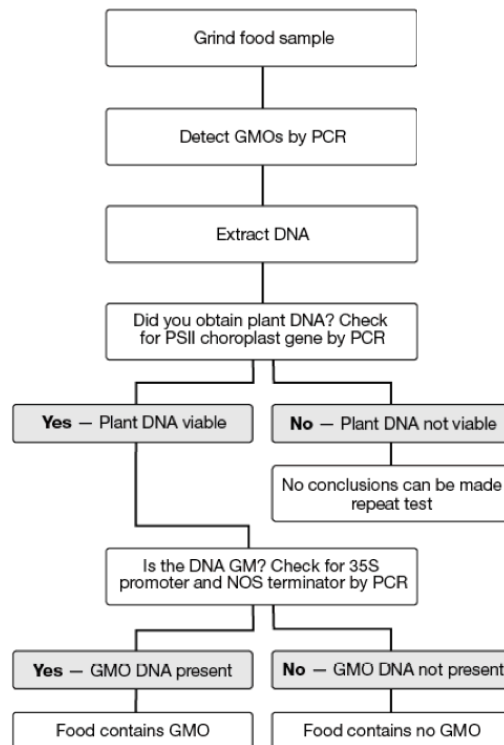


# Experimental Controls

- Controls allow for comparison of results to determine effects of treatments.
- Just as importantly, controls provide for a way to determine whether results are meaningful (useable). They allow the scientist to determine whether something went wrong in the experiment.

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## Primers and Dyes

- One set of primers (with the red dye) is specific for DNA found in GM foods. There are two kinds of primers in the red solution: one that recognizes the CaMV 35S sequence; one that recognizes the NOS terminator.
- The other set of primers (with the green dye) is specific for a gene that codes for a photosystem protein, which is found in nearly all plants.

3

## Primers and Dyes (cont.)

- The GMO primer (red) will allow PCR amplification of DNA from a GM food. It therefore provides for a positive test for GM food.
- The Photosystem primer (green) will allow PCR amplification of DNA from any plant. It serves as a control that tells you whether a negative result for GMO is a true negative result (the food is not GM) or a result of failure to successfully extract DNA.

4

## Control for Contamination

- The experiment includes a sample of certified non-GMO food (the oatmeal). This serves as a control against a false positive.
- If the oatmeal tests positively for GMO, this indicates that the sample was contaminated with GMO DNA.
- Therefore, if your test food also gives a positive result, you cannot trust the result, because your food sample might have been contaminated also.

5

## Control for Successful PCR

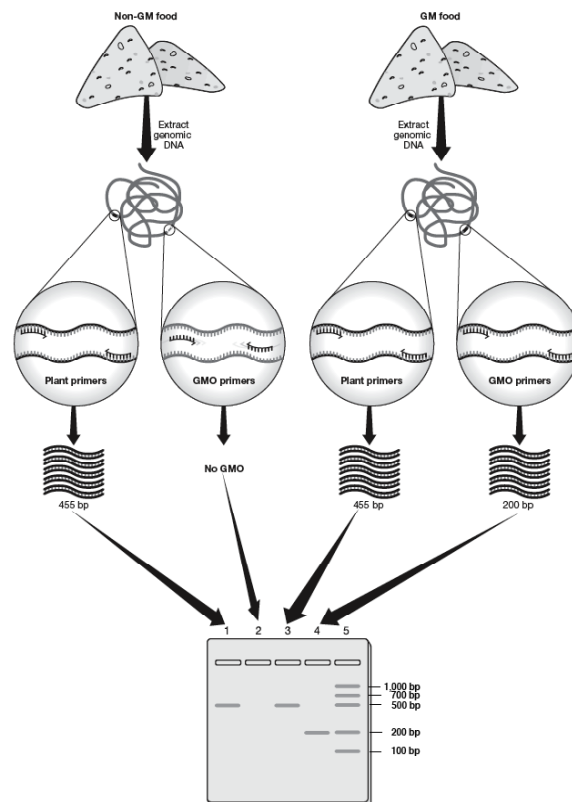
- The experiment uses a solution (GMO+) containing DNA from a GM food. This serves as a control against false negatives.
- If the GMO+ solution gives a negative result for GMO, this is an indication that the GMO DNA was not successfully amplified by PCR.
- Therefore, if your test food also gives a negative result, you cannot trust the result, because PCR amplification might have failed for your test food as well.

6

# A Nearly Universal Test

- The experiment includes primers for the two DNA sequences (CaMV 35S and NOS terminator) that are currently the ones most commonly used for GM foods.
- Since 85% of GM foods currently being produced contain one or both of these sequences, 85% of GM foods will be detected by this experiment.
- Even if nothing goes wrong in the experiment, there is still a 15% chance of a false negative occurring. This would happen if the test food is a GM food that was produced without either of these two commonly used DNA sequences.

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