

**AIM:** To prepare and submit 1,3-diphenyl pyrazole from diphenyl hydrazone and a vicinal diol.

**REFERENCES:** Practical Heterocyclic Chemistry by A. O. Fitton and R. K. Smalley Academic Press London and New York, Page. 25.

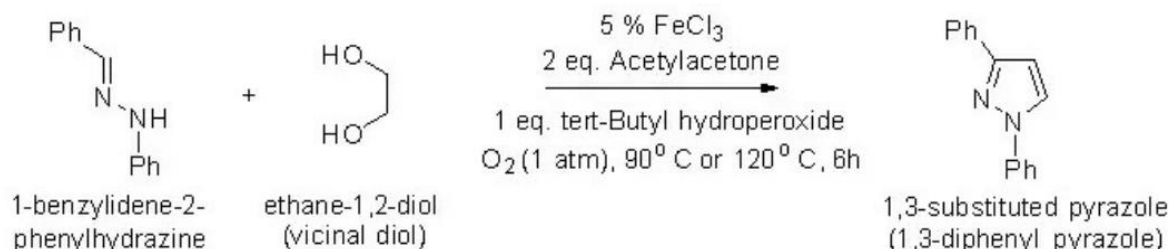
**REQUIREMENTS:**

**Chemicals:** 1-benzylidene-2-phenyl hydrazine, Ethane-1,2-diol(ethylene glycol), Ferric chloride, Tert-butyl hydroperoxide, Acetyl acetone, Sodium chloride, Ethyl acetate, Sodium sulfate.

**Apparatus:** Water bath, Beaker, Measuring cylinder, Thermometer, Stirrer, Separatory funnel Buchner funnel, etc

**Principle:** 1,3-substituted pyrazole is prepared by cyclization of diaryl hydrazone and vicinal diol in the presence of ferric chloride and tert-butyl hydroperoxide (TBHP) which is also called the regioselective synthesis of substituted pyrazole.

**Reaction:**



**Use:** Can be used as an antibacterial and antiviral agent. **PROCEDURE** About 4.55 g of 1-benzylidene-2-phenyl hydrazine is dissolved in the solution of 25 ml of vicinal diol and ferric chloride (5 mol %). Then another solution of tert-butyl hydroperoxide (5.3 g) in 25 ml of acetyl-acetone is added to it. Mix solution is maintained at a temperature range of 90 to 100° C.

The mixed solution is left to reach room temperature and stirred for 6 hours. Content is poured into water and extracted with ethyl acetate three times. The combined organic solution is washed with water, then with a saturated solution of sodium chloride, passed through sodium sulfate, and evaporated under a vacuum. About 3.15 g of the final product is found with m.p: 185°C.

**Calculation:**

– Molecular Formula (MF) of 1-benzylidene-2-phenyl hydrazine = C<sub>13</sub>H<sub>12</sub>N<sub>2</sub>

– MF of 1,3-diphenyl pyrazole = C<sub>15</sub>H<sub>12</sub>N<sub>2</sub>

– Molecular weight (MW) of 1-benzylidene-2-phenyl hydrazine = 196 g/ mol

– MW of 1,3-diphenyl pyrazole = 220 g/ mol

196 g of 1-benzylidene-2-phenyl hydrazine yields 1,3-diphenyl pyrazole = 220 g

4.55 g of 1-benzylidene-2-phenyl hydrazine shall yield 1,3-diphenyl pyrazole =  $(220 / 196) \times 4.55 = 5.1$  g

Therefore, the Theoretical yield of 1,3-diphenyl pyrazole = 5.1 g

If reported Practical yield = ..... g

Then, Percentage Practical yield = (Practical yield / Theoretical yield)  $\times$  100

= (..... / 5.1)  $\times$  100 = ..... %

**Result:** The percent yield of 1,3-diphenyl pyrazole is .....% with m.p. ....°C.