GREEN CHILI PLANT RESULTS ON TYPES OF ORGANIC MULCH AND MANURE

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ABSTRACT

Improvement of cultivation techniques to increase green chili yield is by applying organic mulch and using manure. This study was to determine the best organic mulch and manure application for the growth and yield of green chili plants. The study was conducted in Pandes I, Wonokromo, Pleret, Bantul Regency, Special Region of Yogyakarta in March - June 2023. This study used a Split Plot Design with two factors in three replications. The main plot is the type of organic mulch consisting of 4 levels: rice straw, rice husks, sawdust, and bamboo litter. The subplot is the type of manure consisting of 3 levels: cow manure 30 tons/ha, goat manure 30 tons/ha, and chicken manure 30 tons/ha. The results showed that there was no interaction between the use of organic mulch and manure on all plant yield parameters. Organic mulch such as rice straw, sawdust, rice husks and bamboo litter did not give the best results on the total weight of green chili per plot, the weight of green chili per hectare and the harvest index of green chili. The use of chicken manure gave the best results on the weight of green chili per harvest, the total weight of green chili, the weight of green chili hectare, and the harvest index of green chili.

Key words*: chili green, organic mulch, manure.*

INTRODUCTION

Green chili or “lalap” chili is a type of chili that comes from cayenne pepper (*Capsicum frutescens* L.) which is harvested when it is still green. Green chili peppers are usually harvested at 60-70 days after planting (DAP), while cayenne peppers are generally harvested at 80-115 DAP. Green chili is a horticultural plant from the Solanaceae family and contains capsaicin which is a component that gives a spicy taste, namely a secondary metabolite found in the fruit placenta or where the seeds are attached. Lalap chili is widely cultivated by farmers because it is widely needed by the community on a household scale and has benefits, especially in its fruit which is used as a cooking spice and a mixed ingredient in the food industry. In addition to the fruit, other parts of this plant such as the stem, leaves, and roots can also be used as medicinal ingredients. The nutritional content of fresh cayenne pepper per 100 g is 103 calories, 4.7 g protein, 2.4 g fat, 19.9 g carbohydrates, 45 mg calcium, 85 mg phosphorus, 2.5 mg iron and various vitamins (Amin, 2019).

The prospect of cultivating green chili in Indonesia is very good because it is widely liked and needed by the community. Every year, the demand for green chili commodities is always in large and continuous quantities. The need for green chili always increases along with population growth, rising living costs, and increasing public awareness of the importance of nutritional value. Efforts to increase green chili yields can be achieved through intensification and expansion of the area. This intensification can be done through the use of organic mulch and organic fertilizers on planting land.

Mulch is a material that is spread on the surface of the soil. Mulching has an effect on preventing erosion, as well as increasing the water content of the soil, soil temperature, soil air, and sunlight reflection, as well as suppressing weed growth, maintaining the balance of water, temperature, and soil humidity so that plants can grow and develop optimally (Maulana, et al., 2011). The advantages of using mulch are saving water use because it reduces the rate of evaporation from the land surface, reducing soil temperature fluctuations so that it benefits the growth of roots and soil microorganisms, reducing the rate of soil erosion due to the impact of raindrops or surface flow, and inhibiting the rate of weed growth (Ainun et al., 2011). Materials that are often used as organic mulch are rice straw, leaf litter, sawdust, and rice husks.

Organic fertilizer is fertilizer that comes from dead plants, animal waste or animal parts and other organic waste that has gone through an engineering process in solid or liquid form. The decomposition of organic materials is broken down (reorganized) by microbes so that it can provide nutrients for plant growth and development (Hartatik et al., 2015). Solid organic fertilizer is the result of the decomposition of organic materials, either dry plants or waste from livestock manure that is broken down by microbes so that it can provide nutrients needed by plants (Supartha, et al., 2012). The benefits of organic fertilizer are to improve the chemical, physical, and biological fertility of the soil and as a source of nutrients for plants so that they can support more optimal growth and results.

