Evaluation Biochemical of color changes in bean root glands

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Abstract: Research project as a split plot experiment in randomized block design with four replications in the research farm, Islamic Azad University of Ahvaz were executed. The main treatments include bean plant varieties and different levels of secondary treatments were N fertilizer. about 21-25 knots formed days after sowing on plant roots began in the nodes, which consists of very small (the highest average diameter of 0.21 Cm), mostly green and white had a few that Colors mark the node recently and is also lack of nitrogen fixation. After 35 days of planting the color pink, reddish nodules were marked and there was lag, hemoglobin, and nitrogen fixation was started in the red bean nodules average 10 days after flowering continued. The different levels of nitrogen in terms of value increase be white within the gland more time your showed such treatment 80 kg N fertilizer per hectare, white inside glands 60 days after planting in 64 percent of the nodes was observed But in the 40 kg ha treatment 40 days after planting, only 12 percent of white lumps were observed. Green, white and non-efficient Nitrogenase enzyme that normally expresses the growth was achieved during the primary colors red, pink and biological nitrogen fixation efficiency and the approximately 35 days after planting continued until after flowering, and brown or black aging glands shows that 10 days after flowering, the color nodes showed.[Tayeb Saki Nejad, Alireza Shokoohfar. Evaluation Biochemical of color changes in bean root. Journal of American Science 2011; 7(7):75-78]. (ISSN: http://www.americanscience.org1545-1003).

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1. Introduction

Leg hemoglobin (in legumes glands)

Hemoglobin log significant only in tumor tissues and legumes are treated in other systems, N fixation is not observed. Valentine et al (2008) for their extensive studies of the pigments in fungi and yeast have identified, but in other higher plants (except legumes) have had there. Initially that ***Leg hemoglobin*** glands were placed within tissues. Host cells containing Bacteria from other infected cells are not bigger. Nitrogenase activity and nitrogen fixation in legumes contain large quantities ***Leg hemoglobin*** with them (in the case of red or pink) is connected. Yellow or browning that denote ***Bacteroied*** aging or failure is usually caused by poor condition occurs. Green, a white or non-effectiveness node reveals Nitrogenase activity. Physiological importance pigment ***Leg hemoglobin*** is not completely understood, but probably do breathe oxygen transfer in the glands and the production of ATP is required and can say that observation number, size and color glands signs of status in legumes is nitrogen fixation(2).

Before 1960 little information about the biochemistry and enzyme studies had stabilized. Enzymes which were able to establish for the first time in early 1960 were extracted from the cells, the first success in this field of research anaerobic bacterium Clostridium enzyme was. Enzyme, which then were able to stabilize free from other microorganisms stabilizer (including aerobic bacteria from you) are also extracted. Then the stabilizers of bacteria in the ball of Bacteroiedy legumes were extracted. The enzyme stabilizers of the root were also extracted (4).

That the enzymatic catalytic reduction wills "Nitrogenase" is called. The final product ammonia interaction is. By the interaction, catalytic Nitrogenase is as follows:

When ammonia is produced, none of the compounds (stable and unstable) intermediates of this reaction have not yet discovered secreted out of and then construction ***Bacteroied*** amides and amino acids can be stabilized.

Very large and complex enzyme that ammonium nitrogen reduction surgery will do that in fact the Nitrogenase is composed of two proteins, one protein that contains iron and molybdenum catalyst and other reaction is a protein that contains iron as a reducing substance for protein, iron - molybdenum acts.

How to transfer electrons to nitrogen is not known precisely but is likely to include several stages (2, 3 and5).

Nitrogenase enzyme contains several important properties are:

1 - Basically this enzyme requires anaerobic conditions. Hence the free oxygen concentration in cells

Contaminated, the bacteria must be kept very low level. Legume nodules is essential in the presence of hemoglobin log is possible. The red hemi protein the building of the animal hemoglobin recalled, with a strong affinity for oxygen is thus low oxygen concentration is maintained at around Bacteroied while doing breathing oxygen is still available.

