Mechanism of coloring food with natural pigments by using salts

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The red, purple and blue colors of fruits and vegetables are mostly anthocyanins. Anthocyanins exhibit various vivid colors. So, those pigments are expected for a safe food colorant. Therefore, in weakly acidic and neutral solutions most anthocyanins are very unstable and rapidly decolorized. By cooking or food processing decomposition of the color also occurs. In Japan the pigments from red bean, azuki, are used for coloring baked rice, "sekihan". In this study we investigated the pigments of various pulses and the mechanism of coloring "sekihan" by red bean.

Using our procedure pigments were extracted and isolated from edible pulses. The structures were determined by ^{1}H NMR and FABMS. (Table)

"Sekihan" was baked with salt solution. The color of the baked rice with aq. NaCl or $MgCl_2$ solution was lighter than that with water.

Table. Major anthocyanin and its content of various pulses.

	scientific name	pigment	content mg/g dry pulse
Glycine			
kuromame (Hokkaido)	*Glycine soja*	cyanidin-3-glc	0.8
kuromame (Tanba)	*Glycine soja*	cyanidin-3-glc	0.7
kuromame (kamiiso)	*Glycine soja*	cyanidin-3-glc	1.0
Vigna			
azuki (Tohoku, China)	*Vigna angularis*	cyanin	<0.01
akatake azuki	*Vigna umbellata*	delphinidin-3-glc	<0.01
sasage (Thailand)	*Vigna sinensis*	cyanidin-3-glc	<0.01
Phaseoleae			
hanamame	*Phaseolus coccineus*	delphinidin-3-glc	0.2
kintoki	*Phaseolus vulgaris*	pelargonidin-3-glc	0.2
uzura	*Phaseolus vulgaris*	delphinidin-3-glc	0.03
black turtle	*Phaseolus vulgaris*	delphinidin-3-glc	1.7
small red	*Phaseolus vulgaris*	delphinidin-3-glc	<0.05