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Sucrose, Inorganic Phosphate and Latex Thiol in Clones PB 260 and BPM 1

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Abstract. The content of various metabolites (sucrose, inorganic phosphate, thiol) in the latex can be used as a guide in order to achieve optimum crop production. This study aims to determine the metabolite content and production in clones BPM 1 and PB 260. Research conducted by PT. Plantation Nusantara III (Persero). In the area of plant clone PB260 and BPM1 planting year 1999 (plant age 15 years). This study was prepared using t - test, each repeated three times using ten trees of each experimental unit. Results of correlation analysis showed that sucrose with inorganic phosphate correlate quite real. Rubber production (g-1 t-1 t) is the highest in January at BPM1 clones is equal 29.70 (g-^{1}t-^{1}t) and the clone PB260 23.25 (g-^{1}t-^{1}t) and the lowest in April that is equal to 9.40 (g-^{1}t-^{1}t) in clones BPM1 and 10.08 (g-1 t-1 t) in clones PB260. Required further observations over a longer period of time to determine the production of rubber on each kon BPM1 and PB260.
Keywords: *Hevea brasiliensis, clone PB260, BPM 1, sucrose, inorganic phosphate, thiol*

Introduction

Rubber (Hevea brasiliensis) is one of the agricultural commodities that can contribute to state revenue from non-oil sector. In addition, the rubber is also a source of income for many farmers live. Indonesian rubber production increased from 2.990 million tons in 2011 to 3.040 million tons in 2012 (Ditjenbun,2012).Character physiology and anatomy into one variable observation in view of the production. Some physiological characters associated with the production is the concentration of sucrose, the levels of Pi and thiol levels. (Milford *et al.*,1969). The big difference in the characteristics of physiology and anatomy of latex clones, is one in considering the proper exploitation of the system to increase the production of optimal (Sumarmadji, 2000). This study aims to determine the metabolite content and production in clones BPM1 and PB260. Based on these results, it is necessary to study on the content of various metabolites on BPM1 clones and clones PB260.

Materials and Methods

Research conducted by PT. Plantation Nusantara III (Persero) in the area of plant clones PB260 and BPM1 planting year 1999 (plant age 15 years) located in Deli Serdang - Sumatra, with a height of 25 m above sea level and type of Ultisol. The study lasted for four months (March - July 2014). The treatments were tested by 2 clones are clones that represent a low metabolism (BPM1) and clones that represent a high metabolism (PB26) with a system of tapping 1 / 2Sd3. This study was prepared using t - test. Each repeated three times using ten trees of each experimental unit. Parameters observed in this study include plant physiological diagnosis of Latex (sucrose levels, thiol 'inorganic phosphate), productivity (g^{-1}t^{-1}t and kg^{-1} ha $^{-1}$y), and precipitation.

Results and Discussion

Plant physiology

The decline in plant physiological conditions can be determined by observing the diagnosis of latex and dry rubber content (KKK). In the event of severe exploitation stress, it can be seen from the condition fisilogis latex (DL) decreased significantly (Sainoi and Sdoode, 2012).

Results of the analysis of the DL in each clone BPM 1 and PB 260

Clone	Tapping System	Sucrose	Fa	Tiol
		..... mM		
	S/2d3	15.87	9.59 a	0.39
	S/2d3	20.75	7.35 b	0.57

Note: Values in the same column followed by the same letters are not significantly different at the $P=0.05$ level according to t-test.

Sucrose is the main ingredient in the formation of latex. Based on the observation of latex sucrose content in clones BPM1 15.87 mM, whereas latex sucrose content in clones PB260 20.75 mM. Sucrose levels in clones PB260 clone BPM higher than 1, because the clone PB260 known high metabolic Quick Starter (QS) Sumarmadji *et al.* (2006) found that clones with high metabolism describes the process of forming poliisoprene (latex) is faster. Clones Slow Starter (SS) describes the rate of formation poliisoprene (latex) of the basic ingredients of photosynthesis in carbohydrates such as sucrose is slow to moderate. This same Kuswanhadi opinion, (2009) stated that low levels of sucrose showed that low metabolism, whereas high levels indicate a high metabolism.

Kuswanhadi *et al.* (2009) stated that high levels of Fa showed high metabolic activity and vice versa. According to Traore *et al.*, (2011), the maximum Fa levels for healthy plant is 25 mM, when Fa levels exceed the threshold then it indicates a plant's response to stress or disease. The results showed that the levels of each clone Fa is still below the threshold at 9.59 BPM1 mM clones and clones PB260 7.35 mM. Thiol levels is an important indication of the rubber plant associated with the incidence of Brownt Bast (Rajagopal *et al.*, 2004). The results showed generally low levels of 0.39 mM thiol on clones and clone PB260 BPM1 of 0.57mM (Table 2).

Sucrose conjuction with inorganic phosphate in PB 260 and BPM 1 Clones.

