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Stability of formula *Bacillus* spp. for control *Ralstonia syzygii* subsp. *Indonesiensis* and increase the growth and the yield of chili plants

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Abstract*—Solid formulations of Rhizobacteria Bacillus. Spp. and storage time to control bacterial wilt disease Ralstonia syzygii subsp. indonesiensis. Bacterial wilt disease caused by Ralstonia syzygii subsp. indonesiensis is a major constraint in chili cultivation. Bacillus spp,is capable to suppres bacterial wilt disease, to increase the growth and the yield of chili plants. The aim of this research was to obtain the best formula of Bacillus spp. which was stable to control bacterial wilt disease and to increase the growth and yield of chili plants. To increased its stability and interaction with chili plants, Bacillus spp, was urged to test furthermore especially its formulation with based on solid organic carriers (rice bran, rice straw, bagasse and their combination). The most effective storage time also need to test. Result showed that all formula had ability to decrease incidence of bacterial wilt disease compared to control. Moreover, all the three formula could increase plant growth, total of leaves, total of branch and yields. Decreasing of disease rate and increasing of plant growth rate variated between different formulations.*

***Keywords*—chili, formulation, Ralstonia syzygii subsp. indonesiensis, storage time, Bacillus spp.**

I. INTRODUCTION

Chili is a commodity important horticulture cultivated and consumed by the people of Indonesia. Partly big cultivated and consumed in fresh form or preserved beforehand in the form of sauces, chili powder and dried fruit, and used as ingredients in traditional medicines (Djarwaningsih, 2005). The productivity of chili plants in Indonesia was relatively stable from 2015 to 2017, namely 8.65 tonnes / ha, 8.47 tonnes / ha and 8.46 ton / ha (Central Bureau of Statistics, 2018). However, productivity the still classified low compared optimum productivity which reaches 25-30 tonnes / ha (Rostini, 2011). One of the causes of the low productivity of chili plants in Indonesia is the attack of pests and pathogens that cause disease (Ardianto, 2014).

Some of the main diseases of chili plants in Indonesia include leaf spot *cercospora*, leaf spot *phytopthora*, fusarium wilt (Semangun, 2001), anthracnose, curly yellow virus and bacterial wilt (Wiratama et al., 2013). Bacterial wilt disease caused by *Ralstonia syzygii* subsp. *indonesiensis* (used to be known *Ralstonia solanacearum*) (Safni *et a*l., 2014). *R. syzygii* pathogens because range high genetic diversity (Suryani and Machmud, 2002).

The recommended control for bacterial wilt includes technical culture, mechanics and resistant varieties (Hassan *et al*., 2010). However, this control method is still ineffective, so it is necessary to look for cheap and environmentally friendly alternative controls such as biological control. One of agency group control biological that Lots developed is a group plant growth promoting rhizhobacteria (PGPR) or plant growth promoting rhizobacteria (Yanti *et al*., 2017). Rhizobacteria is a saprophytes that live in the rhizosphere which colonize the root system of plants, become one of the biocontrol agents for disease control and growth promoters plant (plant growth promoting rhizhobacteria) to increase crop production (Silva *et al*., 2004).

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Superior rhizobacteria need to be formulated so that population density can be maintained so that it is effective in controlling disease and make it easy in use and marketing (Nakkeeran *et al*., 2005). The type of formula will be determined by ingredients carrier and too determine the stability of the rhizobacteria in it. Carriers in formula making include peat soil, tapioca starch, charcoal, clay, organic matter (Bashan et al., 2014) and agricultural organic waste (Vandamme, 2009). Material carrier formulations Rhizobacteria are used bagasse, rice straw and bran because they have the following nutrients, bagasse contains 48-52% water, 3.3% sugar, 47.7% fiber and also contains cellulose, hemicellulose and lignin (Idris et al., 1994). Rice straw contains 27% hemicellulose, 39% cellulose, 12% lignin and 11% ash (Karimi *et a*l., 2006). Bran contains metabolic energy of 2980 kcal / kg, 12.9% crude protein, 13% fat, 11.4% crude fiber, 0.07% Ca, 0.22% available P, 0.95% Mg and 9 moisture content. % (Saputra, 2015). Information regarding usage carrier material and storage time for rhizobacterial formula *Bacillus* sp. stain RZ.2.2.AG2 needs to be further investigated to obtain a stable formula in control R. syzygii subsp. indonesiensis. Based on the description above, it is necessary to conduct a study entitled "Stability of the Formula *Bacillus* spp. for Control *Ralstonia syzygii subsp. indonesiensis* and Increased Growth and Yield of Chili. " This research aims to obtain formula *Bacillus* spp., which is stable for controlling bacterial wilt disease and increasing the growth and yield of chili plants.

