrome-boron, penetration, retention.
Today, increasing emphasis is placed on using preservatives that are targeted more specifically to particular applications. Such preservatives are safer to use and potentially less damaging to the environment. To this end, a water borne preservative named CCB is used for this study in which the components are sodium dichromate, copper sulfate and boric acid. In CCB preservatives, copper acts as a fungicide, boron as a biocide and chromium as fixative (Lahiry, 2001). Boron compounds, usually in the form of boron salts, have long been known and used as effective wood preservatives for timber (Cartlidge et al., 1995).

The preservative treatment of wood modifies its properties making it dimensionally stable and durable for efficient utilization (Winandy, 1991). Normally rajkoroi is a non-durable wood. But the wood of rajkoroi can be an alternative source for plywood and different wood related industries. Furthermore it can play an important role in reducing pressure on other timber species.

In this study, it was tried to determine the treatability group of A. richardiana wood using CCB preservative treatment by soaking method.

**Materials & Method**

Raj koroi (Albizia richardiana) (Fig. 1) wood 35 years old were collected from Barisal district for this study. Then the log were sawn and dried in the shed of Bangladesh Forest Research Institute (BFRI) Laboratory to reduce the moisture content below fiber saturation point (FSP). Samples were collected from the bottom, middle and top containing heartwood. The samples were in the form of 50.8 cm X 5.08 cm X 2.54 cm (20" X 2" x1"). The converted samples were dried in open air for 30 days to reduce the moisture content of the wood samples. The samples were dried in the oven at 105°C to get constant weight before treating with preservative.

Before treatment, all samples were dried and the average moisture content of the samples were recorded 18.92%. Finally 24 numbers of samples were prepared for soaking method. Copper-chromate-boron (CCB) preservative was used in this study. The desired CCB preservative was made by mixing of sodium dichromate, copper sulfate and boric powder as salt-based ratio of 2:2:1 respectively (Lahiry,1996). The desired CCB preservative solution was made by nine times water of total preservatives (sodium dichromate, copper sulfate and boric).

All the wood samples were dipped into the 10% CCB preservative solutions for different duration. Out of 24 samples, every 6 samples were immersed into 10% CCB (copper-chromate-boron) solution (2:2:1) for 7 days, 14 days, 21 days and 28 days respectively. After the desired duration, the treated samples were taken out from preservative solutions step by step, removed excess preservative from the surface of the samples and weighing the treated samples. The average retention of immersed samples was determined by weighing the samples. Then the samples were placed on polythene sheet for air drying.

After drying, 3 nos. of samples from each group were split for measuring the absorption or penetration. Penetration was measured to the nearest centimeter for each stake and averaged (Anon 1986).

The volumetric analysis was used to calculate preservative retention of wood samples. Air dry weight before treatment and air dry weight after treatment were taken to determine the retention. The difference of the two weights was the weight of preservative solution penetrated into the sample. Retention was expressed as kg/m³ (Table 1).
Results and discussion
Retention of CCB preservative
In 4 (Four) different soaking periods, trials have been executed with 10% CCB solution. It resulted that A. richardiana can be impregnated with preservatives by soaking method (Table 1). The results of penetration and retention at different time periods are shown in table 2 and figure 2. At 7 days duration, penetration & retention were recorded 2.3 cm (end) and 8.99 kg/m³ which is lowest result in the experiment. It was found that with the increase of time period, penetration & retention were increased significantly.

![Retention plot](image)

Fig. 2. Retention results with soaking period

According to Bangladesh Standard Testing Institute (BSTI), timbers in direct contact with ground or water, especially in outside locations, such as poles, piles, fence-posts, etc. the required retention for CCA preservative chemical is 16 kg/m³ (Anon.1988). In the present study, penetration and retention were recorded 4.60 cm and 16.88 kg/m³ respectively at soaking period for 28 days which is supported with BSTI.

According to BDS code, the required retention of CCB is 8-16 kg/m³ (Anon, 1975). In this study, the retention results at 28 days soaking period is acceptable. Chandra and Gupta (1972) stated that 16 kg/m³ of dry salt were necessary for the effective preservation of the poles in contact with ground. In the experiment, the retention result was 16.88 kg/m³ at 28 days soaking method which is up to standard and matched with Chandra et al.1972.

Research report of Commonwealth Scientific and Industrial Research (CSIR) (Du Toit 1988) indicated that average sapwood retention levels are required for adequate protection of poles against wood rot and termite attack. In this study it is expected that this penetration would provide adequate protection of the pole for ground contact service.

The result of present study prove that penetration and retention level can be maximized into rajkoroi by soaking method. Thus the wood can be free from wood rot and termite attack resulting in escalating the durability of rajkoroi.

Table 1. Average penetration of preservative chemicals (10% copper-chrome-boron) in rajkoroi.

<table>
<thead>
<tr>
<th>Moisture content (%)</th>
<th>Soaking Period (day)</th>
<th>Penetration (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Side</td>
</tr>
<tr>
<td>19.44</td>
<td>7</td>
<td>1.55</td>
</tr>
<tr>
<td>18.48</td>
<td>14</td>
<td>2.40</td>
</tr>
<tr>
<td>18.43</td>
<td>21</td>
<td>2.45</td>
</tr>
<tr>
<td>19.34</td>
<td>28</td>
<td>2.65</td>
</tr>
</tbody>
</table>

Table 2. Average retention of preservative chemicals (10% copper-chrome-boron) in rajkoroi.

<table>
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<tr>
<th>Moisture content (%)</th>
<th>Soaking Period (day)</th>
<th>Retention (kg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.44</td>
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<td>16.88</td>
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</table>

Conclusion
Rajkoroi can be treated with CCB solution. Subsequently the wood can be used commercially. It is mentionable that untreated rajkoroi samples were destroyed after 7 to 9 months in the soil contact. But the treated A. richardiana samples destroyed after 35 to 40 months.

References