Study on the possibility of converting rice husks to organic fertilizer using bacteria Pseudomonas aeregenosa and Celullomonas flavigena

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Abstract

Peel rice known Balsbos remnants Majarh are considered, one of the causes of environmental pollution in Qadisiyah province due to the large spread of this Majarh region because it is considered the agricultural environment ideal for rice so research aimed at solving environmental pollution Balsbos problem by re-use this article (Sbos) and considered as a raw material in the preparation of Bacteria fermented with bacteria Pseudomonas aeregenosa and Celullomonas flavigena. Preliminary research results showed that the fermentation medium is loaded Celullomonas flavigena Of the plant and the soil and its effect on the growth parameters of the barley plant where the results were good for the height of the plant and the dry weight of the vegetative total and the total root compared to the bacterial fermentation medium Pseudomonas aeregenosa. Which is followed by the effect and these two mediums are correlated with other fermentation mediums for the center of the cypress and the middle of the spousal paste and the bacterial medium. All these circles are loaded with the same bacteriostatic species.

1. Introduction

Diwaniyah city is famous for its cultivation of rice in large quantities, and is known as one of their side conversion to rice crop rice husks are rice st raw, which is known locally (with spouses) Which has become one of the problems of the environment in this city, especially near the mills for the conversion of plums to rice, which are remnants of light weight and can easily fly because the crust is almost dry, it is possible to be easily combustible materials and on this basis launched the idea of this research using those crusts as a manufacturing fermentation medium with the presence of other materials that increase their nutritional value as molasses[1,2]. Molass Produced from sugar mills, which is also an accidental substance that is wasted in large amounts in an unprogrammed or organized way to agricultural land In addition, those circles are used in terms of developing and brewing some types of bacteria useful plant Cabactrella Celullomonas flavigena, Pseudomonas aeregenosa which are of great importance and high capacity in The analysis of cellulose and cellulose semen due to the enzymes they have the ability to analyze this multi-ball and in the simplest case [2,3]. Hence the importance of cellulose enzyme cellulase enzymes Which changes the enzymes induced in most microorganisms, which are synthesized by the presence of cellulose or similar carbohydrate compounds in the structure of this multi-sugar as it produced large amounts of sugars. It activates the other micro-organisms that are adjacent to it in competition with cellulose analyzers Alexander, [4,5]. In addition, the cellulose enzyme can be adsorbed on clay minerals This happens when adding this enzyme to clay soils and Almazijah My interest is reflected in the benefit of plants [5]. Among these goals, a preference was given to the enzymatic degradation of substances on chemical decomposition and summarized as follows: Indranisilva, Piers, 1987 .

1 - enzymatic degradation does not cause pollution in the environment.
2- The process of enzymatic degradation is very specific.
3. The process of enzymatic decomposition does not require high energy, but requires a little energy compared to chemical decomposition

2. Materials and methods of work

2.1. Analysis of samples taken: Analysis of the SPUS material Spouses is analyzed to determine its components and to determine the amount of cellulose contained in these crusts.

2.2. Analysis of molasses: The molasses are analyzed for the purpose of knowing the generator and the elements involved in its installation. The results were certified by the Standardization and Quality Control Agency (Baghdad).
2.3. The process of mashing on rice husks: The crusts were well washed after being purified of dust and impurities. And it took the amount of those peels and washed well with running water to get rid of the soil and suspended solids and that amount has taken complete the pilgrimage to and put in Baker (600 ml) were added with caustic soda (5-10) tablets for Baker each after dissolved with water sterile distilled after making sure of the value of the PH And then the baker's well was sealed with asilica sheet and the baker was placed on the autoclave machine at a temperature of (126 m) and the pressure of 1 atmosphere and several times for the purpose of mashing and converting to a paste. In contrast, there are flasks (1000 ml) rice husks is mashed just because it's exposed to the sterilization process once in autoclaving [7].

I took out the dough Albbeckrat container and wash well, to offset the center distributed the dough on Filasket (250 ml) and (250 g) of the beaker and one blamed these decanters with all its material.