Results of regression analysis-correlation (R^2) between the levels of sucrose, on levels of inorganic phosphate in a row was 0.54 in clones PB260, and BPM1 0.41.

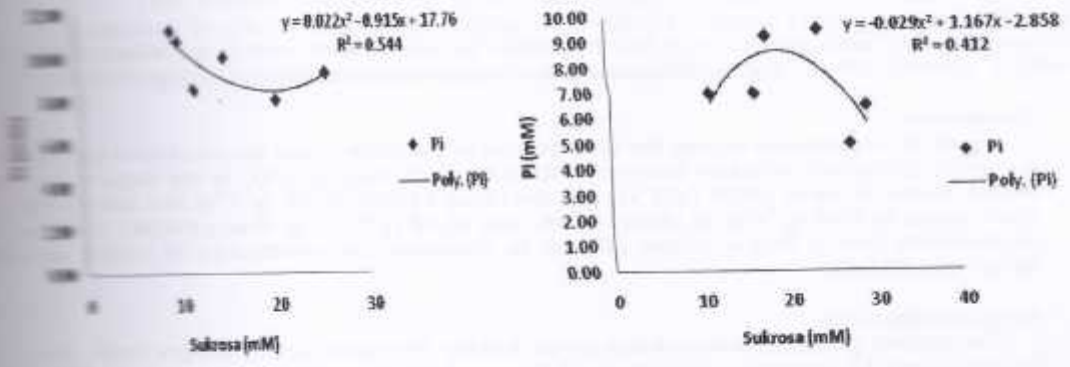

Figure 1. A. Relationship Sucrose (mM) with inorganic phosphate (mM) in clones BPM1
B. Relationship Sucrose (mM) with inorganic phosphate (mM) in clones B260.

The relationship between the levels of sucrose and inorganic phosphate levels closely. In normal conditions of exploitation intensity, the higher the sucrose content of the inorganic phosphate levels will be higher rubber to a certain extent. But if it continues to occur increased levels of inorganic phosphate decreased levels of sucrose in the rubber.

Rainfall in Production

The results of the analysis menunujukkan low rainfall caused tranloksi nutrients required for the growth of lower leaves and vice versa. Along with declining rainfall will shed leaves (Siregar 2001). In April of low rainfall conditions in the natural canopy leaf fall period so that production in April decreased both in clones BPM1 and PB260. Period of leaf fall in rubber trees in North Sumatra generally occurs from February to March or April (BPP Tanjung Morawa, 2001). In January, the production was higher than in April. Increased production of rubber in January caused naturally as improving the condition of the canopy after leaf fall period so that the conditions are in a period of aging canopy of leaves, the plant will increase production (Figure 2). Rubber production ($g^{-1}t^{-1}t$) is the highest in January at *BPM1* clones is equal *29.70* ($g^{-1}t^{-1}t$) and the clone PB260 23.25 ($g^{-1}t^{-1}t$) and the lowest in April that is equal to 9.40 ($g^{-1}t^{-1}t$) in clones BPM1 and 10.08 ($g^{-1}t^{-1}t$) in clones PB260.

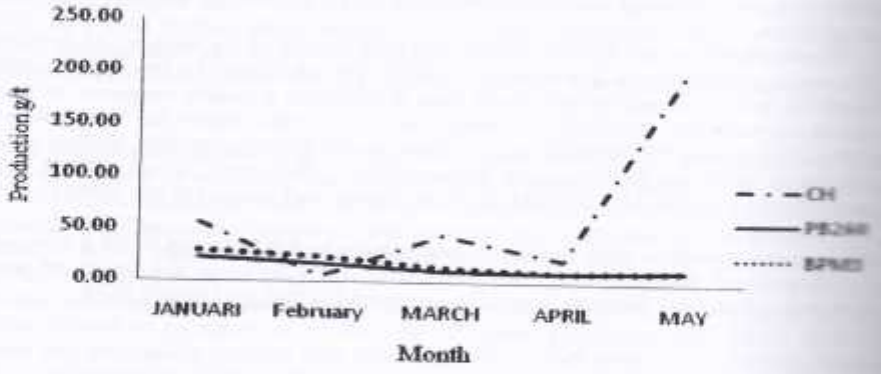

Figure 2. Rainfall (mm / month) with Production (g / p)

Conclusion

From the observation during the four months of the study it can be concluded that sucrose with inorganic phosphate correlate quite real. Rubber production ($g^{-1}t^{-1}t$) is the highest in January at BPM1 clones is equal 29.70 ($g^{-1}t^{-1}t$) and the clone PB260 23.25 ($g^{-1}t^{-1}t$) and the lowest in April that is equal to 9.40 ($g^{-1}t^{-1}t$) in clones BPM1 and 10.08 ($g^{-1}t^{-1}t$) in clones PB260. Required further observations over a longer period of time to determine the production of rubber on each clone BPM1 and PB260.

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