II. METHOD OF RESEARCH

2.1 Time and Location of Research, and Sampling Method

The research was carried out in the Microbiology Laboratory of the Department of Plant Pests and Diseases, Faculty of Agriculture, Andalas University, Padang and wire house in the Experimental Garden of the Faculty of Agriculture, starting from November 2019-March 2020.

2.2 Formulation *Bacillus* spp.

The study consisted of two phases, namely: stage (1.) Rhizobacterial viability in various organic solid waste formulas, resistant to (2.) Rhizobacterial stability test to control bacterial wilt disease in chilies. This research was an experimental study using a completely randomized design with 24 treatments and 5 replications**.** The treatments consisted of rhizobacteria formulated with various carrier media from organic waste and a combination of organic waste AT + JP, AT + D and D + JP with a ratio of 1: 1 (v / v), stored in time that different (without storage, 2, 4 and 6 weeks). Next 1 ml of results preculture transferred to 49 ml of sterile coconut water in a culture vial flask (100 ml) for mainculture and incubated on shaker for 2x24 hours. Solid formula ingredients (bagasse, straw and bran) used mash in a blender. Each material was put into a Schott bottle with a volume of 100mL of 9.5 g. Then, 0.5 g of sucrose (5% of the total weight of the media) was added and then sterilized by autoclaving at 121 ° C. After cooling it is added 5 mL suspension the result mainculture *Bacillus* sp. strain RZ.2.2.AG2. Formula viability tested for a long time different storage (0, 2, 4, 6 and 8 weeks).

2.3 Stability of Formula *Bacillus* spp. for Bacterial Wilt Control

The composition of the planting medium to be used is a mixture of soil and 2: 1 (v / v) manure. The planting medium is put in 20 g / hole seedtray for seeding and 10 kg into poly bag for planting (Habazar *et al*., 2015). Introduce the formula twice, at the time of seeding and planting. Seed chili sterilized surface. Furthermore, the seeds were put in each treatment according to the standard population formula (10 8 CFU / g). Each treatment was soaked for 15 minutes and dried and dried. Seed sown 2 seeds on seed tray. The seeds are maintained for 3 weeks. Maintenance includes watering chili seeds in the morning or evening using hand sprayer. The introduction of the next formula is at planting 3 week old seeds with the same steps for seeding. *R. syzygii subsp. indonesiensis* inoculated on chilli plants that were 35 days old. Chili plants were inoculated by wounding the roots of chili seeds by cutting the roots on both sides of the plant. Then 10 ml of the bacterial suspension was sent *R. syzygii subsp. indonesiensis* with a population density of 10 7 CFU / mL. Plant maintained by applying fertilizers, weeding weeds, heaping.

Change being observed is Rhizobacteria viability in various formulas Waste Solid Organic, development of bacterial wilt disease (incubation period, disease incidence and severity of attack disease wither bacteria), The growth of the seedling phase (germination capacity, seed yield capacity, seed height, number of seed leaves, seed root length and seed vigor index), vegetative phase growth (plant height, number of leaves, number of branches), generative phase growth (when flowers appear, number of fruit and fruit weight). The effectiveness of disease progression is calculated using formula 1, while the effectiveness of growth is the phase of seedling, phase vegetative and generative phases using formula 2.

$$E = \frac{Kp - p}{Kp} \text{ x } 100\% \qquad (1)$$

$$E = \frac{p - Kn}{Kn} \text{ x } 100\% \qquad (2)$$

Information: E (Effectiveness), P (Treatment), Kn (Negative Control), Kp (Positive Contro).

