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(54) ELECTROCULTURE

(54) גידול חשמלי

ELECTRO CULTURE

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## ELECTROCULTURE

### Abstract of the Disclosure

The disclosure relates to the electroculture of plants. An activator has been discovered which when properly mixed with the supporting soil for plants has a pronounced effect upon the rate of growth and yield of the plants. The activator preferably comprises magnetite ( $\text{Fe}_3\text{O}_4$ ) ground to 100-mesh or smaller size granules having an applied electrostatic charge. The charged magnetite is plowed into the soil supporting the plants preferably to a depth of two to four inches and at a ratio of at least 100 lbs. of charged magnetite per acre of soil under cultivation. The magnetite activator is produced by pulverizing or crushing ore containing magnetite and classifying the ore to provide granules of a size of 100-mesh or smaller. The classified material is charged to apply an electrostatic charge thereto by exposure to a magnetic field established by an electromagnet energized by 440 volts direct current. The charged granules of magnetite are separated magnetically from the ore.

## ELECTROCULTURE

The present invention relates to the culture of vegetables or plants and more particularly to directing an electrical charge to plants to stimulate the rate of growth and yield of the plants and is commonly referred to as "electroculture". The terms plants and vegetables are used herein synonymously and are intended to define all forms of plant life in the plant kingdom or included in the broad vegetable classification of matter.

It is an object of the present invention to provide a new and improved activator for plants which when applied to the supporting soil for plants has a pronounced increased effect on the rate of growth and yield of the plants.

Another object of the present invention is to provide a new and improved activator for plants which is relatively inexpensive to produce and comprises a granular mineral nutrient for plants which is also capable of receiving and carrying an appreciable electrostatic charge so that the charge can be transferred to the plants to stimulate the rate at which nutrients are assimilated by the plants.

A further object of the present invention is to provide a new and improved activator for plants comprising 100-mesh or smaller magnetite granules having an electrostatic charge applied by an electromagnet energized by 440 volts direct current.

A still further object of the present invention is to provide a new and improved activator which in addition to stimulating plant growth and yield makes the plant relatively insect repellent and protects plants exposed to subfreezing temperatures as low as 22°F so that no damage results to the plants or fruits thereof.

Another object of the present invention is to provide a new and improved method for making the activator including

crushing and classifying ore containing magnetite to provide granules of 100-mesh size or smaller, applying an electrostatic charge to the granules, and separating the charged magnetite granules magnetically from the other material in the ore.

5           A still further object of the present invention is to provide a new and improved method of culturing plants by mixing into the supporting soil for the plants a granular material which has an applied electrostatic charge so that the charge is transferred to the plants to stimulate electrostatic charge. The mag-  
10 netite granules can vary in size in the practical range of from 2 to 600-mesh or smaller but 100-mesh or smaller granules are preferred because these size granules are easier to produce and handle, will readily accept and store an appreciable electrostatic charge, and readily dissolve for quick assimilation of the iron  
15 into the soil and plants.

The test results indicate that for best results, the charged magnetite granules should be plowed into the supporting soil for the plants preferably at least two to four inches depending on the type of plant to be cultured and the nature of the  
20 supporting soil. However, any depth from surface to several feet would be beneficial to the plants. The activator should be applied in a ratio of at least 100 lbs. of activator per acre of soil under cultivation. The concentration of activator can be increased above the 100 lbs. per acre ratio with an attendant  
25 increase in yield and growth rates up to of course practical limits.

Outstanding results have been realized from utilizing the activator according to the present invention. Most notable of the results were an increase in the number of crops grown per  
30 year in a given growing season, a marked increase in the size of the fruit and of the plants treated by the activator without

adversely affecting the texture of the fruit, pronounced resistance of the plant to insects and the ability of the plant to withstand subfreezing temperatures. With respect to the latter, plants treated with the activator have withstood temperatures of 5 22°F without damaging the fruit or the plant itself. It should be understood, however, that the activator is not a substitute for fertilizer. The plants must be fertilized in accordance with fertilizer programs established for the various plants in order to realize the full benefits of the activator. The test of the 10 activator was conducted in conjunction with a proper fertilizer program.