Also it added the same amount of crust and mashed and distributed to Filasket (500 ml) and then complete the volume, (250 g) for each flask, then added material molasses to all Filasket and by (2%) on the basis of the dry weight of that material then sterilized those Filasket on Temperature (112 m) and several times, and then extracted and cooled these media. In addition to those circles worked a comparison unit of the form of moist and sterile scales only, as the work of each center three repeats [8].

2.4. Preparation of isolates of bacteria used in research:
   1. Pseudomonas aeregenosa: Where obtained through the work of Walt Khavljev sample planted soil Bal Jetand then diagnosed and examined the optical microscope.
   2. Celullomonas flavigena: This isolation was obtained through the work of some of the fear of a sample of the soil under the fallen leaves of the trees where they were diagnosed and examined by optical microscope.

Both samples were based on the shape and growth of the colonies and the manner in which they were trampled on the center Nutrient agar In dishes and keeping those isolates in the refrigerator until use.

2.5. The effect of fermentation circles on growth and germination of bacteria Pseudomonas aeregenosa and Celullomonas flavigena: If you take swabs from a pure plantation to bacteria aeregenosa p. By means of the lob and the vials were cleaned containing the circles and by three flasks for each medium placed on heat (37 m) and for a period of (48) hours. The same process was performed on bacteria Celullomonas flavigena And with the same replicates.

2.6. Using a medium Bacterial agar With rice husk paste 2% of molasses and note its effect on the growth and germination of bacteria Pseudomonas aeregenosa and Celullomonas flavigena: If the experiment was carried out using the standard mean to determine the efficiency of the prepared medium of the cellulose paste (rice husks) by adding and preparing 50 g of cellulose paste with one flask/5 g of paste, using repeaters in the preparation process, from the middle of both Aldourguin it was added to one of Jugs (2%) of molasses and finished to size (500 ml) with constant shaking of the flasks and add one tablet for each flask of NaOH and then sterilized the bottles in the device of the inventory then cooled and poured circles (6 dishes) / flask and left the dishes to freeze and then vaccinated bacteria of (pseudomonas aeregenosa and Celullomonas flavigena) [9]. And by three dishes/bacteria and this especially in rural repeaters free Molasses, Tnyalsht other container on the center containing (2%) of molasses immunizing bacteria mentioned above the two types and by three dishes for each bacterial type.

2.7. Preparation and cultivation of the land: I tested a piece of agricultural land (3 × 3) m² where it was identified and divided in the form of squares (50 x 50) cm² where analyzed by wiping. Where he tested two types of plant for agriculture (barley and jute).

2.8. The effect of fermentation and bacterium pseudomonas aeregenosa and Celullomonas flavigena on the growth criteria of barley and grit plant: Mix the circles with the soil well mix and then watering with water for three days in order to homogenize the distribution of circles in the soil as each box contains a certain center with a control unit. The seeds were then seeded and covered with a light layer of soil and left for 10 days for seedling germination, where 50 seeds/square were planted and these replicates applied to the gat plant [9,10].

2.9. Effect of circles on plant growth criteria (plant height, dry weight on root and vegetative total): I left the seedlings for a period of one month and then randomly tested three seedlings for each transaction in one or soil At measuring growth criteria as well as measured lengths of roots, stems and leaves (surface area) for both plants (barley and alfalfa).

3. Results and discussion
   3.1. A Effect of Temperature on Cellulose Decomposition in Rice Peels During the Marsh Process: Since they contain husks of rice to 50% of cellulose and other residues from the Ratios of fairly cellulose (15-30%) land Allknyn (20-30%) protein material containing the majority of the nitrogen and sulfur plant and other compounds dissolve in water, such as simple sugars and acids amino compounds are complex insoluble only in solvent Kalahtir, alcohol and chloroform such as vegetable oils and dyes (reformer system, 1984), and thus the use of high
temperature and high pressure led to the separation of unwanted materials process in the peels of cellulose as the material during the period. There were mutations there. It led to the disintegration of the exclusive ties forming crusts and separated despite the slow decay as a result of purity cellulose does not degrade rapidly as the more Alkyne mixture ratio with increased difficulty of cellulose degradation [11,12].