III. INDENTATIONS AND EQUATIONS

Viability *Bacillus* . ,on storage time that different shows a stable population density (Table 1). The stability of the formula can be assessed based on the standard population determination 10 8 CFU / g. Where is the population density of the formula *Bacillus* spp,ranged between these standard populations. The stability of the bacterial population density in the formula is thought to be due to the presence of nutrients in the carrier materials used so that the bacteria can grow well as long as period storage. Bran contains metabolic energy of 2980 kcal / kg, 12.9% crude protein, 13% fat, 11.4% crude fiber, 0.07% Ca, available P 0.22%, Mg 0.95% and 9% moisture content (Saputra, 2015). Bagasse contains 48-52% water, 3.3% sugar, 47.7% fiber and also contain cellulose, hemicellulose and lignin (Idris *et al*., 1994). Rice straw contains 27% hemicellulose, 39% cellulose, 12% lignin, and 11% ash (Karimi *et al*., 2006) In addition, the carrier material used also has an ideal formulation character. According to Nakkeran, Fernando and Siddiqui (2005), the ideal formulation character for biological agents is to increase shelf life.

Formula introduction *Bacillus* spp. with different storage times in chili plants showed that all the formulas introduced were stable in suppressing the development of bacterial wilt disease (Table 2). All formulas *Bacillus spp*,able push period incubation, disease incidence and severity of bacterial wilt disease in chili plants. There are 8 formulas *Bacillus spp*,from 24 formula that introduced in chili plants which are more stable and suppress the incidence of disease and formula disease severity until the end of the day of observation (42 DAI) with 100% that is formula Bran without 2 weeks storage and storage, Bran + Straw formula without storage, formula Bran + Dregs Cane without storage and storage for 4 weeks, the Straw formula without storage, the Straw formula + Bagasse without storage and the 4 weeks storage sugarcane bagasse formula. This is supposedly a formula *Bacillus* spp. ,produces antibiotic compounds that can directly inhibit development pathogens (Bakker *et al*., 2007). The ability of a biological agent, especially rhizobacteria, to suppress pathogens usually involves one or several inhibitory mechanisms (Mahartha *et al*., 2013). Niu et al. (2011), suggests that the association of rhizobacteria triggers the defense response of plant cells by accumulating hydrogen peroxide, the high peroxide activity will kill the pathogen. Furthermore, Soesanto (2000) said that pathogens are difficult to dopenetration if system the root is dominated by antagonists

Formula *Bacillus* spp. which was introduced to chili seeds was able to increase the yield capacity of the seedlings compared to control with effectiveness sprouts are suspected because these bacteria have the ability of PGPR (Plant Growth Promotong Rhizobacteria) so as to increase seed germination (Table 3). This is in accordance with Muis's research *et al*. (2014), which states that giving antagonistic bacteria to plant seeds can increase seed germination. The results showed that the chili seeds were introduced to the formula *Bacillus* spp. which is more stable in increasing the growth of chili seeds is a formula Straw + Dregs Cane without storage. Formula introduction *Bacillus* spp,was also able to increase the growth of chili plants in the vegetative phase with effectiveness 69.00%. Increase in plant growth chili could seen on increase in plant height, number of leaves and number of branches of chili plants every week. This is thought to be a rhizobacterial formula that used able stimulates increased production of growth hormones in chili plants. According to Sorensen *et al*. (2001) which states that PGPR is able to synthesize auxins and cytokinins and are involved in plant ethylene synthesis. Rhizobacterial ability 0.40%. Enhancement power as a plant growth promoter is indicated by the ability to provide and mobilize the absorption of various nutrients in the soil as well as to synthesize and change the concentration of various phytohormones (Compant *et al*., 2005).

Formula introduction *Bacillus* spp. on chili plants also had an effect to enhancement The growth of chili plants in generative fese (first flower appearance, number

of fruit and fruit weight) was compared to the control (Table 4). There are two best formulas for increasing the growth of chili plants phase generative that is, formula Bran + Straw that is stored for 4 weeks and the formula of Straw + Bagasse which is stored for 4 weeks with an effectiveness of 60.45%. In accordance with the results of Sari's research (2017), chili plants introduced by PGPR can accelerate the appearance of chilies better than the control (51.25 dst). Character urgent rhizobacteria in increasing plant growth is to produce the IAA hormone, giberalin (Joo *et al*., 2004), fixing N (Hafeez *et al*., 2007), dissolving P (Mehrvraz and Chaichi, 2008). Special on dissolve *Bacillus* . spp could excrete organic acids such as formial, acetic and lactic acids which can dissolves the insoluble forms of phosphate so that they become available forms for plants (Rao, 2007). When compared with the optimum production of chili plants (25-30 tonnes / ha), the highest production in this study is said to have not been able to achieve optimum production in the field. This is because, when in the field the chili plants are attacked by whitefly pests (*Bemisia tabaci*) which results in chili production. This is supported by Hoddle's (2003) statement, attack Bemisia tabaci on plants can result in reduced plant height, leaf number, leaf size and yield. Result that, a stable formula that increases the growth of chilies in the seedling phase and plant growth phase has not been able to increase the yield of chili optimally in the fruit weight observation, and vice versa

