CHAPTER 5

CONCLUSION

This present work investigated physiological change of rice during germination, GABA, amino acid contents, GAD enzyme activity and also protein profile of GABA enriched rice.

Germinated grain weight decreased during germination, while the weight of rice roots, young leaves and whole seedling increased.

The increasing concentrations of GABA were simultaneous with most of the amino acids during germination in comparison with the lower concentration levels observed in the raw seeds, but their contents were higher in young leave than grain.

Rice cultivars had an effect on the GABA and amino acid contents during germination. The GABA and amino acid-producing abilities of the seven selected rice cultivars were quite different, especially in germinated grains, at most germination days. While in rice leave the differences of GABA and amino acid contents were observed only after 5 germination days.

In addition, the germination days also affected the GABA and amino acid contents. Both compounds were increased in a parallel manner with the germination days. The highest GABA content was found in young leave at 3.91 mg/g at 15 germination, while the germinated grains found at 2.01 mg/g at 25 germination days.

Although, this study found that the long germination days, especially at 20-25 days, provided the higher contents of GABA and amino acids than the early germination time, the long time period led to the rice grain physiology that was not suitable for consumption. However, GABA enriched-rice leaves at the long germination stage can be used for application in fortified food, to produce germinated rice juice and to add in pharmaceutical products.

This study presented an optimized condition for the LC-MS and western blotting techniques for determination of both GAD activity and GAD protein in germinated grain and leaf tissue. The activity was parallel with the germination day and GABA content, their activity in young leaves were higher than in germinated grain.

These results suggested that young leaves are better sources of GAD enzyme than grains. It may be possible to use GAD enzyme in other applications.

Considering the results of the protein profile of GABA rice during germination, disappeared protein can be seen later during at the long germination time using SDS-PAGE. The proteome analysis, Maldi-Toff Masspectrometry and LC/MS-MS provided the same data showing globulin 2 as a disappeared storage protein in GABA rice. This is useful information for the control of germination conditions and metabolism in order to provide a higher level of nutrition in further studies.

However, this study suggested that the optimal germination days for GABA rice grain production is within 5 days. The GABA contents in grains at this time were different at 0.33, 0.36, 0.60, 0.68, 0.71, 0.73 and 0.73 mg/g of PL2, SP1, RD6, CN1, SPT1, PT1, KDML105 cultivars, respectively. While, the optimal GABA doses are 200-500 mg per day (do not exceed 1000 mg) **(Edmund, 2005).** Therefore, the consumer can use the described conditions for GABA rice in household production use. They have to consume this GABA rice at least 606 mg of germinated rice per day in order to obtain recommended GABA dose.

This results imply that rice is a good source for GABA, both grains and leaves during germination, With regard of GABA function, consumers will be of health benefits.