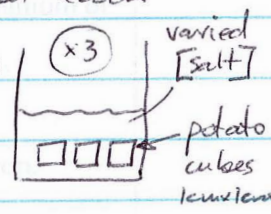


DATA

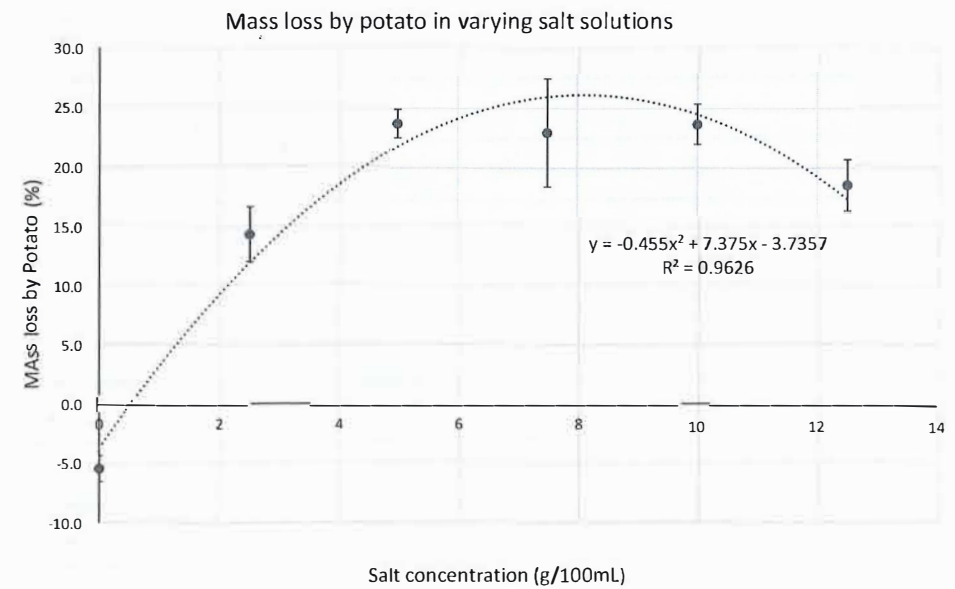
SET
3

Data collected by 8N in an investigation on osmosis in potatoes. Each group trialed three salt concentrations, with 3 1cm by 1cm cubes at each concentration. Four groups used salt concentrations of 0, 5, and 10 g/100mL, and four groups used 2.5, 7.5, and 12.5 g/mL. The class set of results are shown below



Concentration of Salt (g/L)	Mass loss by potato (%)									
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Average	(+/-) Uncertainty (range/2)
0	-4.6		-6.8		-0.08*		-5		-5.5	1.1
2.5		13.4		17		12.4		23*	14.3	2.3
5	23.5		22.6		25		23.8		23.7	1.2
7.5		18.9		28		8.9*		22	23.0	4.6
10	22.4		25.4		22		25		23.7	1.7
12.5		16.7		21		3.6*		18	18.6	2.2

*Anomalies not used in calculations



The effect of salt concentration on osmosis in potatoes (8N)**Identification of Trends and Relationships**

As the salt concentrations (g/100mL) increases, the osmosis (mass loss) in the 1 cm³ potato increases and then subsequently decreases. The mass loss increases from -5.0% with 0 g/mL salt concentration and peaks at approximately 26.5% at 8g/mL. The rate then decreases consistently to a minimum of 18.6% at 12.5g/mL. The relationship between osmosis is best described by:

$$y = 0.455x^2 + 7.375x - 3.7357 \quad R^2 = 0.9626$$

The data shows that there is a "natural" limit to how osmosis responds to salt concentration.

Identification of Uncertainty and Limitations

There is a significantly high level of uncertainty within the data. The greatest level of uncertainty (indicated by error bars) occurs at 7.5 g/mL. At this data point, the mass loss was 23.0 ± 4.6 g/mL. This is a range of 18.4 to 27.6, approximately a 40 % range. This displays a significant level of uncertainty within the data recorded. The uncertainty for the other pieces of data. However, the trendline does not go through all the ranges of uncertainty and the data does not fit the trend very closely. There were also anomalies in the data, and four data values were omitted. This, yet again, reflects the significant amount of uncertainty within the data.

This set of data is reasonably limited in the amount of data collected. The range of the independent variable, the salt concentration (g/100mL), investigated is relatively narrow. The range of data was between 0 g/100mL and 12.5 g/100mL, yet salt concentrations higher than these were not investigated. It is not certain that the trend between 0 g/100mL and 12.5 g/100mL will be maintained and remain consistent beyond this range of data. There are not enough high and low salt confirm the data trend.

Conclusions

Osmosis occurs at an optimal salt concentration of 8 g/100mL. Osmosis decreases either side of this data point. This relationship between osmosis and salt concentration is best described by

$$\text{mass loss} = 0.455 [\text{salt}]^2 + 7.375 [\text{salt}] - 3.7357 \quad R^2 = 0.9626$$

The results suggest that osmosis is highly dependent on salt concentration, and that osmosis occurs best at moderate amounts of salt. This also displays that there is a "natural" limit to osmosis.

Identification of Reliability and Validity

The data does not seem reliable. There is a significant amount of uncertainty within the data, the greatest range being approximately 40% uncertainty. There were also four data values that were omitted. ~~And~~ The trend line does not go through all the ranges of uncertainty, and the data does not fit the trend very closely, and therefore is not considered very reliable.

The conclusions drawn from the data do not seem to appear valid due to the limited amount of data investigated. The range seemed relatively narrow, as there were not enough high and low salt concentrations investigated. A way to improve this is to have more variations of the independent variable (salt concentration). This significantly reduces the validity of the conclusions that were drawn from the data recorded.

Excellent opening. Concise, supports with data description & relationship. →

need to elaborate here - use data to support this statement. Explain the use of "limit". →

One sentence (in the middle) appears unfinished?? Does cover all 3 uncertainty techniques. Very well done. →

Not totally clear - but two issues are identified - too narrow a range AND not enough data pts. These are excellent points, but should be separate arguments, not combined together. →

Elaborate on this point. This is the part where you detail the real-life significance of the findings. Need more in senior school. →

Really very good. Very very concise and to the point. Great writing. Does contain an improvement, which in senior school would be a separate section. →