I. FIGURES AND TABLES

Table 1: Viability of the Bacillus spp. in each formula

Carrier Material	**Formula Viability (CFU/g)**			
	No storage	2 weeks	4 weeks	6 weeks
Sugarcane Dregs	64.50 x 10^7	24.10 x 10^7	20.90 x 10^7	19.40 x 10^7
Bran	68.10 x 10^7	24.40 x 10^7	9.80 x 10^7	9.20 x 10^7
Straw	46.10 x 10^7	24.10 x 10^7	13.50 x 10^7	15.10 x 10^7
Bran + Sugarcane Dregs	77.20 x 10^7	25.60 x 10^7	23.70 x 10^7	11.80 x 10^7
Bran + Straw	52.10 x 10^7	27.00 x 10^7	26.80 x 10^7	12.30 x 10^7
Straw + Sugarcane Dregs	59.80 x 10^7	23.20 x 10^7	18.60 x 10^7	8.20 10^7

Table 2: Development of Bacterial Wilt Disease in Chili Plants Introduced by Bacillus spp.

Treatment		Observation						
Carrier Formula		Incubation Period		Incidence of Disease		Severity of Disease		
		DAI	Effectiveness %)	%	Effectiveness(%)	%	Effectiveness(%)	Reaction
Bran	0	42.0a*-	150.0	0.0d	100.0	0.0b	100.0	Healthy
Bran	2	42.0a*-	150.0	0.0d	100.0	0.0b	100.0	Healthy
Bran	4	37.2abc	121.4	80.0ab	20.0	2.2b	97.5	Healthy
Bran	6	31.2bcd	5.7	60.0abc	40.0	1.4b	98.4	Mild
Sugarcane Dregs	0	33.6abcd	00.0	40.0bcd	60.0	0.4b	99.5	Healthy
Sugarcane Dregs	2	30.0cd	8.6	80.0ab	20.0	2.0b	97.6	Mild
Sugarcane Dregs	4	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Sugarcane Dregs	6	30.6abcd	2.1	80.0ab	20.0	2.0b	97.6	Mild
Straw	0	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Straw	2	37.8abc	25.0	20.0cd	80.0	1.4b	98.3	Mild

Straw	4	39.6ab	35.7	20.0cd	80.0	1.5b	98.2	Mild
Straw	6	35.4abcd	10.7	40.0bcd	60.0	2.8b	96.6	Mild
Bran+Sugarcane Dregs	0	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Bran+Sugarcane Dregs	2	39.6ab	35.7	40.0bcd	60.0	0.4b	99.5	Healthy
Bran+Sugarcane Dregs	4	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Bran+Sugarcane Dregs	6	30.0cd	8.6	80.0ab	20.0	0.8b	98.8	Healthy
Bran + Straw	0	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Bran + Straw	2	33.6abcd	00.0	40.0bcd	60.0	0.4b	99.5	Healthy
Bran + Straw	4	33.6abcd	00.0	40.0bcd	60.0	0.4b	99.5	Healthy
Bran + Straw	6	27.0d	0.7	80.0ab	20.0	5.6b	93.4	Mild
Straw+Sugarcane Dregs	0	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Straw+Sugarcane Dregs	2	33.6abcd	00.0	40.0bcd	60.0	0.8b	99.1	Healthy
Straw+Sugarcane Dregs	4	39.6ab	35.7	20.0cd	80.0	1.0b	99.8	Mild
Straw+Sugarcane Dregs	6	38.4abc	28.6	40.0bcd	60.0	0.6b	99.3	Healthy
Streptomycin	-	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Control (+)	-	42.0a*-	50.0	0.0d	100.0	0.0b	100.0	Healthy
Control (-)	-	16.8e	0.0	100.0a	0.0	84.6a	0.0	Weight
CV		11.95		8.93		11.95		

***** - shows the plant does not cause symptoms until the last day of observation (42HSI)
*** *** asymptomatic repetition plus the rationalization number with the number 42.00
* The numbers followed by the same lowercase letter in the same row are not significantly different according to LSD at 5% level

Table 3. Growth of Vegetative Phase of Chili Plants Introduced by Bacillus spp.

