

Is our food safe?

Info sheet answers.

1) What is the average CAPTAN residue on apples at:

a) **Holly Farm?** Answer: 1.53 mg/kg b) **Ivy Farm?** Answer: 1.58 mg/kg

2) Are the averages of either set of data higher than the Maximum Residue Level (MRL) of 3mg/kg?

Answer: No

3) What is the standard deviation for each set of data?

Answers: Holly Farm = 0.14944 Ivy Farm = 2.24638

4) Given this standard deviation, how many samples would you need to test in order to be confident you had a reliable result?

Answer: This is a discussion topic rather than one requiring an exact answer. Students should discuss, for example:

1. Do you exclude the outlier results at Ivy Farm?
2. ... or leave them in, and accept an abnormal distribution?
3. ... or have a normal distribution with a negative skew?
4. What could have caused the outliers? Poor testing? Inclement weather conditions? Equipment failure? Geography of different places on the farm?
5. What does the standard deviation tell us about the results collected?

5) Do you think that all the apples from each farm are below the MRL?

Answer: No. Some of the apples tested have CAPTAN levels above the MRL.

6) What percentage of samples exceed the MRL?

Answer: Holly Farm: 0%; Ivy Farm: 30%; Overall: 15%.

7) Do your results give a *valid* answer to the question 'is this food safe to eat'?

Answer:

- For Holly Farm, no. It only gives an answer to the question, are CAPTAN levels below the MRL. A factbox tells you that two other pesticides are used at the farm which you have not tested for, so you have no idea whether levels of those pesticides are safe.
- For Ivy Farm, no. We know that some of these apples are above the MRL for CAPTAN, but we don't know what the safe level is (it will be higher).

8) Can you say that apples from either farm are definitely safe? Justify your answer.

Answer: No. (See answer to Q.7)

9) If CAPTAN levels were above the MRL in both wheat and in parsley, which do you think scientists would worry most about?

Answer: wheat. Wheat is a very important foodstuff, a staple in Western diets. Parsley, on the other hand, is eaten in very small quantities. Most people will ingest far more CAPTAN from wheat because they eat so much more wheat than they do parsley.

10) What fraction (by mass) does an MRL of 3mg/kg represent?

Answer: .000003%