

Research on effective utilization of *Turumurasaki*

W201910-3 Hiroshima prefectural Saijyo Agricultural High School

Background



About *Turumurasaki* (*Basella alba*)

Produce many bright reddish-purple berries about 7 mm in diameter. Leaves and stems are used for food such as *ohitashi*. Fruits are rarely used.

Objective: Application of the fruits of the *Turumurasaki* to food



Experimental method

- General Composition

Protein:	Kjeldahl method
Lipid:	Soxhlet fat extraction method
Ash content:	Burning ashing method
Moisture:	Measured with a moisture meter
Carbohydrates:	100- (protein + lipid + ash + water)

- Mineral Composition

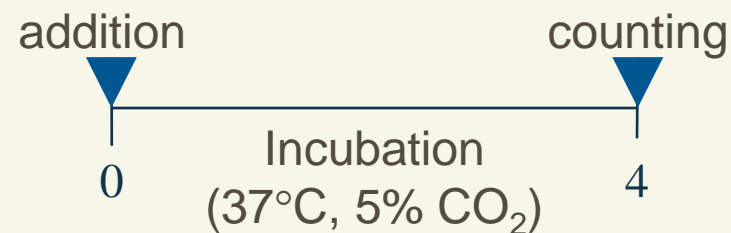
- Polyphenols

total polyphenols ——— Folin-Ciocalteu method

Anthocyanins ——— From *The Japanese Society of Plant Physiologists*^{*1}

Antioxidant ——— DPPH radical scavenging activity method

- Cell Viability

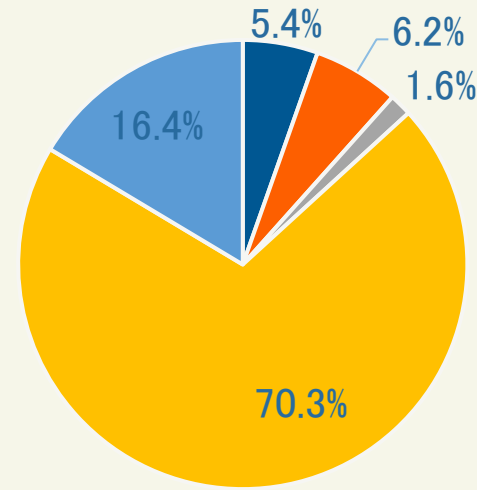


Result

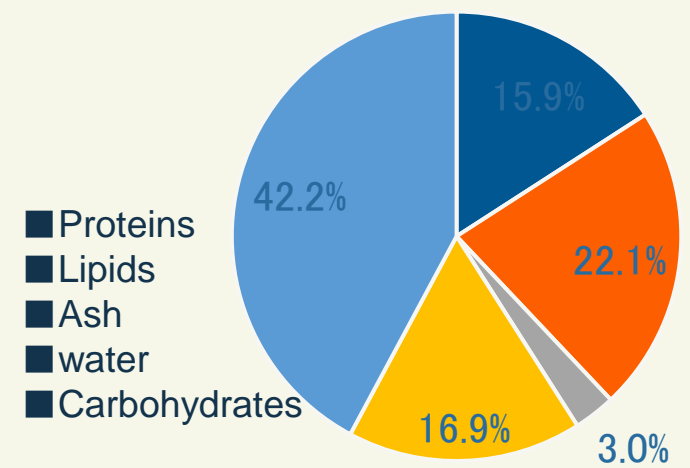
- General Composition

- Water is high in fruits (70.3%)
- Carbohydrates are highest in seeds (42.2%)