Treatment		Observation					
Carrier Formula		plant height		Number of leaves		Number of Branches	
		cm	Effectiveness (%)	Sheet	Effectiveness (%)	Branch	Effectiveness (%)
Bran	0	53.4cd	4.71	38.0cdef	-19.83	14.2abcd	-10.13
Bran	2	51.2d	0.39	47.4bcde	0.00	15.6ab	-1.27
Bran	4	55.2cd	8.24	79.8a	68.35	14.6abcd	-7.59
Bran	6	59.4abcd	16.47	49.2bcd	3.80	15.6ab	-1.27
Sugarcane Dregs	0	68.2ab	33.73	56.8bc	19.83	16.4ab	3.80
Sugarcane Dregs	2	56.4bcde	10.59	45.8bcdef	-3.38	13.6bcd	-13.92
Sugarcane Dregs	4	53.2cd	4.31	39.2bcdef	-17.30	15.0abcd	-5.06
Sugarcane Dregs	6	59.8abcd	17.23	58.0b	22.36	16.4ab	3.80
Straw	0	51.6d	1.18	46.2bcdef	-2.53	17.6a	11.39
Straw	2	50.8d	-0.39	30.0ef	-36.71	17.4ab	10.13
Straw	4	48.4d	-5.10	53.8bc	13.50	16.6ab	5.06
Straw	6	69.8a	36.86	52.6bc	10.97	13.6bcd	-13.92

Bran+Sugarcane Dregs	0	52.0d	1.96	51.0bcd	7.59	14.2abcd	-10.13
Bran+Sugarcane Dregs	2	53.2cd	4.31	57.8b	21.94	16.0ab	1.27
Bran+Sugarcane Dregs	4	50.4d	-1.18	33.2def	-29.96	12.0 cd	-24.05
Bran+Sugarcane Dregs	6	53.4cd	4.71	32.8def	-30.80	11.8d	-25.32
Bran + Straw	0	53.2cd	4.31	42.0bcdef	-11.39	14.4abcd	-8.86
Bran + Straw	2	53.2cd	4.31	28.2f	-40.51	14.6abcd	-7.59
Bran + Straw	4	57.20abcde	12.16	49.4bcd	4.22	15.4abc	-2.53
Bran + Straw	6	56.20bcde	10.20	49.8bcd	5.06	16.4ab	3.80
Straw+Sugarcane Dregs	0	56.8abc	29.02	50.6bcd	6.75	15.4abc	-2.53
Straw+Sugarcane Dregs	2	51.0d	0.00	46.0bcdef	-2.95	15.2abcd	-3.80
Straw+Sugarcane Dregs	4	54.0cd	5.88	47.6bcde	0.42	16.4ab	3.80
Straw+Sugarcane Dregs	6	69.8a	36.86	44.8bcdef	-5.48	15.0abcd	-5.06
Streptomycin	-	46.4d	-9.02	50.4bcd	6.33	14.2abcd	-10.13
Control (+)	-	51.0d	0.00	47.4bcde	0.00	15.8ab	0.00
Control (-)	-	18.80e	-63.14	46.0bcdef	-2.95	6.0 e	-62.03
CV		8.99		15.44		19.16	

* The numbers followed by the same lowercase letter in the same row are not significantly different according to LSD at 5% level

Table 4. Growth of Generative Phase of Chili Plants Introduced by Bacillus spp.

