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## Agriculture Articles

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### Biochemical Stimulation of Plant Growth

by

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Besides the [Biodynamic Formulas](#), there exist several other methods of stimulating seed germination and plant growth with non-toxic substances. Several other methods are in general use by farmers:

**(1) Nutrient Presoaking** ~ Presoak seeds in a solution of nutrients that will add to the vigor of the seeds. Pure water tends to dissolve out substances contained in the seeds' shells that are needed for the germination and growth. One easy method of stimulating the germination of seeds is to soak them in an aqueous extract of the full-grown plant from the preceding crop. Low-voltage direct electrical current can facilitate the electrophoresis of nutrients into the seeds, as described in the review of [ElectroCulture](#).

**(2) Acid Scarification** ~ This technique is recommended for thick-shell seeds. Place dry seeds in a glass container and cover them with concentrated sulfuric acid (sp. gr 1.84) for 5 minutes. Pour off the acid and wash the seeds very thoroughly with fresh water to remove any residual acid. Never add water to the acid; it will spatter violently. Always add acid to the water. The seeds should be planted immediately while wet.

**(3) Moist-Chilling** ~ Also known as Vermiculization or Stratification, this technique of preconditioning seeds accelerates the after-ripening of seeds by exposing them to low temperature (0-10 degrees), moisture, and air for a period of time. Moist chilling is most effective when applied after hot water presoaking. Seeds are mixed with two volumes of sand and are kept in plastic bags in a refrigerator or outdoors. At the end of the after-ripening period some of the seeds may begin to germinate while in storage. The seeds can be separated from their medium by shaking the mixture on a screen. The seeds should be planted immediately before they dry out.

**(4) Thiourea** ~ Aqueous solutions (0.5-3%) stimulate germination, but inhibit later growth. Therefore seeds should be soaked no longer than 12 hours, and must be thoroughly rinsed with fresh water.

**(5) Potassium Nitrate** ~ Seeds will germinate faster when placed in sand moistened with 0.2% aqueous potassium nitrate. Rewater with pure water rather than additional nitrate solution.

**(6) Hydrogen Peroxide** ~ 30% hydrogen peroxide also is effective as a stimulant of germination. Very dilute hydrogen peroxide also accelerates later growth if used only occasionally.

**(7) Gibberillin** ~ When seeds absorb water, the hormone gibberillin appears in the embryo and is translocated to the aleurone layer, where it activates the metabolism to initiate sprouting. Gibberillin causes the rapid growth of beans and bamboo, which contain large amounts of the hormone.

Gibberillin is not, however, appropriate for application to all plants. In most cases, gibberillin increases the thickness and internodal length of the stalk. Sometimes the terminal nodes are weak branching is suppressed, and the roots develop poorly. The number of flowers increase, and they are larger. Germination and flowering are stimulated, but leaf growth and chlorophyll production are reduced proportionately.

Gibberillin is extracted from cucumber seeds, fresh cantelope seeds, dried corn kernels, and from pencil rod, lupine, and pinto beans. Soak 200 gr of powdered seeds for one week in 110 ml of a mixture of acetone (10 parts), isopropyl alcohol (5 parts) ethanol (2 parts) and water (5 parts). Filter the mush and rinse it with 20 ml acetone and 20 ml isopropyl alcohol. Combine the rinse and mother liquor, evaporate the solvent, and dissolve the residual gum in alkaline water for experimental use.

**(8) Auxin** ~ Auxin is the general name of a group of plant hormones that includes indole-acetic-, -propionic-, and -butyric-acids. Auxins are active in many plant functions, such as stem growth, root development, and flowering.

The sexual expression of plants is strongly influenced by the amount of auxin present during the flowering phase. Other factors being equal, females develop with higher levels of auxin.

Combine auxin (1:5000 water) with vitamin B-1 (1 ppm) to increase the effect of both nutrients, which are available in commercial preparations.

**(9) Triacontanol** ~ This fatty acid is found in many plants. It increases growth rates and yields up to 25%, and increases the protein content, even in darkness, when most plants are dormant. It seems to enhance the growth of plants without increasing their consumption of nitrogen.

Triacontanol is non-toxic, and incredibly potent. The applied dosage is one part in 10 million of water, applied as a foliar spray. The simplest way to use triacontanol is to plow under a crop of alfalfa, which contains relatively large amounts of the substance. Other common sources include cotton, apples, and sunflower seeds (which contain up to 8% in the fatty acid fraction).

Triacontanol is extracted from dried plants by chloroform, which is then filtered and evaporated. Extract the residue with acetone, filter and evaporate the acetone, and extract the residue with petroleum ether to yield crude triacontanol. It can be purified by reverse chromatography.

Other stimulants of plant growth include: ascorbic acid (vitamin C); use one to five parts in 10,000 of water. Dilute camphor also stimulates plant growth.



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