- Mineral Composition



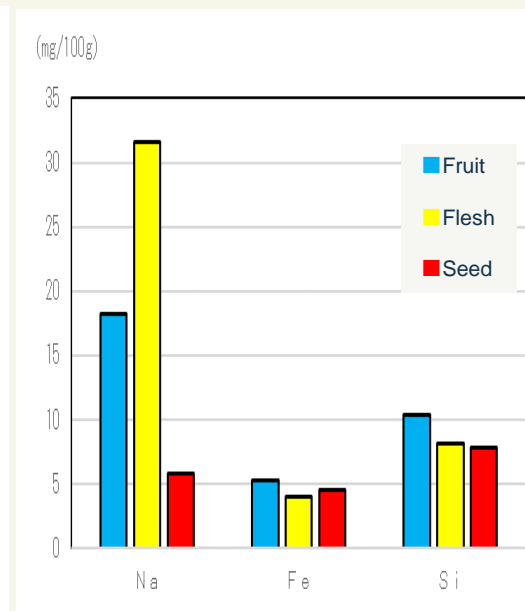
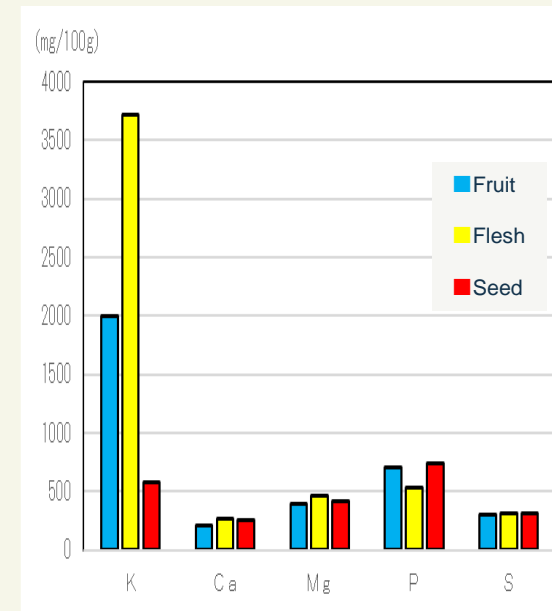
Fruit



Seed

- Proteins
- Lipids
- Ash
- water
- Carbohydrates

	<i>Turumurasaki</i> (Fruit)	grape (peel · raw) ^{*2}	grape (No peel · raw) ^{*2}
potassium (K)	2000	220	130
sodium (Na)	18	0	1



→ High potential as a source of nutrients

Result

Total Polyphenols Folin-Ciocalteu method

Absorbance of total polyphenols

dilution ratio	absorbance		
	sample— Color Blank	sample	Color Blank
32	0.026	0.027	0.001
16	0.060	0.060	0.000
4	0.208	0.228	0.02
2	0.682	0.699	0.017