The problem that arises is which types of organic mulch and manure can provide the best results of green chili plants. The purpose of the study was to determine the types of organic mulch and manure for the best results of green chili plants. Thus, research is needed on chili plants with the treatment of various organic mulches using rice straw mulch, sawdust, rice husks and bamboo litter and manure including cow manure, goat manure and chicken manure.

Literature Review

Description of green chilli variety Trisula Hijau is as follows: Origin from PT. Oriental Seed Indonesia. Lineage from MG 715-23-6-15-0. The variety group is self-pollinating. Plant height 90 - 110 cm. The shape of the stem cross-section is round. Stem diameter 1.2 - 1.4 cm. Stem color green. Leaf shape juts out. Leaf size length

8.0 - 10.0 cm, width 3.0 - 3.5 cm. Leaf color green. Flower shape like a trumpet. Flower petal color green. Flower crown color white. The color of the pistil head is white. Stamen color is bluish green. Flowering age starts 30 - 37 days after planting. Harvest age starts 68 - 73 days after planting. Fruit shape is conical. The tip of the fruit is slightly pointed. Fruit size length 3.7 - 4.5 cm, diameter 0.6 - 0.9 cm. Fruit color is red. Fruit skin thickness 0.7 - 0.9 mm. The taste of the fruit is spicy. The color of the seeds is yellowish white. The shape of the seeds is round and flat. The weight of 1,000 seeds is 5-6 g. The weight per fruit is 1.8-2.4 g. The number of fruits per plant is 150-180 fruits. The weight of the fruit per plant is 400-500 g. The fruit storage capacity is 8-12 days after harvest. The fruit yield is 8-10 tons/ha. The population per hectare is 20,000 plants. The seed requirement per hectare is 110-130 g. Description adapts well to lowlands with an altitude of 100-400 m above sea level.

Green chilli plants are one type of short-lived plant or annual plant and are one type of horticultural plant that is widely cultivated commercially. Green chili is a dicotyledonous plant that is still related to eggplant plants. Green chili is identical to the spicy sensation caused by the capsaicin compound it contains (Nurwanto et al., 2017). According to Hapshoh et al., (2016) green chili plants have many benefits for body health and as a cooking spice to provide a spicy sensation. Some of the benefits of green chili for body health include overcoming sunisitis, overcoming high blood pressure, preventing obesity or obesity, and treating diabetes. As an external medicine, green chili can also be used to treat rheumatism, stomach ache, chills, and skin diseases. Based on research by Elmitra et al., (2019), it is known that the ethanol extract of green chili fruit contains flavonoid and steroid or terpenoid compounds which function as antibacterials against Gram-positive bacteria Staphylococcus aureus, a type of bacteria that can cause skin diseases.

The use of mulch is a layer given to the surface of the soil as a protector to prevent evaporation of groundwater. Organic mulch is organic material from agricultural waste such as leaf litter, straw, plant stumps, or agricultural by-products such as sawdust, wood chips, or rice husks which, when decomposed, can increase the organic matter content in the soil (Agustina, 2011). The application of organic mulch has several benefits, namely preventing weeds from growing in the field, maintaining soil moisture and temperature, preventing erosion, and adding organic matter (Suminarti, 2018). The use of mulch can help the entry of water and sunlight so that it can maintain soil moisture which is a place for worms to live. The help of worms found under the mulch can help the rate of decomposition, so that it can provide macronutrients N, P, K and micronutrients needed by plants.

Rice straw is a by-product in agriculture in the form of stems and stalks that have dried after the rice grains are separated. The use of organic rice straw mulch can help maintain the soil from being washed away by too much water and maintain

soil aggregation. The advantages of using rice straw mulch are that it is more economical, easy to obtain, maintains soil moisture, can decompose well so that it increases the organic matter content in the soil and helps in water absorption by the soil. Some of the elements contained in straw include the nutrients N 0.5-0.8%, K2O 1.2-1.7%, P2O5 0.07-0.12% and Si 4-7%. Based on research by Alhadi (2018), the use of rice straw mulch affected the height of eggplant plants at 45 DAP, namely 77.66 cm and the average number of fruit per plot of eggplant plants was 46.22 number of fruits/plot. This is because organic rice straw mulch can be decomposed by various kinds of soil organisms so that it will rot and produce organic material and release a number of nutrients into the soil so that it will create environmental conditions suitable for plant growth and development.

