

Improving Quality with Seasonal Rice Propagation for Production by Protein SDS-PAGE Combined with Classical Technique

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Abstract

One of the main reasons that have caused constraints for development of Makapuno plantation in Mekong delta was embryo to be very difficult to germinate in natural condition. Farmers have not known how to propagate this plant. Thus results obtained from farmers are not high. With experiences, farmers collected nuts from bunch which bore Makapuno fruits. Then they sowed all nuts in shading and wet places until seedlings developed and obtained 5-6 leave; after that they planted seedlings in gardens with other trees such as mangoes, durians, tamarinds, rambutans, star apples...Consequently, coconut trees bore less than 25% of Makapuno fruits. In Vietnam, there have been two Makapuno varieties. One is green and another is yellow. Both of them are different only color of fruit. All other parts are the same. In Philippines, Makapuno have classified to three genotypes (A, B and C). Type A is slightly thicker and softer than normal coconut. Type B has soft solid endosperm filled about 50% of the cavity; and Type C, has a soft solid endosperm almost occupied the cavity, little water. Type C is almost not germination. Germination of Type B is lower than type A. Our results also obtained the same (three types). Presently, market demand of Makapuno is bigger than supply from farms and demand of Makapuno seedlings is also very high. Although Makapuno fruit just is used presently for food, but it is very promising for biofuel in future.

Keywords: *improving quality, seasonal rice propagation, protein SDS-PAGE*

1. Introduction

In the Mekong delta of Viet nam sensitive saline soil achieved 740.000 ha distributed mainly along coastland of seven provinces, e.g Ben Tre, Long an, Tien Giang, Tra Vinh, Soc Trang, Ca Mau and Bac Lieu. According to FAO, red river and the Mekong River will be affected seriously due to climate change, sea water will intrude the inland 300.000 ha along the coastal areas, total effect over 1 million ha up to the year of 2020-2030. Thus, to maintain rice production-biomass- in this region should be a big challenge. In this topic a famous traditional rice or seasonal rice, named “ Mot bui do” or “a tiller with red husk”, in Bac Lieu province were exploited, it can tolerate to saline soil 6%, especially this variety farmer can plant in the model shrimp + rice ; however, amylose content was very high over 25%, protein content 6-7%, potential yield 3-4 ton/ha with cultivated area around 50.000ha, hard rice cooking so the farmer planted this variety in those seven provinces sold rice production difficulty with low price.

2. Materials and method

The red husk variety was collected at Hong Dan district, Bac Lieu province in 2009. Each seed was cut into two halves, one half of grain without germ was used to extract total protein according to protocol Japan of Agriculture ministry (1989) for run SDS-PAGE. Another half –grain was propagated based on the gel results showing the faint band protein waxy (60 KDa). In order to propagate faster, rice plants with faint band protein planted up to 60 days old, then cut seasonal characteristic by treating sunny light lower 8 hours (each day cover by black nylon from 15:30 pm to 8:30 a.m of the day after, this treatment last 20 days). Then harvested seeds were planted in the normal condition in the green house. Final mass of seed was 2 kg per each elite line, check waxy protein band again by SDS-PAGE method and amylose content by Cagampang & Rodriguez (1980). Chose 2 elite pure lines of rice to propagate in the paddy field (2010) according to Randomized

Complete Block Design with three replications. Nutrition components were analyzed at Advanced Research Center, Can Tho University.

3. Results

Of 100 seeds, nine wells with faint waxy protein (Fig. 1) were chosen to propagate,

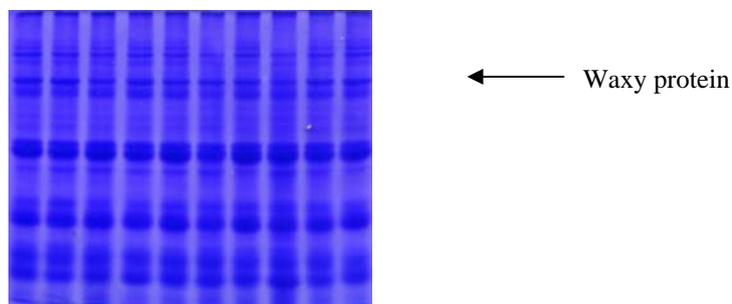


Fig. 1 Protein profile of original rice “Red husk tiller” Well 8 (left to right) was selected.

After propagation in the green house, waxy protein bands of each line was tested, only six of them had more fainter protein bands, high protein contents (from 9.8 % to 10.1%) and high filled seed per panicle (Table 1). Based on these characteristics, two of them were propagated in the paddy filed.

