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Title: 2a Measuring small volumes in a Biotechnology Lab

Reference: 14-15 Lab manual

Purpose: To learn how to measure small volumes correctly with pipets.

Procedure: Lable each of your plastic tubes A, B, C + D. Make sure to understand the maximum amount of liquid each pipet can measure. Measure the correct amount of each dye into the tubes A, B, C, D and check that your tubes are within the meniscus of the key tube. Redo if not.

Tube	Readye vol(mL)	Blue dye vol(mL)	yellow dye vol(mL)	Total volume(mL)
A	1.1	1.7	0.33	3.1
B	1.27	0.85	2.9	5.0
C	0.7	2.8	1.8	~~5.3~~ 5.0
D	1.6	1.9	0.66	

Observations and Procedural Notes

It took some practice to figure out which pipette to use. The right size for accuracy and ease of use. We used the 1-2 mL for this lab with .01 mL graduations. And for one the 5 mL for one. After practice we all got much more efficient w/ using the electric pipettor. Speed of suction was crucial. After a few tries we all learned to use a gentle, practiced hand. As time went on we were able to pipette much slower. One was close but I added a mL by starting at -1

Title: Measuring very small volumes in a biotechnology Lab 2b

Reference: Pages 15-17 Lab manual

~~Procedure:~~

Purpose: to learn how to measure very small volumes in μL with micropipettes and then calculate our percent error.

Procedure: Following Table 2.2 and using the correct micropipette for each amount, measure the indicated amount of dye into each tube. Spin the tubes in the microcentrifuge. Measure the amount of liquid you pipetted into each tube and calculate your percent error.

Table 2.3 Percenterror for micropipetting Practice

Tube	Expected volume	Actual volume	% Error
A	12 μL	13 μL	8.3%
B	24 μL	21 μL	~~12.5%~~ 13%
C	100 μL	105	5.0%
D	900 μL	855	5.0%

Observations and Procedural notes

The micropipette was much easier to use once we mastered the first & second stop. With Tube A with measuring the actual volume we had some liquid left with the micropipette set at 12 μL so we switched to 13 μL and then had air bubbles so we made an error.

Tube error was measured

Once we ~~measure d~~ mastered measuring the volume from the micropipette tubes we were able to measure the actual amount we measured much faster.

Hopefully we can improve our accuracy with time.

tube A $\left|\frac{a-e}{e}\right| \times 100$ error

$\left|\frac{13-12}{12}\right| \times 100 = 8.3\%$

tube C $\left|\frac{105-100}{100}\right| \times 100 = 5.0\%$

tube D $\left|\frac{855-900}{900}\right| \times 100 = 5.0\%$

tube B $\left|\frac{24-24}{24}\right| \times 100 = 12.5\%$

$= 13\%$

Title: Measuring Mass 2c

Reference: Lab manual Pages 17-18

Purpose: To learn how to accurately measure mass using an analytical scale

Procedure: weigh out the appropriate amount of glucose according to the chart for each solution. Add water to each tube to make a final volume of 10 mL. Test each tube with a Diastix test strip and compare color to the key. Record the results.

Solution to be Prepared mg/dL	Equivalent concentration g/mL	Final volume (mL)	mass of glucose (g)	Diastix test result
250.0	0.0025	10	0.025	225 mg/dL
100.0	0.001	10	0.01	100 mg/dL
50.0	0.0005	10	0.005	50 mg/dL
0	0	10	0	0 mg/dL

Observations and Procedural notes

We had a little trouble with the analytical balance at first, until we realized it took a very light touch. weigh paper would normally work better but we measured with the small weigh boats. The only sample ~~were~~ we were not sure was the 250.0 mg/dL it was slightly off so we gave it a value of 225 mg/dL. It could have

Title: 2a Checking the Accuracy of Micropipets using a Balance

Reference: Lab Manual 18-19

Purpose: To measure the accuracy of micropets by using the known factor of 1mL water weighs 1.0g

Procedure: measure the specified volume of water into the weighboats and then weigh the water. Calculate the percent error. remeasure if outside of accepted range.

Table 2.5 micropipetting precision

Micropipet	Volume (μL)	volume (mL)	Expected Mass (g)	Actual mass (g)	Percent error	Acceptable error (%)	Type of Balance used
P-1000	1000	1.0	1.0	1.03	3%	3	table top
P-1000	255	.255	.255	~~.2780~~ .2508	1.65%	3	analytical
P-100	100	1.100	.100	.100	0%	5	analytical
P-100	17	.017	.017	~~.018~~ .0178	4.71%	5	analytical
P-10	10	.01	.01	.011	10%	10	analytical
P-10	2.4	.0024	.0024	~~.003~~ .0025	4%	10	analytical

$$\left| \frac{\text{actual mass} - \text{expected mass}}{\text{expected mass}} \right| \times 100$$

$$\left| \frac{1.03 - 1.0}{1.0} \right| \times 100 = 3\%$$

the first P-1000 required recalibration after we were outside the recomended error 710%

The next P-1000 was accurate.

- the P-100 was more accurate then the P-1000 for measuring 100 µL

if the measurement ~~if~~ was outside of acceptable error. we redid the ~~calculation~~ measurement.

$$\left|\frac{.100 - .100}{.100}\right| \times 100 = \%$$

$$\left|\frac{.0178 - .017}{.017}\right| \times 100 = 4.71\%$$

$$\left|\frac{.011 - .01}{.01}\right| \times 100 = 10\%$$