

MASTER 4.8

CALCIUM AND PLANT GROWTH

NAME

DATE

You probably know some of the reasons why calcium is important in the human body. Calcium helps form and maintain healthy teeth and bones. You may be less familiar with some other roles for this important element. Calcium also plays a role in the clotting of blood, the sending and receiving of nerve signals, muscle contraction and relaxation, and regulating the release of certain hormones and other chemicals in the body.

In plants, calcium is a constituent of cell walls and is involved in the new growth of leaves and root tips. It provides elasticity and expansion of cell walls, which prevent the growing points from becoming rigid and brittle. As scientists continue to study the role of calcium in plants, they find that calcium is important in many plant functions ranging from nutrient uptake to coordinating changes in the cells that help the plant react to the impact of environmental changes and stresses.

Calcium deficiencies in plants generally appear in areas of new growth, such as leaves, stems, buds, and roots. Young leaves may be deformed. Areas around the edge of the leaf may die or the entire leaf may die. In older leaves, dead (necrotic) spots may develop.

In plants like tomatoes and peppers, calcium deficiency causes a disorder called blossom-end rot. In such cases, a black leathery spot appears on the blossom end of the fruit. The fruit then stops developing and eventually falls off. In peanuts, low calcium levels cause a condition that prevents nuts from developing.

Calcium deficiencies also affect roots. Roots may be short, stubby, and misshapen. In severe cases, root tips may die.

MODEL DATA SHOWING THE EFFECTS OF CALCIUM DEPLETION ON PLANTS

FIRST EXPERIMENT:

BEFORE TREATMENT



AFTER TREATMENT



The second experiment seen below included treatment with 5 mM EDTA and liquid fertilizer (Miracle Gro mixed according to package directions). The fertilizer treatment is not included in the current procedure.

SECOND EXPERIMENT:

BEFORE TREATMENT



AFTER TREATMENT



The following data provide another way to look at the effects of EDTA, and liquid fertilizer in this experiment, on the growth of pea plants.

EFFECT OF EDTA AND FERTILIZER ON PEA GROWTH

TREATMENT				
	TAP WATER	5 mM EDTA	25 mM EDTA	LIQUID FERTILIZER (MIRACLE GRO)
HEIGHT (CM)	25.4	27.9	15.2	30.5
	35.6	25.4	16.5	40.6
	24.1	22.9	17.8	30.5
	24.1	17.8	20.3	30.5
AVERAGE	27.4	23.5	17.5	33.0

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ADDITIONAL EXPERIMENTAL RESULTS

NAME
DATE

BEFORE EXPERIMENTAL TREATMENT
WATER



AFTER EXPERIMENTAL TREATMENT
25 mM EDTA



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EDTA EFFECTS ON PEA PLANTS

NAME
DATE

**BEFORE
TREATMENT**



**AFTER
TREATMENT**

