FIGURES
FIG. 1. SYNTHESIS OF POLYSTYRENE GLYCOL.
FIG. 2  IR SPECTRUM OF POLYSTYRENE GLYCOL.
FIG. 3. SYNTHESIS OF ALKYD BY MONOGLYCERIDE PROCESS.
FIG. 4. SYNTHESIS OF STYRENATED ALKYD.
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Fig. 6. Scratch hardness of linseed alkyd and its PG blends.
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Fig. 9. (a) Water (b) Acid (c) Alkali and (d) Solvent resistance of linseed alkyd and its PG blends.
Fig. 10. Water resistance of nigerseed alkyd and its PG blends.

Condition of the film immersed in cold water after 20 days.

- 5: Unaffected
- 4: Slight loss of gloss
- 3: Loss of gloss and change in colour
- 2: Cracked
- 1: Partially removed
- 0: Completely removed

Graph showing the water resistance of nigerseed alkyd with different percentages of PG.
Fig. 11. Boiling water resistance of castor alkyd and its PG blends.

- 5: Unaffected
- 4: Slight loss of gloss
- 3: Loss of gloss and change in colour
- 2: Cracked
- 1: Partially removed
- 0: Completely removed

Condition of the film immersed in boiling water after 2 hrs.

25% UF

10% UF

% PG
Fig. 12. Acid resistance of nigerseed alkyd and its PG blends after 20 days.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
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<tbody>
<tr>
<td>5</td>
<td>Unaffected</td>
</tr>
<tr>
<td>4</td>
<td>Slight loss in gloss</td>
</tr>
<tr>
<td>3</td>
<td>Loss of gloss and change in colour</td>
</tr>
<tr>
<td>2</td>
<td>Cracked</td>
</tr>
<tr>
<td>1</td>
<td>Partially removed</td>
</tr>
<tr>
<td>0</td>
<td>Completely removed</td>
</tr>
</tbody>
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Condition of the film immersed in 2% HCl

Condition of the film immersed in 2% H₂SO₄

Condition of the film immersed in 2% HNO₃

5-Unaffected
4-Slight loss of gloss
3-Loss of gloss and change in colour
2-Cracked
1-Partially removed
0-Completely removed

Fig. 13. Acid resistance (a) HCl (b) H₂SO₄ (c) HNO₃ of castor alkyd and its PG blends after 20 days.
Condition of the film immersed in 2% Na$_2$CO$_3$ after 20 days.

- 5: Unaffected
- 4: Slight loss of gloss
- 3: Loss of gloss and change in colour
- 2: Cracked
- 1: Partially removed
- 0: Completely removed

Fig. 14. Alkali resistance of Nigerseed alkyd and its PG blends.
Fig. 15. Alkali resistance of castor alkyd and its PG blends.

- 5: Unaffected
- 4: Slight loss of gloss
- 3: Loss of gloss and change in colour
- 2: Cracked
- 1: Partially removed
- 0: Completely removed

Condition of the film immersed in 2% NaOH after 4 hrs.
Fig. 16. Solvent resistance of niger seed alkyd and its PG blends.

Condition of the film immersed in xylene, white spirit, petrol & 1:1 xylene and toluene separately after 20 days.

<table>
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<tbody>
<tr>
<td>5-Unaffected</td>
<td>2-Cracked</td>
</tr>
<tr>
<td>4-Slight loss of gloss</td>
<td>1-Partially removed</td>
</tr>
<tr>
<td>3-Loss of gloss and change in colour</td>
<td>0-Completely removed</td>
</tr>
</tbody>
</table>

10 & 25% UF
Condition of the film immersed in xylene, white spirit, petrol & 1:1 xylene and toluene separately after 20 days.

5 - Unaffected
4 - Slight loss of gloss
3 - Loss of gloss and change in colour
2 - Partially removed
1 - Completely removed

Fig. 17. Solvent resistance of castor alkyd and its PG blends.
Fig. 18. Melting point of estergum and mixed esters.
Fig. 19. Surface dry time of varnish of ester gum and mixed esters.
Fig. 20. Scratch hardness of estergum and mixed esters.
5 - Unaffected
4 - Slight loss of gloss
3 - Loss of gloss and change in colour
2 - Partially cracked
1 - Cracked and partially removed
0 - Completely removed

Fig 21. Water resistance of varnishes of ester gum and mixed esters.
Fig. 22. Acid resistance (a) H₂SO₄ (b) HNO₃ of varnishes of ester gum and mixed esters.
5- Unaffected
4- Slight loss of gloss
3- Loss of gloss and change in colour
2- Partially cracked
1- Cracked and partially removed
0- Completely removed

Fig. 23. (a) Alkali and (b) Solvent resistance of varnishes of estergum and mixed esters.
FIG 24: SYNTHESIS OF COPOLYMER OF POLYSTYRENE GLYCOL AND GLYCERYL PHTHALATE.
Fig. 25. Scratch hardness of linseed oil alkyd copolymers.
Fig. 26. Scratch hardness of niger seed oil alkyd copolymers.
Fig. 27. Scratch hardness of castor oil alkyd copolymers.
Fig. 28. Water resistance of linseed oil alkyd copolymers.
5 - Unaffected
4 - Slight loss of gloss
3 - Loss of gloss and change in colour
2 - Partially cracked
1 - Cracked and partially removed
0 - Completely removed

Fig. 29. Water resistance of nigerseed oil alkyd copolymers.
5—Unaffected
4—Slight loss of gloss
3—Loss of gloss and change in colour

2—Partially cracked
1—Cracked and partially removed
0—Completely removed

Fig. 30. Water resistance of castor oil alkyd copolymers.
Fig 31. Acid resistance of linseed oil alkyd copolymers (a) HCl (b) H$_2$SO$_4$ (c) HNO$_3$.
Fig. 32. Acid resistance of niger seed oil alkyd copolymers (a) HCl (b) H₂SO₄.
Fig. 33. Acid resistance of castor oil alkyd copolymers.
Fig. 34. Alkali resistance of linseed oil alkyd copolymers (a) Na$_2$CO$_3$ (b) NaOH

5 - Unaffected
4 - Slight loss of gloss
3 - Loss of gloss and change in colour
2 - Partially cracked
1 - Cracked and partially removed
0 - Completely removed
5. Unaffected
4. Slight loss of gloss
3. Loss of gloss and change in colour
2. Partially cracked
1. Cracked and partially removed
0. Completely removed

Fig. 35. Alkali resistance of nigerseed oil alkyd copolymers.
5-Unaffected
4-Slight loss of gloss
3-Loss of gloss and change in colour
2-Partially cracked
1-Cracked and partially removed
0-Completely removed

Fig. 36. Alkali resistance of castor oil alkyd copolymers.
5 - Unaffected
4 - Slight loss of gloss
3 - Loss of gloss and change in colour
2 - Partially cracked
1 - Cracked and partially removed
0 - Completely removed

Fig. 37. Solvent resistance of linseed oil alkyd copolymers.
Fig. 38. Solvent resistance of (a) nigerseed oil (b) castor oil alkyd copolymers.
Fig. 30. Acid value of linseed fatty acid esters of PG.
Fig. 40. Inherent viscosity of linseed fatty acid esters of PG.
Fig. 41. Drying time of linseed fatty acid esters of PG (a) surface dry (b) hard dry (c) tack free.