Rice husk is the residue or waste from the rice milling process. Rice husk is categorized as biomass that can be used for various needs such as industrial raw materials, animal feed, and organic fertilizers. Rice husk mulch can maintain soil moisture, this is because the husk has a high lignin content so that it is difficult to decompose and can reduce the process of soil evaporation or evaporation in plants and maintain soil water content longer than other types of mulch. Rice husk mulch is also very effective in suppressing weed growth so that plant leaf formation can run in balance. Based on research by Mukaroma and Rahmi (2021), the application of organic rice husk mulch has an effect on the number of flowers, production per sample plant, and production per chili plant plot. This is because rice husks contain elements N 0.32%, P2O5 15%, K2O 31%, Ca 0.95%, Fe 180 ppm, Mn 80 ppm, Zn 14.1 ppm and pH 6.8 which nutrients can help plant growth and development. The characteristics of rice husks are light, high air circulation, high water holding capacity, so that they can absorb sunlight effectively. In addition, rice husks have properties that easily bind water, do not clump easily, are relatively cheap, are easy to obtain, are light, sterile and have good porosity.

Sawdust mulch contains organic materials needed for plant growth and development. The accumulation of organic materials in the soil will affect the nature of the soil and will subsequently affect the growth and development of plants because organic materials function as a source of nutrients and energy sources for most soil organisms. Organic sawdust mulch can also prevent evaporation where water that evaporates from the soil surface will be retained by the mulch material and fall back to the soil. Sawdust can also inhibit weed growth and keep the soil temperature normal, not too hot, and not too cold so that soil moisture is maintained (Dini, 2006). Sawdust contains 2.80% fat, 0.25% N, 0.26% P and 0.90% K so that the application of organic sawdust mulch can increase soil fertility because it contributes organic matter and nutrients to the soil. Based on research by Asamin et al., (2019) the application of organic sawdust mulch has an effect on the average height of tomato plants when they are 3 weeks old after planting with a height of

34.73 cm and the number of tomato plant branches when they are 3 weeks old after planting with a total of 0.93 pieces.

The use of organic bamboo litter mulch has several advantages, namely it is more economical, easy to obtain, easy to decompose so that it increases the organic content in the soil, and can maintain soil moisture and sunlight. Soil with mulch treatment can show the lowest soil temperature compared to without mulch treatment, this is because the heat received by the mulch is directly exchanged with free air so that the heat absorbed by the soil surface with organic mulch treatment will be lower. The application of organic bamboo litter mulch can also function to suppress soil temperature fluctuations so that it can reduce the amount of water given (Isda, et al., 2018). Based on the results of research by Nugroho, et al., (2019) it was proven that the provision of bamboo leaf litter mulch had an effect on accelerating the growth of the number of leaves and plant height but did not affect the stem diameter, dry weight of the plant and root length in tomato plants. Bamboo leaf litter contains N 40% P2O5 0.21% K2O 2.20% CaO 2.10% and MgO 0.65% so that the application of organic mulch can increase plant height because the nitrogen content in bamboo leaf litter mulch is higher. Bamboo leaf litter has a C/N ratio of 35.82 - 38.27. Good compost fertilizer has a complete nutrient content composition with a C/N ratio of 10 - 20, so it is necessary to add other raw materials to meet the nutrient content and reduce the C/N ratio of bamboo leaf litter.