It is not known precisely how the activator according to the present invention produces the astounding growth and yield results described. It is hypothesized that the charged 100-mesh 15 magnetite granules on being plowed into the ground discharge electrostatic energy and also go into solution so that the iron therein is readily absorbed as a nutrient by a plant. This action also releases the negative charge carried by the granules which migrates to the plant and enters into the fluid sap stream of the 20 plant. Apparently, the charged sap circulates at a more rapid rate and thereby speeds up the assimilation processes of the plants which accelerates the plants' growing cycle. In addition, it is believed that the charge acts on the soil to release minerals which are naturally bound in the soil and which are applied 25 as various fertilizers, such as nitrogen, sodium, potassium, phosphorous, calcium, sulfur and others, thereby increasing the available nutrients for assimilation by the plants.

The resistivity of the plant to subfreezing temperatures can be explained perhaps by the increased circulation rate of 30 the sap within the plant and a negative ion charge present in the plant. An analogy may be made between the action of the

charge in the plant and a water pipe above ground into which charged electrons are directed to prevent the water from freezing even at subzero temperatures.

The resistivity to insects can possibly be explained  
5 by the fact that the plant carries a slight negative charge which is uncomfortable to most insects and therefore, they immediately depart from the plant upon sensing the charge.

There are other materials which could be used for the activator. The requirements for such material are that the material be capable of being charged electrostatically and will retain  
10 that charge and upon being plowed into the ground releases the charge to the soil and plant. The magnetite is preferred because of its relative abundance making a relatively inexpensive commodity. In addition, the magnetite contains iron which is recognized  
15 as an important nutrient for most plants. Examples of other nutrient materials which may be used in the activator but without all the benefits provided by magnetite are iron, ilmenite, and possibly wolframite. Also, non-nutrient materials capable of receiving and discharging a negative charge in the soil may be  
20 used.

The preferred activator is made by a process and apparatus which is shown somewhat diagrammatically in the drawings. Referring to the drawings, and in particular to FIG. 1, an ore processing unit 10 for making the activator is shown. The ore  
25 processor 10 receives ore containing magnetite which has been crushed and pulverized by conventional means. The magnetite ore or the material to carry the charge is classified to 100-mesh or smaller by a classifier 12. The classifier 12 is a conventional classifier and may include a shaker screen designed to permit  
30 passage therethrough of 100-mesh or smaller particles. The properly classified particles are then directed to a hopper 14,

either by gravity or by any conventional conveying mechanism. The material which has not been pulverized to 100-mesh or smaller is returned, recrushed and redelivered to the classifier 12.

The material is then fed from the hopper 14 onto a conveyor 16, which in the illustrated embodiment is a vibrating or reciprocating type conveyor. The hopper 14 may include a feeding device such as a pair of rotating feed rolls adjacent the opening in the bottom thereof to ensure orderly feeding of the material onto the top surface of the conveyor 16 as is well known in the art. Conventional drive means can be employed to reciprocate the conveyor 16 to move the material from a point below the hopper toward a charging and separating device 18 arranged downstream and above the conveyor 16.

The charging and separating device 18 includes an electromagnet 20. The electromagnet 20 has poles 22 and 24 of opposite polarity and which are activated by a coil 26. The coil 26 is energized by a source of 440 volts direct current. The electromagnet 20 sets up magnetic fields above the conveyor adjacent to pole 22 and 24. The magnetic fields are of sufficient strength to apply the desired charge to the 100-mesh particles as they are conveyed to the fields by the conveyor 16. The conveyor 16 is covered adjacent the poles by a covering 28 best illustrated in FIG. 2. The covering 28 extends over the top of conveyor 16 to prevent the material being moved through the fields from being physically attracted to the poles 22 and 24.

The magnetite has a natural magnetic charge and the effect of the electromagnet 20 is to fortify this charge so that it will have an appreciable effect on the plants with which the activator is used.

