

## Antioxidant Activity of blackish Purple Rice and Identification of New Substances

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### Introduction

Anthocyanin identified in black purple rice is composed of approximately 80% cyanidin-3-glucoside (C3G), 5% peonidin-3-glucoside (P3G) and low level of mavidin, pelargonidin and delphinidin and shows antioxidant activity. This is natural, harmless phenolic compounds which reported that reddish brown rice contained. In cross combination between Heugjinjubyeo and Suwon 425, we found that C3G higher containing rice was breded. And the clinical demonstration showed that it was nontoxic in rat and effective to reduce cholesterol level in pig. To find which compounds in blackish purple rice is effective, we fractionated and isolated Heugjinjubyeo in HPLC. And we have oryzafuran, quercetin, vanillic acid and procatechuic acid from BuOH fraction. Among them, oryzafuran was reported firstly in nature and it showed excellent antioxidant activity.

### Materials and Methods

- Cross combination : Heugjinjubyeo / Suwon 425 (Fig.1)
- Biosynthesis pathway of flavonoid an anthocyanin : Madavi et al., 1995
- Isolation of compound from the BuOH fraction of Heugjinjubyeo

### Results and Discussion

1) The most breeds of blackish purple rice contained C3G an amount of less then 50 mg by weight of 100g brown rice, only 6 breed contained above 200 mg. Among these, Heugjinju contained C3G 500 mg per 100g unpolished rice are highest content. However, In cross combination between Heugjinjubyeo and Suwon 425, lines (Fig.1, 1678 mg/ 100g brown rice) was higher 3.4 times in C3G content which that of Heugjinjubyeo was breded, such lines containing high C3G is expected to use as intermediate parents.

2) As comparing blackish purple rice of high anthocyanin content (1500 mg per 100 g of brown rice) with that of low anthocyanin content (500 mg per 100 g of brown rice), it was revealed that quantity of PAL did not have the difference, but CHS was increased to about 70 times, DFR was increased to more than 100 times, and ANS was increased to near 2,000 times.

3) MeOH extract from Heugjinjubyeo rice bran was fractioned by n-hexane, CH<sub>2</sub>Cl<sub>2</sub> and n-BuOH in sequence, and then oryzafuran, quercetin, vanillic acid and procatechuic acid was

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obtained by separation of the n-BuOH fraction to determine their structures. Among these compounds, oryzafuran was a natural compound found firstly in nature.

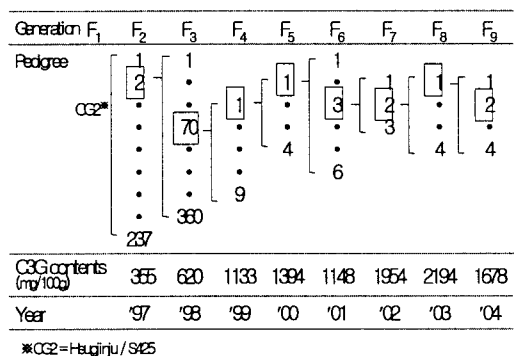


Fig. 1. Pedigree of high C3G selection

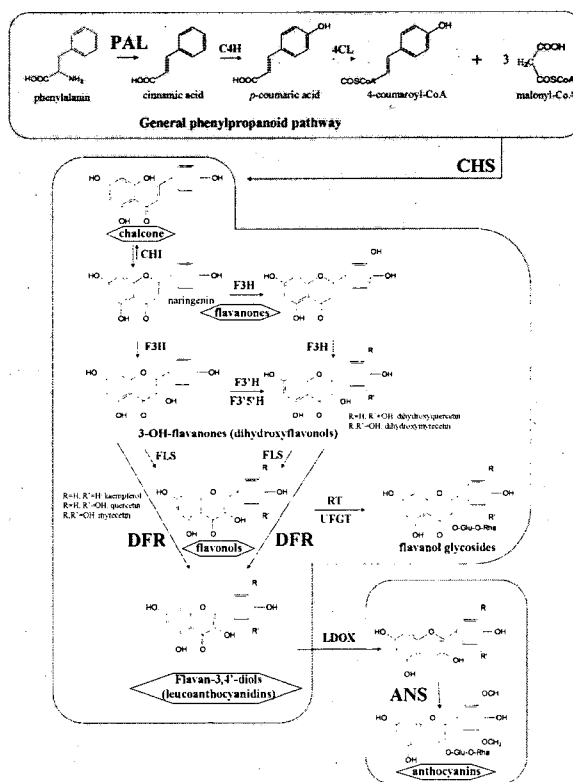


Fig. 2. Biosynthesis pathway of flavonoid and anthocyanin

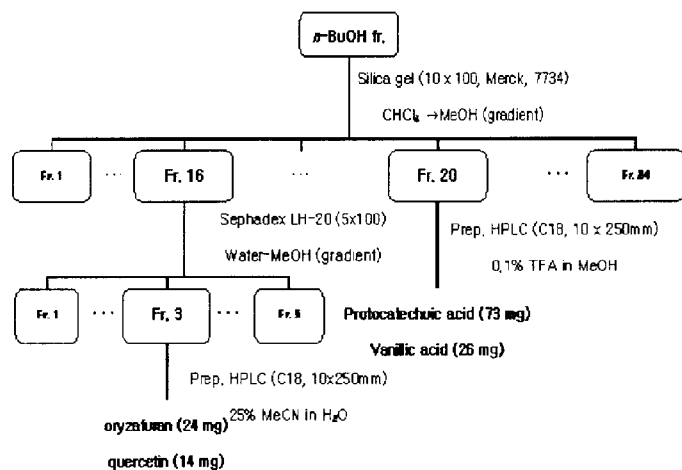


Fig. 3. Isolation scheme of compounds from the BuOH fraction of Heugjinjubyee

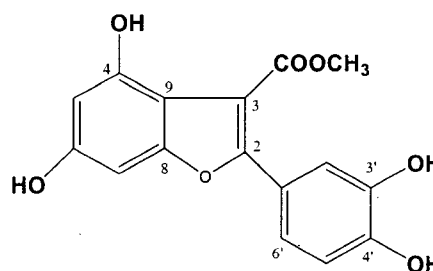


Fig. 4. Chemical structure of oryzafuran