PSII: HIGH CAROTENE *E. guineensis* BREEDING POPULATION

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MPOB INFORMATION SERIES • ISSN 1511-7871 • JUNE 2006 MPOB TT No. 312

The country is currently facing rapidly depleting prime agricultural land for further expansion of oil palm planting area. As such, the strategy by the oil palm industry should be to increase yield per unit area. This may be achieved through good agricultural practices (GAP) and planting of improved genetic materials. Another alternative is to develop specialized planting materials to add value to the crop. One trait which may increase the crop value is carotene content. Thus, high carotene in palm oil has been prioritized for exploitation.

HIGH CAROTENE OIL PALM

Carotene is much used in pharmaceuticals (Choo and Yusof, 1996). In 2002, MPOB offered *Elaeis oleifera* (PS4) with a carotene of >3000 ppm and iodine value >80 (Mohd Din *et al.*, 2002) to the oil palm industry as planting materials. Although it had an extremely low oil yield (*ca.* 0.5 t ha^{-1} yr^{-1}), the oil can be directly used as carotene.

In the current DxP (*Elaeis guineensis*) oil palm planted, the carotene content is only 500 to 700 ppm. However, as its oil yield is much higher than that of *E. oleifera*, carotene can be extracted from the oil. Thus, it would be worthwhile to screen for high carotene *E. guineensis* palms to raise the carotene content in normal palm oil.

NOVELTY OF TECHNOLOGY

Some palms from the MPOB *E. guineensis* germplasm collections have been screened for carotene content, and some with >2000 ppm (*Figure 1*). However, only a few of the palms have high fresh fruit bunch (FFB) and oil yields as well (*Table 1*). These have been selected as breeding palms for PS11.

BENEFITS AND ADDITIONAL VALUE

High carotene planting materials have high economic value since the oil produced can be used as food and also for pharmaceuticals (*Figure 2*). Some 56% of β-carotene can be obtained from the total carotene of the current DxP. Based on current price of β-carotene at RM 64.9 (USD 17.1 x 3.8) per g, the value of current DxP for β-carotene is RM 83 591 ha^{-1} yr^{-1} (Mohd Din *et al.*, 2005). The value of PS11 for β-carotene is RM 363 440, which would provide an additional value of RM 279 849 ha^{-1} yr^{-1} (*Table 2*) to the industry.

CONCLUSION

Planting of high carotene *E. guineensis* (PS 11) would provide additional value to the crop.

Figure 1. Carotene concentrate.

Figure 2. Carotene capsules.

ISSN 1511-7871
9 771511 787001

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TABLE 1. SELECTED HIGH CAROTENE *E. guineensis* PALMS

No.	Trial	Palm No.	Population	Progeny	Fruit type	Carotene	I.V.	FFB1	FFB2	BNO	ABW	O/B	OY1	OY2	HT
1	256	718	4	407	*Tenera*	2 279.8	53.0	226.5	33.5	24.3	9.3	20.4	46.3	6.8	2.1
2	256	271	2	201	*Tenera*	2 177.3	55.0	192.7	28.5	19.2	10.1	17.0	32.8	4.8	1.0
3	256	803	9	901	*Tenera*	2 058.8	55.8	185.0	27.4	14.2	13.1	17.3	32.0	4.7	2.1
4	256	327	10	1 001	*Dura*	2 474.0	57.6	226.5	33.5	22.7	10.0	13.8	31.2	4.6	1.2
5	256	673	7	705	*Dura*	2 257.4	56.3	195.3	28.9	15.8	12.3	14.5	28.3	4.2	1.2

Notes:
FFB1: fresh fruit bunch yield (kg palm^{-1} yr^{-1})
FFB2: fresh fruit bunch yield (t ha^{-1} yr^{-1})
BNO: bunch number yield (No. palm^{-1} yr^{-1})
ABW: average bunch weight (kg palm^{-1} yr^{-1})
Carotene (ppm)
I.V.: Iodine value
O/B: oil to bunch (%)
OY1: oil yield (kg palm^{-1} yr^{-1})
OY2: oil yield (t ha^{-1} yr^{-1})
HT: height (m)

TABLE 2. VALUE OF PS11 VERSUS NORMAL DxP BASED ON β-CAROTENE

Planting material	Oil yield (t ha^{-1} yr^{-1})	Total carotene (ppm)	Total carotene (g ha^{-1}yr^{-1})	β-carotene (g ha^{-1}yr^{-1})	Value of β-carotene (RM)
PS11	5.0	2 000	10 000	5 600	363 440
Current DxP	3.9	600	2 300	1 288	83 591
Difference					279 849

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