

In chemistry, yield, also referred as reaction yield, is the amount of product obtained in a chemical reaction. The absolute yield can be given as the weight in grams or in moles. The percentage yield which serves to measure the effectiveness of a synthetic procedure, is calculated by dividing the amount of the obtained desired product by the theoretical yield.

$$\text{Percentage yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100\%$$

So, yield loss in an experiment occurs because :-

- (i) Many reactions are incomplete & the reactants are not completely converted to products.
- (ii) Impurities are present which do not react.
- (iii) Losses occur in the separation & purification of the desired product from the reaction mixture.

→ Impurities often contaminate organic compounds, whether they have been synthesized in the laboratory or isolated from natural sources. Recrystallization is the most important method for removing impurities from solid organic compounds. It is suitable for both small scale (< 0.5g) & large scale (> 100g) work. The basic recrystallization plan is to dissolve an impure solid in a hot solvent, then cool the solution so that the desired molecules recrystallize while the impurities remain in solution.

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Subsequent filtration separates the solid crystal from the liquid solvent.

→ Necessary sources of mass loss:- The yield for a recrystallization can never be 100%. Because while the chilled solvent is saturated & should release some crystals, at least some of your desired material will remain dissolved in the cold solvent & will be lost when the crystals & solvent are separated. The primary necessary source of mass loss is to the solvent. Obviously additional mass will be lost to physical handling, & some of the lost mass is simply the impurities that you wanted to lose.