

CHAPTER 5
GENERAL CONCLUSION

The general conclusion on the study of red pigment, monacolin K content, antioxidant activity, flavor and aroma and citrinin content in red yeast rice is shown in Table 5.1.

Table 5.1 Conclusion on the study of red yeast rice

Red yeast rice (3 weeks)	Red pigment (AU/g)	Monacolin K (mg/g)	Antioxidant activity		Flavor and aroma	Citrinin (ng/g)
			Total Antioxidant capacity	β -carotene bleaching		
Comryr	5.32	2.00	0.09	-	unpleasant	2000
Mali105	1.42 ^a	0.36 ^a	0.17 ^a	0.23 ^a	Sweet	1000 ^a
	0.91 ^b	1.12 ^b	0.15 ^b	0.18 ^b	odor	400 ^b
Kam	6.06 ^a	3.13 ^a	0.15 ^a	0.17 ^a	unpleasant	9000 ^a
	5.06 ^b	1.28 ^b	0.19 ^b	0.11 ^b		5000 ^b
RD6	39.9 ^a	33.79 ^a	0.35 ^a	0.18 ^a	unpleasant	7000 ^a
	42.16 ^b	9.41 ^b	0.53 ^b	0.09 ^b		4000 ^b
SPT1	34.13 ^a	33.54 ^a	0.36 ^a	0.12 ^a	unpleasant	14000 ^a
	42.70 ^b	10.55 ^b	0.53 ^b	0.09 ^b		29000 ^b

^a without soybean milk

^b with an addition of soybean milk

Red yeast rice prepared from glutinous rice gave higher concentration of useful compounds. The result indicates the potency to used glutinous rice for red yeast rice production for cholesterol lowering purpose.

Anyway, the citrinin content is still higher than acceptable amount. In Japan, authorized amount of citrinin is under 200 ng/g, while more than 1000 ng/g of citrinin was found in Chinese products (Chen and Hu, 2005). The improvement of the production process should be studied to decrease citrinin concentration. A possible way is to find a mutant strains. The variation of some nutrients such as histidine is another method to be done as well as the control of aeration (Blanc *et al.*, 1995a, 1998). The comparison of the citrinin content from various sources is shown in Table 5.2.

Table 5.2 Citrinin contents in red yeast rice

Sources	Red yeast rice used	Citrinin content
Pattanagul, P. <i>et al.</i> , (2008).	Adlay anakak	0.26 ppm (260 ng/g)
Chen & Hu (2005)	Chinese Red yeast rice	0.13ng/g
Boonsangsom <i>et al.</i> , (2004)	Mali Red yeast rice Non-glutinous rice	105 ppm (105,000 ng/g)
This research	Commercial Chinese Red yeast rice	0.0020 mg/g (2000 ng/g)
This research	Mali105 Red yeast rice Non-glutinous rice	0.0004 mg/g (400 ng/g)
This research	Red yeast rice RD6 glutinous rice	0.0070 mg/g (7000 ng/g)

Glutinous (RD6) red yeast rice gave darker red color product and higher content of secondary metabolites including monacolins, antioxidants and mycotoxin. Although the red yeast rice prepared from glutinous rice contains high amount of monacolins, the citrinin content is higher than acceptable safety amount. The optimum condition for the preparation of red yeast rice from glutinous rice should be studied to decrease citrinin. Concerning the aroma of red yeast rice prepared, addition of soybean milk during fermentation enhance the odor of fermented product and alcoholic flavor.

Many further interesting works should be studied concerning red yeast rice production. The optimization for the manufacturing condition using glutinous rice should be carried out. The variable parameters such as oxygen supply and the content of amino acid such as histidine, glycine and leucine are also important.