The duration of degradation of organic mulch such as rice straw, rice husks, sawdust and bamboo litter depends on several factors such as environmental conditions (humidity, temperature, and aeration), microorganism activity, and mulch thickness. In general, the following is an estimate of the degradation time of each material: (1). Rice straw, the degradation time is usually 2-4 months under optimal conditions, such as high humidity and fertile soil with active microorganisms, (2) Rice husk, because it is harder and has a high silica content, rice husk takes longer, around 6-12 months or more, depending on management, (3) Sawdust, this material contains high lignin, so the degradation process is relatively slow, around 8-24 months, especially if used in thick amounts without a mixture of other materials, (4) Bamboo litter, bamboo parts such as leaves can be degraded within 4-6 months, but bamboo stems that decompose into chips take longer, up to 6-18 months, depending on the size. To accelerate degradation, you can add activators such as manure, compost, or microorganism bioactivators (EM-4), and maintain optimal mulch humidity.

Cow manure is one of the alternatives in the application of environmentally friendly and sustainable organic farming technology. Cow manure has good prospects to be used as organic fertilizer because of the nutrients it contains, namely N 0.4%, P2O5 0.2%, K2O 0.1%, and a C/N ratio of 16.9%. Providing cow manure for plants can provide benefits for plant growth, in addition, cow manure can also

increase the soil's ability to store water which will later function to mineralize organic matter into nutrients, cow manure can also increase soil porosity, increase organism activity so that the process of breaking down organic matter in the soil becomes faster. Nitrogen contained in cow manure plays a role in leaf development, while phosphorus and calcium play a role in stimulating root growth and protein composition (Sriyanto, 2015). Providing cow manure with a dose of 30 tons/ha can stimulate the growth and production of chili plants because of the nutrient content it has. The application of cow manure can provide a significant difference in the number of productive branches. Manure can increase soil fertility, increase plant growth and yield in the form of the number of productive branches.

Sustainable use of goat manure can have a positive impact on soil fertility. The nutrient content in goat manure is N 0.6%, P2O5 0.3%, K2O 0.17%, and a C/N ratio of 21.12%. Goat manure has the properties of improving soil aeration, increasing the soil's ability to retain nutrients, increasing water retention capacity, and as a source of energy for soil microorganisms (Latuamury, 2015). Based on Kahar's research (2019), goat manure treatment with a dose of 30 tons/ha gave the highest results on the growth and yield variables of cayenne pepper plants, namely affecting the height of each plant, namely 34.97 cm at the age of 4 MST and 47.78 cm at the age of 6 MST, the number of leaves was 59.50 and 85.35, respectively, the number of productive branches was 6.69 branches, the number of fruits per plant was 36.63, the weight of fruit per plant was 85.57 grams/plant and the weight of fruit per plot was 0.34 kg/plot. This indicates that the application of goat manure can meet the nutritional needs required by plants such as N, P, and K which can accelerate flowering, seed and fruit development, help the formation of carbohydrates, proteins, and fats so that physiological processes in plants will run well.

Chicken manure is a type of organic material that can provide nutrients for plants, especially macro and micro nutrients. Chicken manure contains 1.5% N, 1.3% P2O5, 0.8% K2O, and a C/N ratio of 9-11%. The nutrient content of chicken manure is greater than that of other livestock, this is because solid manure in poultry is mixed with liquid manure so that chicken manure contains three times more N than other manures (Liliana, 2017). The results of Kahar's (2019) study showed that giving chicken manure at a dose of 30 tons/ha had a significant effect on eggplant plant growth. The higher the dose of chicken manure given, the more it will affect the fruit because good plant growth requires complete nutrients. This is also because chicken manure is able to provide a higher supply of macro nutrients than other manures, besides chicken manure has a low C/N ratio. The C/N (carbon to nitrogen) ratio in manure varies depending on the type of livestock, feed, and level of decomposition. In general, the C/N ratio of several manures is (1) Cow manure: Fresh C/N is 25 – 30; Mature C/N (after compost) 15 – 20. (2) Goat manure: Fresh C/N 20 – 25; Mature C/N (after compost) 10 – 18; (3) Chicken manure: Fresh C/N

10 – 20; Mature C/N (after compost) 8 – 12. A lower C/N ratio (such as mature chicken manure) indicates a higher nitrogen content, thus providing nutrients to plants more quickly. Conversely, fertilizers with a higher C/N ratio take longer to decompose and are usually used as materials to improve soil structure.