Total Polyphenols 3.6 mg/g

Anthocyanins

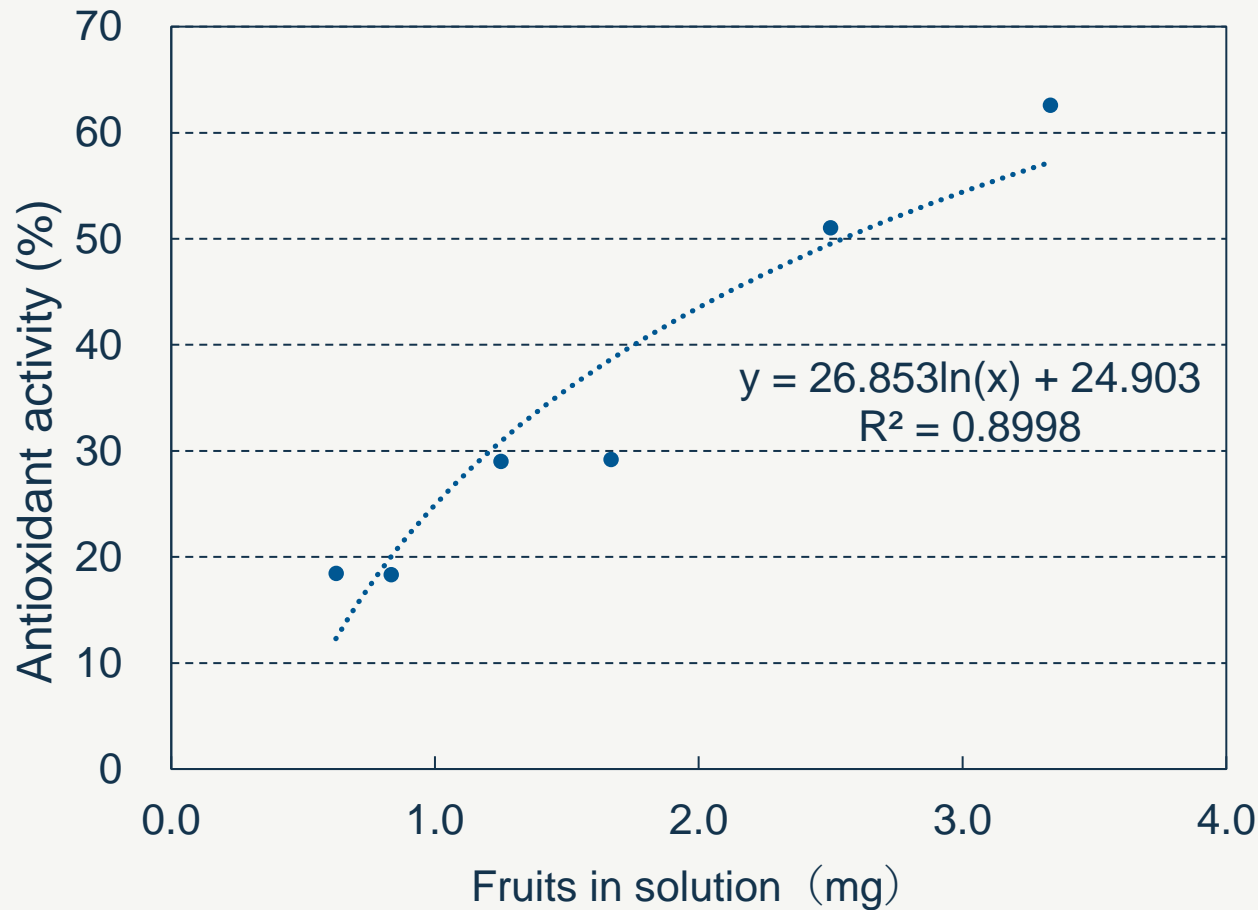
Anthocyanin

dilution ratio	absorbance (527)	concentration (μ M)	Anthocyanin	Average
			(mg/g)	
8	0.719	319.3	1.434	
4	1.399	310.8	1.395	1.418
2	2.855	317.2	1.424	

