

Chemguide – answers

COLUMN CHROMATOGRAPHY

- a) Glass wool to prevent the packing material being washed out of the column.
 - b) The mixture is dissolved as a concentrated solution in the same solvent as used in the column, and then carefully added to the top of the column without disturbing the packing material. The tap is then opened so that the green solution is all absorbed into the column.
 - c) The alumina or silica gel both have OH groups on the surface. Because the yellow dye passes quickly through the column, it can't be all that strongly attracted to the stationary phase. On the other hand, the blue dye travels more slowly, and must spend more time adsorbed to the stationary phase. That means that the blue dye perhaps has the ability to form hydrogen bonds to the stationary phase whereas the yellow one forms weaker or no hydrogen bonds, or at the very least, the blue one is more polar than the yellow one.
 - d) You could wash it out more quickly by changing the solvent to a more polar one. This will be more attracted to the polar molecules in the blue dye, and perhaps adsorb on the stationary phase itself, getting in the way of the adsorption of the dye molecules. Either way, the blue dye will spend more time in the solvent and pass through the column more quickly.
2. Collect the output from the column in small samples in test tubes – say, every 1 cm³ or 5 cm³. Run a thin layer chromatogram of a drop from each tube on the same plate as a drop from a pure sample of what you are trying to make. You would, of course, have to find some way of making the spots on the final chromatogram visible.

You will know when a sample is pure because you will only get a spot corresponding to what you are trying to produce. If you get more than one spot (or no spot), or if the spot is in the wrong position, then you are collecting impurities (or just solvent).

At the end, you can collect together all the samples of the solutions which are shown to contain only your desired product.