2 - Restore the enzyme catalyst in many reactions such as intermittent Substrata is Cyanamid and acetylene. These Svbstrat intermittent physiological importances are not. However, acetylene reduction and accurate method suitable for evaluating enzyme activity has created.

Products because this practice is that polyethylene by Bacteroied or nodes are free and can be analyzed by gas chromatography.

3 - This enzyme can also restore the catalyst is the proton reduction to hydrogen gas by the enzyme Nitrogenase Bacteroied depends on the preparation and continuous supply of ATP and resuscitation been able to give the hydrogen atoms (i.e. protons and electrons) to The reason is that is mentioned in paragraph after ATP is required(2, 6).

ATP and inorganic phosphate of ATP in their respiratory chain Bacteroied system is produced. Article revived by accommodating change of host plant photosynthesis products is obtained major photosynthetic products in the transport of these materials leaves of higher plants to other parts of the plant, but probably through sucrose Bacteroiedy ball of legumes is not used. But instead, may be the first by the enzyme "Anvrtaz" be hydrolyzed to glucose and fructose. Although currently in carbohydrate metabolism Bacteroied not start well, but know that Bacteroied glycol sis enzymes are contained (2, 6).

Thus it is believed that glucose-6 phosphate as a material for accommodating variable interplay Nitrogenase enzyme acts all details of electron transfer to Nitrogenase enzyme is not yet clear. But despite this, can a hypothetical system of electron transfer to Nitrogenase offered (8).

It is believed that the interplay of structural variability in this sector to create iron protein Will. And reducing to a matter will become strong. Then this could be strong reducing electrons to the iron and molybdenum significant part Nitrogenase (which in turn makes the resuscitation) to transfer (12, 15).

Studies (in the laboratory and outside the living cell environment) have shown that at least four ATP molecules per pair of electrons are transferred to hydrolysis, so the revivals of a molecule into two molecules, at least 12 ATP molecules are required because six electrons per molecule was required resuscitation.

In addition to several other accommodating change materials may be revived by the Nitrogenase complex. Acetylene gas is one of the materials that a non-physiological material is ethylene and is revived. Because ethylene can be high sensitivity by gas chromatography (small and portable device) was discovered and determined than determining acetylene - ethylene sometimes for Nitrogenase activity in the field to measure and identify the effects of various environmental factors and agricultural operations on the fixation is used (16).

Proton also for accommodating a material change is Nitrogenase. In fact, part of the electron flow through Nitrogenase (in some cases third or more) may not be used in reclamation should be thus, may also stabilized by Bacteroied gas production out of them. Get out of this release and reducing power dissipation and shows some of the rhizobial bacteria that produce some ball in the Nitrogenase enzyme action and little or no value basically do not lose. In these bacteria are more efficient and effective fixation. Because having a mechanism through which are produced and released by Nitrogenase is placed back in the cycle. The first step of getting into this cycle, which is absorbed by the enzyme, is catalytic Bacteroied in:

$$H_2 \rightarrow 2H^+ + 2e$$

The next steps include re-utilization of protons and electrons produced in the interplay of materials by electron carriers. Many of the current research is devoted to the consolidation in the identification of some varieties of cultivars and rhizobial bacteria, some varieties of legume plants that produce some ball in which is not produced(16,13).

2. Material and Method

Research project as a split plot experiment in randomized block design with four replications in the research farm, Islamic Azad University of Ahvaz were executed. The main treatments include bean plant varieties and different levels of secondary treatments were N fertilizer.

Sampling

Root study was conducted by the method of the cease-cylinder convention of bringing out the full parameters of root nodule number and diameter (with a caliper) were measured and cut the tubers into the color detection was performed.

A plot, lines 9 and 3 and 2 during plant growth and for sampling of roots and nodules were used, the sampling interval was 12 days of each other, and 0.6 m (cm 100 cm length and 60 between two rows) and number of plants to 10 plants per plot reached.

Statistical calculations

On all results, analysis of variance was followed by Duncan's test, comparison was done and the results are presented as tables with charts, Excel 2000 Plant growth analysis was performed with SAS computer program for agriculture and mini tab and estimates were calculated.