Anthocyanin 1.4 mg/g

Result Antioxidant

DPPH radical scavenging activity method



Concentration in solution and scavenging rate
of *Tsurumurasaki* fruit

Antioxidant
available

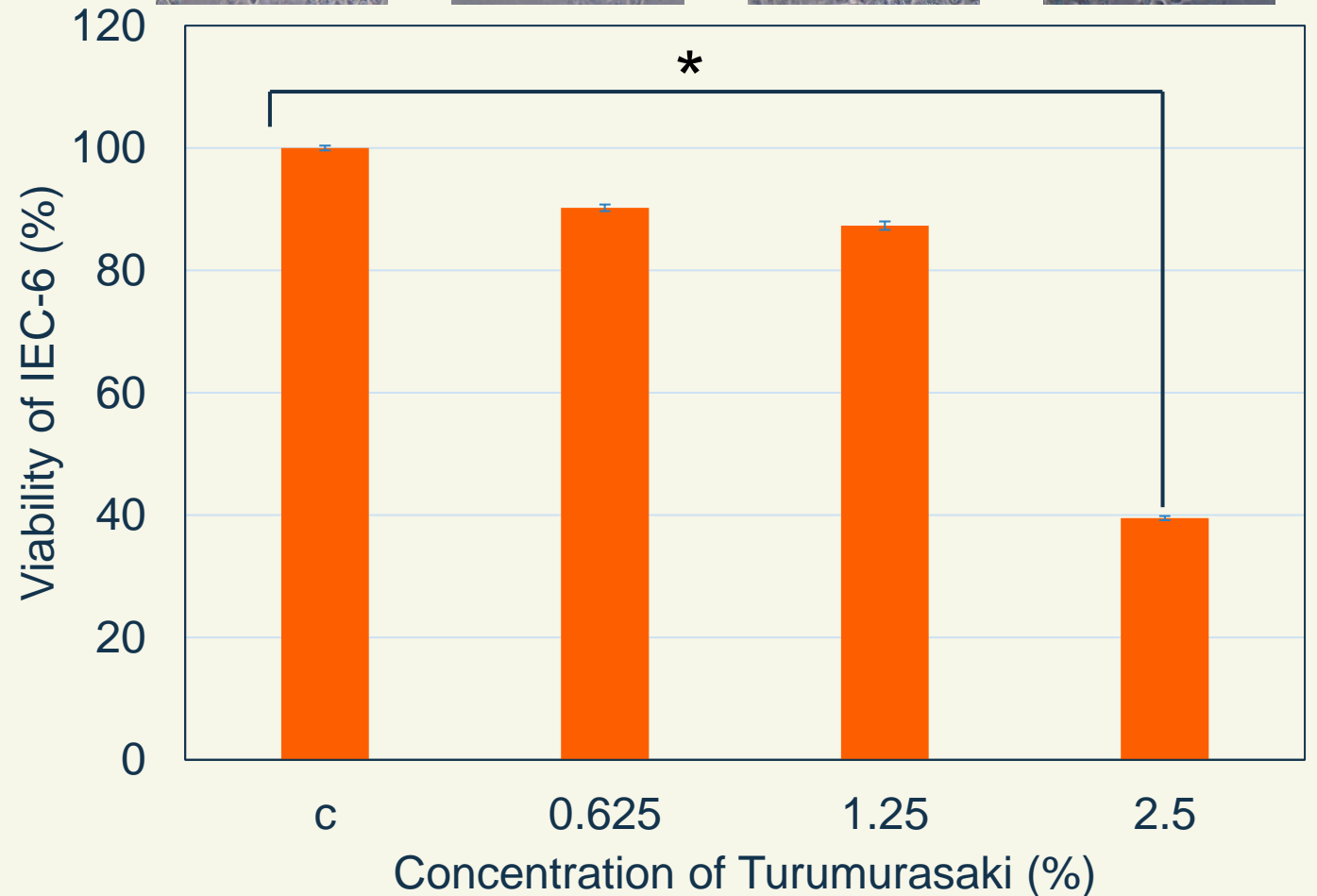
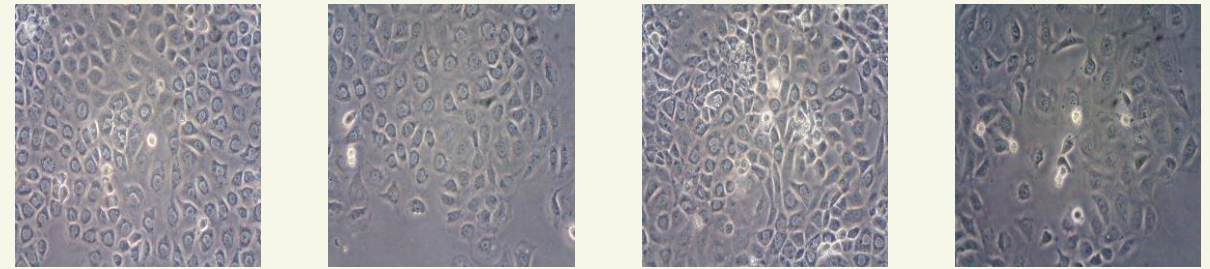


Scavenging rate
Depends on
Tsurumurasaki
concentration

Result

Cell Viability

Used cell: Rat small intestine epithelial cells (IEC-6)