3.2. Partial decomposition of the material sugar cane molasses: The results of the molasses molasses analysis and approved by the Standardization and Quality Control Agency (Baghdad) and shown in Table 1.

| Analytical qualities | Analytical qualities | The ratio |
|---------------------|---------------------|----------|
| Protein P           | Raw protein K       | 0.07     |
| Cellulose PH        | Humidity Purity     | 4.1      |
| EC 1: 3 Density     | EC 1:50 Sugars      | The ratio % |
| N                   | Ca 0.7 Ash          | 18.84    |

3.3. Method of measuring the degree of that organic matter

There are many methods used to determine the degree of degradation of organic matter as a quantitative measure CO₂ Free of organic matter or O₂ The consumer or specifically the shortage in the amount of organic matter either chemically or by weight or trace disappearance or change in the amount of organic compound specified in the soil, such as cellulose or lacquer. The process of weight loss for cellulose paste was used by bacteria Pa And Cf Which were consumed by bacteria in their own ways in enzymatic analysis as shown in Table (2).

Table 2.A. The difference in weight B transactions after vaccination with bacteria Pa.

| Transactions | Weight after vaccination Pa | the average |
|--------------|-----------------------------|-------------|
| 5mg (Without molasses) | 4.22                      |             |
| 5mg (Container on molasses) | 4.01                      |             |
| 5mg Only without molasses | 4.91                      |             |
| 5mg Container on molasses | 4.94                      |             |

The results of the table analysis (2) A And B There are significant differences between the use of molasses on cellulose paste in Table (2) - A Where the weight of the dough without the use of molasses (4.29), but in the case of the use of molasses with the dough was weight (4.09) where these results explain that the bacteria Pa Has been able to analyze the dough faster in the case of molasses, which is a food base based on bacteria during the incubation period and analysis process and, as a result of enzymatic processes that transform the dough into the center of the yeast of the holder of bacteria and can grow and feed it [13,14].

Table 2.B. The difference in weight between treatments after vaccination with bacteria CF.
In the case of the use of rice husks as comparison units where significant differences were formed with units of cellulose paste and between them were weights (4.94 (Without molasses) 4.9) Using molasses. And the use of molasses led to facilitate the process of analysis by the bacteria by increasing the process of metabolic activity and regeneration and breeding and led them as a food medium used by bacteria while incubating on the crusts, although the process of analysis of crusts took longer and was less than the analysis, because the crusts in this case contains On other materials associated with cellulose and is not separated from it. Therefore, bacteria have difficulty in the process of analysis and need a longer period of separation and breakdown of bonds [14,15]

3.4.3: Effect of fermentation on some parameters of growth of barley seedling : (Pseudomonas aerogenosa).

Table 3. Fermentary environments with bacteria aerogeno P.

| Treatment | Plant height | Wg for vegetative total | WJ for the root sum |
|-----------|--------------|------------------------|---------------------|
| Cellulose paste without Molass container on Pa | 30.1 | 5.13 | 2.2 |
| Cellulose paste container on molasses and Pa | 34.2 | 8.98 | 5.13 |
| Rice husk container on molasses and Pa | 25.3 | 4.20 | 2.15 |
| Rice husks do not contain molasses and containers Pa | 25.1 | 4.28 | 2.46 |
| Con Only cellulose paste with molasses Pa | 18.4 | 4.32 | 1.20 |
| Con2 Cellulose pulp without molasses does not contain Pa | 18.2 | 2.27 | 1.13 |
| Con1 Rice peel with molass only Pa | 22.4 | 3.32 | 0.22 |
| Con2 Rice peel without molasses and without Pa | 23.5 | 3.34 | 0.18 |