The results of the study by Aminah et al., (2022) showed that the provision of chicken manure with a dose of 30 tons/ha had a significant effect on plant height, namely 66.33 cm, flowering time 36.33 DAP, fresh weight 283.66 g, number of branches 15.50, weight per plot 3.4 kg and weight per hectare 6.81 tons. Chicken manure has a low C/N ratio, this indicates that the manure has been well decomposed so that the nutrients contained in the chicken manure are more easily absorbed by plant roots. The provision of chicken manure with a dose of 30 tons/ha can stimulate the growth and production of chili plants because the nutrient content is higher than cow and goat manure. Chicken manure is also a hot fertilizer, namely manure whose decomposition by microorganisms takes place quickly so that the fertilizer matures faster, the availability of nutrients needed by plants is met more quickly.

The results of the study by Muliati et al., (2017) showed that the treatment of rice straw mulch type affected the average plant height variable with 36.61 cm at 8 weeks after planting (WAP), the average number of branches was 30.06 at 12 WAP, and the average number of chilies was 67 fruits at harvests I-IV. The results of the study by Wulandari, et al., (2018) showed that the nutrient content of fresh rice straw, namely C-organic 36.74%, N 0.87%, P 0.18%, K 0.25%, Ca 0.18%, Mg 0.18%, and S 0.08% with the nutrients contained in the rice straw, it can increase the nutrients in the soil so that plant growth and development will be more optimal. Providing organic rice straw mulch on the soil surface can increase soil porosity and water absorption into the soil so that it can increase the water storage capacity of the soil. Rice straw mulch has a better effect on plant growth and development because the soil cover becomes denser so that it is protected from the damaging effects of rainwater. Rice straw mulch is also easily decomposed so that it can contribute more nutrients to the soil which has an effect on higher nutrient availability and absorption.

MATERIALS AND METHOD

The research was conducted in Pandes I, Wonokromo Village, Pleret Sub-district, Bantul Regency, Yogyakarta in March-June 2023. The materials used included “Trisula Hijau” variety green chili seeds, rice husk charcoal, cow manure, goat manure, chicken manure, NPK Mutiara 16:16:16, rice straw, sawdust, rice husks, and bamboo leaf litter. The tools used included tractors, hoes, seedling plastic, hand sprayers, buckets, rulers, calipers, watering cans, analytical scales, scissors, and sickles.

This study used a Split Plot Design with three replications. The main plots are various types of organic mulch consisting of 4 levels, namely rice straw mulch (M1), sawdust mulch (M2), rice husk mulch (M3), and bamboo leaf litter mulch (M4), while the sub-plots are types of manure consisting of 3 levels, namely 30 tons/ha of cow manure (P1), 30 tons/ha of goat manure (P2), and 30 tons/ha of chicken manure (P3).

The implementation of the research includes sowing seeds in seedling plastic with a planting medium in the form of a mixture of soil and rice husk charcoal (1:1). Land processing with a perfect soil processing system using a tractor at a depth of 20 cm on a land area of 23.5 m x 8 m. Then a trial plot/bed was made with a length of 2 m x 1.5 m and a harvest plot of 0.8 m x 1.2 m. The application of cow, goat and chicken manure at a dose of 30 tons/ha is given 7 days before planting, follow-up fertilizer using NPK Mutiara 16:16:16 weighing 0.09 kg/plot is given at 7 DAP and at the flowering period at 30 DAP. Planting is done in the morning with a spacing of 40 cm x 40 cm. Installation of organic mulch is done by spreading it on the ground surface with a mulch thickness of 3 cm. Plant maintenance can be in the form of watering every day, replanting if there are plants that die when they are 4-7 DAP, weeding by removing weeds that grow around the plants, pruning by removing shoots that grow in the leaf axils on the main stem when the plants are 3-4 WAP, and controlling pests and diseases with insecticide Avidor 25 WP 2 gr/liter to overcome whitefly pests and fungicide Antracol 70 WP 2 gr/liter to prevent the appearance of fungi which are applied once a week after the chili plants are 7 to 31 DAP. Harvesting of plants begins when the plants are 60-70 DAP, carried out 7 times with a picking interval of 6-8 days.