3. Result

In the color of the node that is a qualitative trait following results were obtained:

A - about 25-21 knots formed days after sowing on plant roots began in the nodes, which consists of very small (the highest average diameter of 0.21 Cm), mostly green and white had a few that Colors mark the node recently and is also lack of nitrogen fixation.

B - After 35 days of planting the color pink, reddish nodules were marked and there was lag, hemoglobin, and nitrogen fixation was started in the red bean nodules average 10 days after flowering continued.

C - the color of the flowering period of jaundice turned into nodes and in maturity period, the nodes, Brown was inclined to black, Hague and juts (2005) as picks during the flowering plants because of high energy needs, the transitional process of hydrate carbon to roots and nodules are actually off the bacteria causing the inactivity of plant symbiotic bacteria is biological nitrogen fixation and stops the node to color and blackened leaves.

D - The different levels of nitrogen in terms of value increase be white within the gland more time your showed such treatment 80 kg N fertilizer per hectare, white inside glands 60 days after planting in 64 percent of the nodes was observed But in the 40 kg ha treatment 40 days after planting, only 12 percent of white lumps were observed.

E - green, white and non-efficient Nitrogenase enzyme that normally expresses the growth was achieved during the primary colors red, pink and biological nitrogen fixation efficiency and the approximately 35 days after planting continued until after flowering, and brown or black aging glands shows that 10 days after flowering, the color nodes showed.

Gland enlargement of the bacteria entering into the root level of the three fertilizer treatments were started with different speeds in all treatments, but what how much low-gland enlargement process was seen. the fields and pastures with any amount of nitrogen fertilizer in the soil is usually knots woman will start, but a large dependence on nitrogen initial nodes have high levels of soil nitrogen in the soil reduces the size of the nodes due to Biological fixation of nitrogen in the accumulation of this element that only element nodes are accumulated in very small nodes remains reduced (12). in some legumes that are like planting clover in pastures and hay High levels of soil nitrogen in the presence of large nodules on the roots is synthesized but not nitrogen fixation activity nodes and color within the glands were mostly white and green indicating a very low Nitrogenase enzyme activity (14).

4. Discussion

Rhizobial behavior inside host cells, the active node has several stages: the first stage of infection and invasion are rhizobial invasive modes and secondly between the ball and the rhizobial symbiosis mode occurred and nitrogen fixation begins. In the third stage ball due to rot and fall are coming back to the root zone .

Ball formation on the legume family plants roots first with bacterial invasion began around cords is fatal. Plant roots of their active ingredients (for tryptophan) that are secreted growth and proliferation of bacteria in space node roots are intensifying (16)

Bacteria causing the nodes to turn this material into Akin (alpha-indole acetic acid) and possibly make into the hairy roots of auxin cause corrosion swing are the host. If the node-causing bacteria belonging to the group be able to work on the root enter hairy roots are spun. In some cases the bacteria produce are narrow and the field through their skin of root parenchyma cells (cortex) deliver and cause the swell woven find more amplified (14).

A - Cords develop fatal

B - The community surrounding cords rhizobial bacteria killer

C - Attract polar deadly bacteria on cords

D - Bending the tip hairs fatal

E - Squirm cords fatal

F - Development disciplines within cords fatal infection

G - New rhizobial fatal to the hairs inside the skin cells to root tissue inner skin

H - The release of bacteria from infected fields

Thus the formation of bumps with will say that the root node. Glands root emergence requires that one hand bacteria to infect their specific host and infect the other hand, host plant acceptance and provide factors necessary to contamination. The

fitness area affected by plant genetic structure of bacteria is possible .

Cell division of bacteria within host cells quickly continues, the host cells are divided rapidly in comparison with non-infected cells will be smaller. With growth rates of host cells, bacteria cells and also changes the sheets come in the name Bacteroied. Deformation associated bacteria Bacteroied hemoglobin; Nitrogenase and other enzymes are required for nitrogen fixation. In this time of rhizobial growth forms reached out to the development and tissue formation in the host ***Leg hemoglobin*** nitrogen fixation starts (11)**.**

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