Separation of Aragonite Sand from Water Using a Hydrocyclone

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Protocol:

You will need:

- Hydrocyclone 3.
- DC pump, capable of flow rates of up to 1200L/H.
- Magnetic Stirrer.
- Necessary tubing.
- Aragonite sand solution with a sand to water ratio of 10:90.
- 1 x 5-litre beakers. 2 x 2-litre beakers.
- Heavy duty scales + a set of more sensitive scales for measuring the volume of sand.
- Stopwatch.

Set up of the experiment:

1. While turned off, and unplugged, stick the DC pump to the wall of the 5L beaker, with the inlet nozzle facing the base, 1 inch inch from the bottom.
2. Weigh out 500g of aragonite sand and pour into the sample solution beaker. Then fill the beaker to the 5L marker with water.
3. Set up a clamp stand over the 'Underflow beaker' and secure the hydrocyclone vertically.
4. Connect the necessary tubing; pump to inlet feed, vortex finder to overflow beaker, spigot to underflow beaker. Use tie wraps to secure.
5. Place the sample solution beaker (5L) onto a magnetic stirrer and initiate the stirrer to keep the sand in suspension.
6. Before conducting the experiment, ensure that the stopwatch is to hand.

Conducting the experiment:

1. Instantaneously turn on the DC pump and initialise the stopwatch.
2. (BEFORE THE WATER LEVEL FALLS BELOW THE PUMP INLET) Turn off the pump and stop the stopwatch. Record the time.
3. Leave the underflow and overflow solutions to settle overnight.
4. Carefully pour the excess fluid from both beakers into a measuring cylinder, being careful not to disturb the settled sediment. Note the volume of water.
5. Dry the remaining sediment in an oven.
6. Using the scales, measure the weight of the underflow sediment. Note the ratio of underflow sand:water.
7. Repeat this step for the overflow.