**Experiment name :** n-Butyraldehyde (Butanal)

**Classification:** Oxidation-reduction reactions

**Reaction scheme:**



**Experimental procedure and purification technique:**

Equip a two-necked round-bottomed flask (100 ml) with a dropping funnel and a Hempel column to which is attached a simple distillation apparatus. Fit to the distillation head part a thermometer and attach this system to the receiving flask immersed in a bath of crushed ice/water. Dissolve sodium dichromate dihydrate (Na2Cr2O7. 2H2O) (5.6 g; 21 mmol) in 30 ml of water and add cautiously, with stirring, concentrated sulphuric acid (4 ml). Place butan-1-ol (4.1 g, 5.1 ml; 55 mmol) together with a few small chips of porous porcelain in the flask, heat the butan-1-ol to boiling and run in the dichromate solution via the dropping funnel during about 20 minutes. The oxidation to butyraldehyde proceeds with the evolution of heat, but it is necessary to continue to heat the flask so that the mixture boils vigorously to maintain steady distillation. The temperature at the top of the column, however, should not exceed 80-85 °C. When all the oxidising agent has been added, continue heating the mixture for 15 minutes and collect all that passes over below 90 °C. Separate the water (approximately 0.2 ml) from the distillate and dry the residue over anhydrous MgSO4. Fit the column into a 100-ml flask and arrange for distillation as before. Distil the dried distillate slowly (1-2 drops per second) through the simple distillation apparatus and collect as fairly pure butyraldehyde. bp: 74-76 °C, predicted yield: 32%.

Reference source (1): “Vogel’s Textbook of Practical Organic Chemistry (5th edition)”: 588.

Reference source (2): “Denel Organik Kimya (6th edition)”: 559.