Observations were made on the weight of chili peppers per sample plant (g), total weight of chili peppers (g), weight of chili peppers converted per hectare (tons), and harvest index. The data obtained were then analyzed for diversity using Sidik Ragam with a level of 5%, then if there was a significant difference between treatments, it was tested using Duncan's Multiple Range Test with a level of 5%.

RESULTS AND DISCUSSION

The results of the analysis of variance on the parameters of chili pepper fruit weight per harvest per sample plant during the first to seventh harvests with organic mulch and manure treatments are shown in Table 1.

Table 1. Average weight of green chili fruit per harvest per sample plant (g)

	Green chili fruit weight per sample plant (g)						
Treatment	Harvest						
	1	2	3	4	5	6	7
Organic mulch :							
- Rice straw	10,54 a	20,87 a	25,39 a	26,10 a	26,04 a	24,37 ab	18,81 b
- Sawdust	10,44 a	23,96 a	27,37 a	27,91 a	27,81 a	26,85 a	19,61 ab
- Rice husk	15,00 a	22,72 a	25,69 a	26,74 a	26,56 a	24,55 ab	18,96 b
- Bamboo litter	12,07 a	20,80 a	26,28 a	26,04 a	25,68 a	24,04 b	20,07 a
Manure :							
- Cow manure	12,61 p	20,29 q	24,82 q	25,31 q	25,47 q	24,29 q	18,92 q
- Goat manure	10,90 p	19,57 q	25,02 q	24,43 q	24,37 q	23,06 q	18,54 q
- Chicken manure	12,53 p	26,40 p	28,71 p	30,35 p	29,72 p	27,52 p	20,6 p
Interaction	(-)	(-)	(-)	(-)	(-)	(-)	(-)

Description: Numbers followed by the same letter indicate no significant difference based on the 5% DMRT test. The (-) sign indicates no significant interaction.

Table 1 shows that the weight of green chili fruit per harvest per plant during the 1st to 7th harvests did not show any significant interaction between organic mulch and manure treatments. Interaction is the tendency of a factor to have different effects at various levels of other factors. If the interaction is significant, it means that the effect of one factor depends on the level of other factors. The weight of chili pepper fruit per plant from the 1st to the 6th harvests with the treatment of organic bamboo litter mulch was significantly heavier than the treatment of rice straw mulch and rice husk mulch, but was not significantly different from the treatment of sawdust mulch. Treatment with cow manure, goat manure, and chicken manure with a dose of 30 t/ha on the weight of the plant per harvest 1 was not significantly different, while the others showed significant differences. The treatment of chicken manure on the weight of fruit per plant from the 2nd to the 7th harvest was significantly heavier compared to the treatment of cow manure and goat manure (P2), while the treatment of cow manure was not significantly different from goat manure. This is because environmental conditions such as humidity, temperature, sunlight and water do not fluctuate very high. In addition, chicken manure has a lower C/N ratio so that it is more available to plants compared to the high C/N in goat manure and cow manure.

The results of the analysis of the effects of organic mulch and manure on the total weight of green chili, the weight of green chili per hectare and the harvest index of green chili can be seen in Table 2.

Table 2. Average weight of total green chili per harvest plot, weight of green chili per hectare and harvest index of green chili.