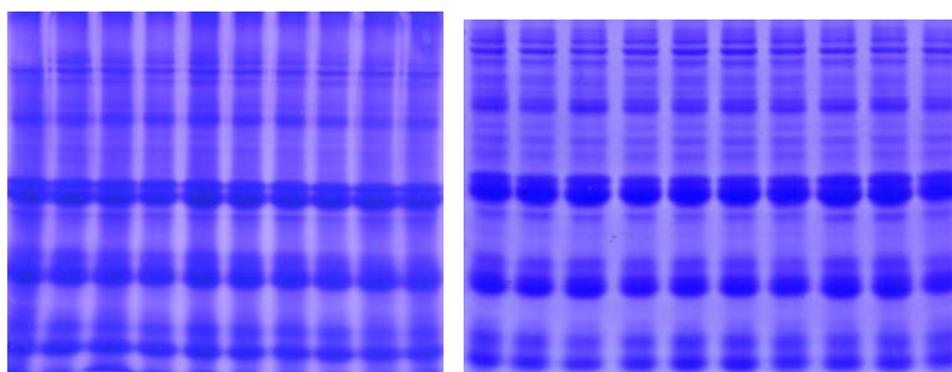


Fig. 2 A protein file of HD6 (left) and HD9 (right)

Table 1 Protein and amylose contents of nine lines run by SDS-PAGE.

Ord.	Name of lines	Protein content (%)	Amylose content (%)	No. filled seeds per panicle
1	HD1	8.43	19.12	86
2	HD2	8.60	18.95	98
3	HD3	9.05	18.80	111
4	HD4	8.54	18.73	102
5	HD5	8.85	18.17	95
6	HD6	9.80	17.69	110
7	HD7	8.30	18.85	83
8	HD8	8.71	19.36	90
9	HD9	10.1	17.35	115
10	Control	8.00	25.21	85

The HD6 and HD9 lines were carried out at three villages, name Loc ninh, Ninh hoa and Vinh Loc yields and other agronomics were estimated in table 2, 3 and 4 :

Table 2 Yield and its agronomic components at Loc Ninh village, Hong dan district, Bac Lieu province (2010)

Ord.	Name	Maturity (days)	Height (cm)	Length of panicle (cm)	No. Panicle Per m ²	No filled seeds/panicle	% filled seeds/panicle	1000 seed weight (g)	Yield (ton/ha)
1	HD6	120	131a	25.3a	196b	98.9a	79.1a	23.3b	3.35 b
2	HD9	120	111c	23.7b	202ab	82.9b	75.4b	25.6a	3.62a
3	Control	120	119b	23.2b	217a	82.8b	72.7c	24.9a	3.23c

Table 3 Yield and its agronomic components at Ninh Hoa village, Hong dan district, Bac Lieu province (2010)

Ord.	Name	Maturity (days)	Height (cm)	Length of panicle (cm)	No. Panicle Per m ²	No filled seeds/panicle	% filled seeds/panicle	1000 seed weight (g)	Yield (ton/ha)
1	HD6	120	130a	25.4a	154b	98.9a	79.5a	23.5b	3.51 b
2	HD9	120	111c	23.9b	224a	90.4b	78.4b	25.8a	3.61a
3	Control	120	117b	22.6c	205a	87.4b	73.2b	24.9a	3.34c

Table 4 Yield and its agronomic components at Vinh Loc village, Hong dan district, Bac Lieu province (2010)

Ord.	Name	Maturity (days)	Height (cm)	Length of panicle (cm)	No. Panicle Per m ²	No filled seeds/panicle	% filled seeds/panicle	1000 seed weight (g)	Yield (ton/ha)
1	HD6	120	130a	25.4a	199b	108a	79.8a	24b	3.43b
2	HD9	120	111c	23.3b	213a	95b	79.1a	25.6a	3.62a
3	Control	120	117c	22.8c	211a	85b	73.7b	25.2a	3.33c

As for nutrition components of these two elite lines were also analyzed (Table 5). Iron content was very high to this variety (>30mg/kg) while each person need 8mg/kg each day. Particularly, this variety also contained anthocyanine which helps people avoid cancer due to it is antioxidant type.

Table 5 Several components of nutrition from HD6, HD9 and its control

Acid amin	new lines	“Red husk tiller” (control)
• Lysine	0,12	0.18
• Threonine	0,09	0.15
• Methionine	0,03	0.03
• Tryptophan	-	-
• Fe (mg/kg)	31,752	35,24
• Ca (mg/kg)	141,7	128,66
• Niacin, VitB3 (ppm)	92,13	83,28
• Thiamin, Vit B1	220,8	334,79
• Vitb6	9,61	11,60
• Anthocyamin (mg/100mg)	3.901	0,136
• Amylose, %	<20	>25
• Protein	8.2	7.5

Conclusion

Using new SDS-PAGE technique combined with knowledge of classical on cultivation could help you improve your breeding in rice faster and effectively.

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