Table 3 Which has been used in fermentary environments with bacteria aerogeno P. That these bacteria and materials loaded from rice husks and molasses in gatt and high spirits in plants and dry weights of the grouped shoot and root where it was noted that the transactions in which the presence of bacteria used Molasses Pa There was an increase in lengths and weights, regardless of the use of cellulose or crust, although there were significant differences between them. Growth rates as standards for pulp Cellulosic container was on molasses and(5:13,8.98,42.2) respectively and compared with the husks of rice containing molasses and Pa (2.46,4.28,28.3), respectively, and in the case of the use of cellulose pulp with molasses and without bacteria Pa The equations (1.20, 4.32, 18.4) And rice husks with molasses and without bacteria Pa (0.22, 3.32, 22.4) And the pulp of cellulose without molasses and without bacteria (2.27,18.2,1.13) While using rice husks without molasses and without Pa (23.5,3.34, 0.18). The treatments for the cellulose pellet are pudding molasses and contain Pa (5.13, 2.20, 30.1), but in the case of using rice husks without molasses and container Pa (25.1, 4.28, 2.46). The differences between plant lengths between the coefficients and the dry weight of the vegetative and root groups can be observed. The coefficients of the increase in lengths and weights can be explained [16].

It is known that these bacteria stimulate the length of the plant through the secretion of growth organizations as some of the stimulants, such as plant root hormones, which helps to increase the root total as well as increase the length of the plant in addition to the increase of plant branches in terms of increasing the contract and leaves and increase the number of flowers
During the provision of organic matter increase the dry weight of the root total and vegetative total of the plant \[16,17,18\].

The equations (28.5, 5.8, 1.2) were either in the case of cellulose paste containing molasses and bacteria Cf. It was (34.1, 5.6, 1.01) in the case of rice husks with molasses only and without Cf (26.3, 3.2, 1.03) and the rice without molasses and without Cf (20.1, 2.4, 0.32) \[17\]. The results can be interpreted in the context of the use of bacteria Cf Which is the basis of bacteria analysis of organic matter, whether the back or other, it benefits the plants through the secretion of enzymes that decompose the dough into a material easier for the plants in the process of exploitation and use and also the ability to analyze the crusts that need time to analyze and thus these bacteria decomposes crusts Faster than Pa And the conversion to primary material because its first task is the analysis of cellulose and cellulose halves and thus showed the differences in the moral standards of growth and so these bacteria work in the first two lines is the process of analysis and the secretion of some of the materials that benefit the plants and is considered to improve the growth of plants added to the soil increases the fertility of. During the provision of organic matter increase the dry weight of the root total and vegetative total of the plant \[16,17,18\].

### Table 4. effect of the parameters on the growth parameters of barley plants using bacteria *Celullomonas flavigena*

| Processors Cf | Barley growth criteria |
|---------------|------------------------|
|               | Plant height | WJL brain | WJL Mg |
| Cellulose paste without Mollass container on C.f | 38.5         | 8.5        | 1.2    |
| Pulp cellulose container and molasses C.f | 45.3         | 10.2       | 4.3    |
| Rice peel without molasses and container on C.f | 28.6         | 5.3        | 1.1    |
| Peel the rice container onto the molasses and container over C.f | 35.4         | 7.3        | 2.01   |
| Pulp cellulose Bmolas only without C.f | 32.4         | 5.1        | 1.3    |
| Cellulose paste only without molasses and without C.f | 34.1         | 5.6        | 1.01   |
| Only raspu mulas peal and without C.f | 26.3         | 3.2        | 1.03   |
| Rice peel without molasses and without C.f | 20.1         | 2.4        | 0.32   |

Table 4. shows the effect of the parameters on the growth parameters of barley plants using bacteria *Celullomonas flavigena* Where some of the transactions were significant differences in comparison with others when using the pulp of cellulose without molasses and a container on Cf. The equations (28.5, 5.8, 1.2) were either in the case of cellulose paste containing molasses and bacteria Cf. It was (34.1, 5.6, 1.01) and the treatment of rice husks with molasses only and without Cf (26.3, 3.2, 1.03) and the rice without molasses and without Cf (20.1, 2.4, 0.32) \[17\].

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