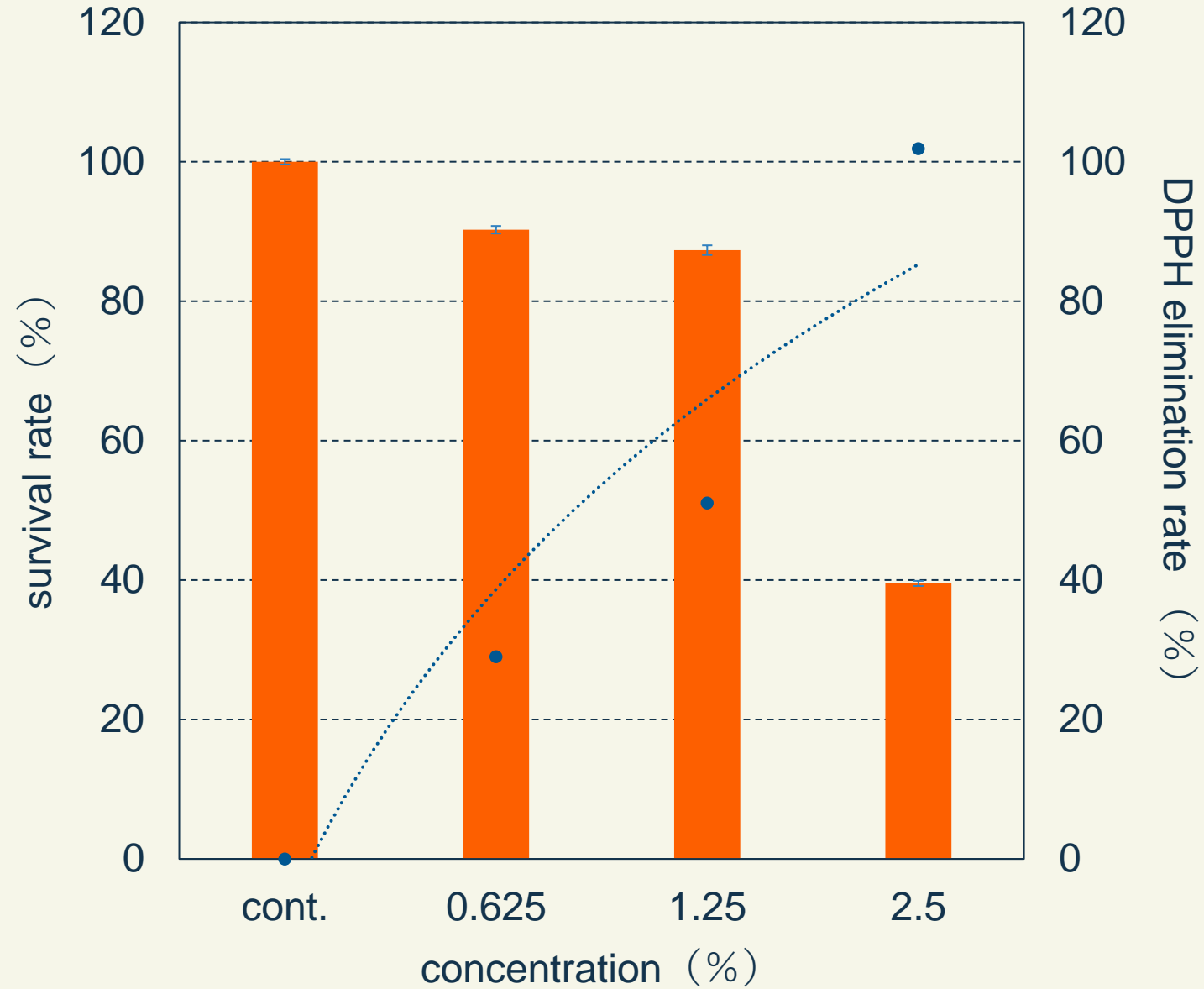
* significant difference ($p < 0.01$, t-test)

Conclusion

Total Polyphenols
3.6 mg/g

Anthocyanin
1.4 mg/g

Others
2.2 mg/g



DPPH and cell proliferation graph

Application

Colors well even at
1.25% with no problem
on cells



More milk

More *Turumurasaki*

Can be used for
coloring confectionery
and other items

References

1. 日本植物生理学会, みんなのひろば, 植物Q & A, anthocyanins法について,
https://jspp.org/hiroba/q_and_a/detail.html?id=257, (access 2022. 5.10).
The Japanese Society of Plant Physiologists, Minna no hiroba, Shokubutu Q&A, , anthocyanins hou
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2. 文部科学省, 日本食品標準成分表2020版(八訂) MEXT, Food composition database, in Japanese,
<https://fooddb.mext.go.jp/>