Treatment	Total weight of green chili fruit (g/plot)	Weight of green chili fruit per hectare (t/ha)	Harvest index of green chili fruit
Organic mulch :			
- Rice straw	152,11 a	14,08 a	0,61 a
- Sawdust	166,61 a	15,42 a	0,76 a
- Rice husk	160,31 a	14,15 a	0,68 a
- Bamboo litter	153,50 a	14,21 a	0,63 a
Manure :			
- Cow manure	151,11 q	13,99 q	0,67 q
- Goat manure	145,50 q	13,47 q	0,65 r
- Chicken manure	177,79 p	15,95 p	0,70 p
Interaction	(-)	(-)	(-)

Description: Numbers followed by the same letter indicate no significant difference based on the 5% DMRT test. The (-) sign indicates no significant interaction.

Table 2 shows that the effect of organic mulch and manure types showed no significant interaction on the total weight of green chili, the weight of green chili per hectare and the harvest index. The interaction between one treatment and another is the tendency of a factor to have a different effect on various levels of other factors (Sutjihno, 1992). Likewise, the use of organic mulch in the form of rice straw, sawdust, rice husks and bamboo leaf litter also had the same effect between treatments, meaning no significant effect. On the other hand, the type of manure showed a significant difference in the total weight of green chili per harvest plot, indicating that the use of chicken manure was able to produce a total weight of green chili of 177.79 g/harvest plot and this result was higher compared to the treatment of cow manure which was only able to produce 151.11 g/harvest plot and goat manure of 145.50 g/harvest plot. Likewise, the weight of green chili per hectare achieved with chicken manure of 15.95 t/ha is higher than the use of goat manure of 13.47 t/ha and cow manure of 13.99 t/ha. This is because chicken manure has a nutrient content of 1.5% N, 1.3% P2O5, 0.8% K2O, and a C/N ratio of 9-11%. The nutrient content of chicken manure is greater than that of other livestock, this is because the solid waste in poultry is mixed with its liquid waste so that chicken manure contains three times more N than other manures (Liliana, 2017). In addition, the food given is also different in that chickens usually eat food in the form of grains, while cows and goats usually eat food in the form of grass. As is known, grains contain higher nitrogen than grass.

The harvest index describes the efficiency of the use of photosynthesis results for human benefit. The value of the harvest index increases with the increasing number of plant parts that can be utilized. If almost all parts of the plant can be utilized, such as forage plants, the harvest index approaches one. Based on Table 2, it can be seen that the treatment of organic mulch types did not significantly

affect the harvest index in green chili plants, while the treatment of manure types significantly affected the harvest index. Chicken manure has a higher harvest index of 0.70 compared to goat manure with a harvest index of 0.65 and cow manure with a harvest index of 0.67. The harvest index value in the chicken manure treatment in green chili plants of 0.70 is included in the high category. This is because the crop harvest index is influenced by the interaction between genetic factors and environmental factors such as soil fertility, water availability, temperature, and sunlight (Marpaung, et al., 2013). In the category of harvest index value 0.10 - 0.39 means low IP, 0.40 - 0.69 means medium IP (quite high) and 0.70 - 0.99 means high IP.

The harvest index is the ability of plants to channel assimilates to the sink part of the plant. If the harvest index is high, then the distribution of assimilates to the fruit enlargement part is also greater or more, and vice versa. The higher the harvest index value, the higher the potential results. According to Suwarto, et al., (2018) said that a high harvest index value means that the rate of photosynthesis is more efficient in producing economic products. Plants that have high photosynthetic efficiency and a high harvest index will also produce high economic weight. The harvest index can also be used as an indicator to improve effective results and promise progress because it is related to results.

CONCLUSION

1. There was no interaction between the use of organic mulch and manure on all parameters of plant yield.
2. The use of organic mulch such as rice straw, sawdust, rice husks and bamboo litter did not provide the best results on the total weight of green chili per plot, the weight of green chili per hectare and the harvest index of green chili.
3. The use of chicken manure provided the best results on the weight of green chili per harvest, the total weight of green chili, the weight of green chili per hectare, and the harvest index of green chili.

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