Magnetite has a known charge characteristic which can be utilized to separate the magnetite from the other materials



with which it is associated as it moves through the field. This characteristic permits a rotary conveyor indicated generally as 30 to pick up the magnetite from the conveyor 16 and transfer it to a collection area. The rotary conveyor includes a rotating 5 disc or plate 32 which is disposed parallel to and above the conveyor 16. The plate is rotated by drive means, not shown, which drives a vertical shaft 34 fixedly secured to the plate 32. The drive means not shown drives the plate 32 in a counterclockwise direction as indicated by the arrow around the vertical shaft 34.

10           The magnetite is picked up from the conveyor 16 by a series of cobalt pins 36 which depend from the plate 32 and are generally equal spaced around the periphery. The charged magnetite is attached to the cobalt pins 36 and the pins move the magnetite over the conveyor 16 and above a collection chute 38 which 15 is disposed below the conveyor 16 and extend beyond each side thereof as shown in FIG. 2. The charged magnetite is released from its associated cobalt pin 36 when it reaches the null point between the north and south poles 22 and 24 of the electromagnet 20. When each pin 36 reaches the null point between pole 22 and 20 24, the charge drops into chute 38 where it is directed into a suitable container 40 which may be associated with the conveyor to move the material away for packaging and shipping. After the material drops from the pins, the pins continue to rotate with plate 32 and again pass over the conveyor 16 where they may pick 25 up any magnetite which was not removed by one of the pins on the upstream pass over the conveyor 16. The material picked up by the second pass is carried over the portion of the discharge chute 38 extending beyond the opposite side of conveyor 16. The material is dropped from the pins 36 into chute 38 as the pins 30 reach the null point between the poles 22 and 24.

The poles 22 and 24 can be adjusted vertically relative to the conveyor 16 to permit adjustment of the strength of the field. It is also possible to adjust the height of the poles 22 and 24 separately or relative to one another and relative to the conveyor 16 so that it is possible for the pins 36 to pick up one type of material on the upstream pass over the conveyor 16 and a different material while making its downstream pass over the conveyor 16. In such an arrangement, the chutes 38 would direct the different materials into different containers or collecting devices.

Although the preferred embodiment of the invention has been described in considerable detail, other changes, modifications and embodiments may occur to those skilled in the art of electro-culture and it is intended to cover all such changes, modifications and embodiments coming within the scope of the appended claims.

WHAT IS CLAIMED IS:

1. A method of electroculturing plants comprising mixing into the supporting soil for the plants granular material having an applied electrostatic charge.

2. A method of electroculturing plants as defined in claim 1, wherein said granular material is a nutrient for the plants.

3. A method of electroculturing plants as defined in claim 2, wherein said granular material is magnetite.

4. A method of electroculturing plants as defined in claim 1, wherein said granular material is crushed and classified to provide granules sized to 100-mesh or smaller.

5. A method of electroculturing plants as defined in claim 1, wherein said granular material is charged by exposing the material to a magnetic field provided by an electromagnet energized by 440 volts of direct current.

6. A method of electroculturing plants as defined in claim 1, wherein said granular material is mixed with the supporting soil according to a ratio of at least 100 lbs. of granular material per acre to be cultivated.

7. An activator for use in the culture of plants comprising granulated magnetite having an applied electrostatic charge.

8. An activator for use in the culturing of plants as defined in claim 7, wherein the granule size of said magnetite is 100-mesh or smaller.

9. An activator for use in the culturing of plants as defined in claim 1, wherein said magnetite is charged by a magnetic field provided by an electromagnet energized by 440 volts of direct current.

10. An activator for use in culturing plants comprising a granular material having an electrostatic charge applied by a magnetic field provided by an electromagnet energized by 440 volts of direct current.

11. An activator for use in culturing plants as defined in claim 10, wherein said granular material is magnetite having granules sized to 100-mesh or smaller.