Treatment		Observation						
Carrier Formula		Appear flower first		Number of fruit		Fruit weight		
		HST	Effectiveness (%)	Buah	Effectiveness (%)	g/plant	Ton/ha	Effectiveness (%)
Bran	0	40.6ab	0.0	34.6ab	55.9	56.7ab	3.92	55.09
Bran	2	39.2abc	3.5	23.0 f	3.6	39.3defgh	2.63	7.71
Bran	4	36.4bcd	10.3	25.2def	13.5	37.4fgh	2.49	2.30
Bran	6	37.8abcd	6.9	26.6cdef	19.8	37.2gh	2.48	1.64
Sugarcane Dregs	0	37.8abcd	6.9	26.8cdef	20.7	43.1cdefgh	2.88	17.78
Sugarcane Dregs	2	37.8abcd	6.9	23.8f	7.2	37.4 fgh	2.49	2.95
Sugarcane Dregs	4	40.6ab	0.0	24.8def	11.7	38.3 defgh	2.56	4.98
Sugarcane Dregs	6	37.8abcd	6.9	24.4def	9.9	37.9efgh	2.53	4.81
Straw	0	39.2abc	3.5	25.6cdef	15.3	41.9cdefgh	2.80	14.72
Straw	2	39.2abc	3.5	29.2bcdef	31.5	43.4cdefgh	2.90	18.76
Straw	4	33.6d	17.2	26.6cdef	19.8	44.1cdefgh	2.91	20.68
Straw	6	33.6d	17.2	24.0ef	8.1	37.9 efgh	2.51	3.77
Bran+Sugarcane Dregs	0	37.8abcd	6.9	31.6abcd	42.3	48.9abcdefg	3.27	34.14
Bran+Sugarcane Dregs	2	36.4bcd	10.3	32.8abc	47.8	52.2abcd	3.47	43.98
Bran+Sugarcane Dregs	4	40.6ab	0.0	29.6bcdef	33.3	49.0abcdef	3.27	35.83

Bran+Sugarcane Dregs	6	42.0a	-3.3	31.4abcde	41.4	45.7cdefgh	3.05	25.05
Bran + Straw	0	39.2abc	3.5	32.8abc	47.8	52.6abc	3.52	44.37
Bran + Straw	2	37.8abcd	6.9	29.0bcdef	30.6	46.7 bcdefgh	3.12	27.68
Bran + Straw	4	36.4 bcd	10.3	34.4ab	54.9	55.7ab	3.72	52.41
Bran + Straw	6	37.8abcd	6.9	23.8f	72.1	58.7 a	3.92	60.45
Straw+ Sugarcane Dregs	0	33.4d	17.7	33.0abc	48.7	53.2abc	3.55	45.40
Straw+ Sugarcane Dregs	2	39.2abc	3.5	35.2ab	58.6	48.2bcdefgh	3.22	31.84
Straw+ Sugarcane Dregs	4	36.4bcd	10.3	34.4ab	55.0	49.7 abcde	3.27	60.45
Straw+ Sugarcane Dregs	6	35.0cd	13.8	31.4abcde	41.4	48.2bcdefgh	3.22	33.86
Streptomycin	-	39.2abc	3.5	26.6cdef	19.8	37.40fgh	2.95	20.79
Control (+)	-	40.6a	0.0	22.2f	0.0	36.6h	2.44	0.00
Control (-)	-	42.0 a	-3.3	0.00g	-100.0	0.00i	0.00	-100.0
CV		11.95		21.21		20.12		

* The numbers followed by the same lowercase letter in the same row are not significantly different according to LSD at 5% level

IV. CONCLUSION

Formula best in pressing disease progression, namely the formula of Sugarcane Dregs stored 4 weeks and Bran + Sugarcane Dregs stored 4 weeks; increase the phase of plant growth and yield, namely bran + straw stored 4 weeks and sugarcane dregs formula stored 4 weeks. Meanwhile, in general, the most stable formula in suppressing the development of bacterial wilt and increasing the growth and yield of chili plants is the Sugarcane Bagasse Formula is a formula that is stable on the viability test. Formula best in pressing disease progression, namely the formula of Sugarcane Dregs stored 4 weeks and Bran + Sugarcane Dregs stored 4 weeks; increase the phase of plant growth and yield, namely Bran + Straw stored 4 weeks and formula research show Sugarcane dregs stored for 4 weeks. Meanwhile, in general, the most stable formula in suppressing the development of bacterial wilt and increasing the growth and yield of chili plants is the Straw + Pulp of Tebuyang formula which is stored for 4 weeks. Based on the research results it can be concluded that all formulas *Bacillus* spp. ,able push development of bacterial wilt disease and increase the growth and yield of chili plants. Sugarcane Bagasse Formula is a formula that is stable on the viability test.

formula of straw + sugarcane pulp which is stored for 4 weeks

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