12. A method of making an activator for use in culturing plants comprising crushing and classifying a material containing magnetite to a predetermined granule size, exposing the granulated material to a magnetic field to apply an electrostatic  
5 charge to the granules and separating magnetically the magnetite granules from the material.


13. A method of making an activator for use in culturing plants as defined in claim 12, wherein the material is crushed and classified to provide granules sized to 100-mesh or smaller.

14. A method of making an activator for use in culturing plants as defined in claim 12, wherein said granulated material is exposed to a magnetic field provided by an electromagnet energized by 440 volts of direct current.

15. A method of making an activator for use in culturing plants comprising crushing and classifying a material including elements which can receive and hold an electrostatic charge to provide granules of a predetermined size, exposing the sized

5 granules to a magnetic field established by an electromagnet energized by 440 volts direct current, and separating said charged elements from the material magnetically.

16. A method of making an activator for use in culturing plants as defined in claim 15, wherein the chargeable element is magnetite classified to provide granules of a size of 100-mesh or smaller.



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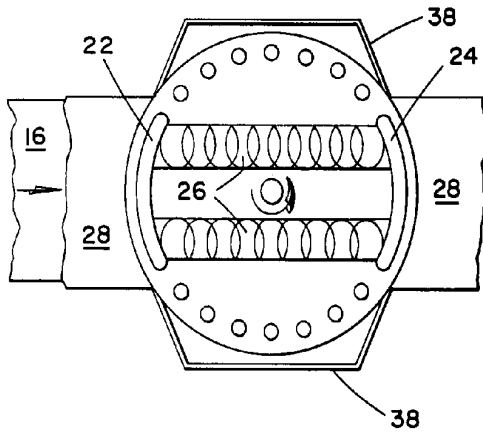


FIG. 2

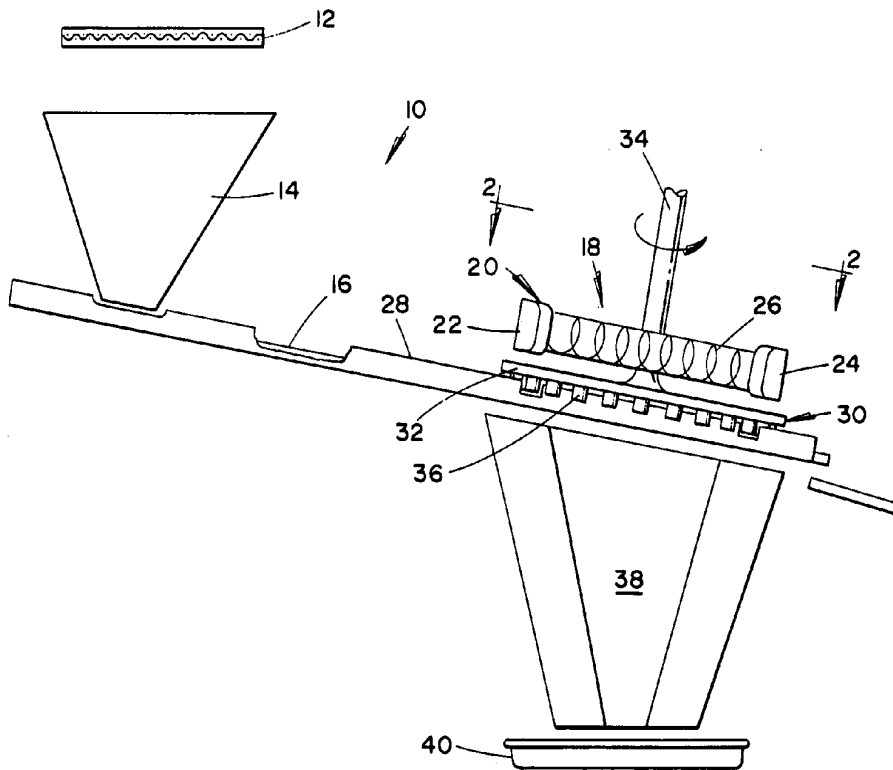


FIG. 1