ORYZA OIL & FAT CHEMICAL CO., LTD.

BUCKWHEAT LEAF EXTRACT

For improving cold sensitivity/stiff shoulders
and preventing angiopathy

■□**BUCKWHEAT LEAF EXTRACT-P**
(Powder, Food Grade)

■□**BUCKWHEAT LEAF EXTRACT-WSP**
(Water-soluble Powder, Food Grade)

■□**BUCKWHEAT LEAF EXTRACT-PC**
(Powder, Cosmetic Grade)

■□**BUCKWHEAT LEAF EXTRACT-LC**
(Liquid, Cosmetic Grade)

ORYZA OIL & FAT CHEMICAL CO., LTD.

Ver. 2.3 YF

Foodstuff to improve cold sensitivity/stiff shoulders and prevent angiopathy

BUCKWHEAT LEAF EXTRACT

1. Introduction

Cold sensitivity is a frequent complaint in females, and is caused by autonomic imbalance, abnormal secretion of female hormones, or peripheral hypesthesia, but is most closely associated with the stagnation of peripheral blood flow in the hands and feet. To reduce symptoms of cold sensitivity, improvement in microvascular blood flow is effective, and natto kinase, Japanese apricot extract, ginkgo leave extract, and Pycnogenol™ are already commercially available for blood flow improvement. These suppliments improve blood flow by affecting blood cells (platelets and erythrocytes) and blood components (such as chylomicron and cholesterols) and improving blood fluidity.

The blood vessels as blood pathways also markedly affect blood circulation. With age, the elasticity of the vascular inner walls decreases, and the vascular ability to flexibly contract and relax in response to changes in temperature and blood pressure decreases. Therefore, to maintain normal blood circulation, care for both the blood and blood vessels is necessary.

Oryza Oil & Fat Chemical Co., Ltd. noted buckwheat containing rutin as a flavonoid that strengthens the blood vessels. Rutin has been long called vitamin P and known as a nutrient indispensable for strengthening the blood vessels and maintaining their elasticity. Buckwheat noodles eaten in Japanese daily life also contain rutin, but in a very small amount. We measured rutin in buckwheat and found a higher content in the leaves than in the seeds. In addition, in a human monitor test using a microchannel array flow analyzer (MC-FAN) and thermography, BUCKWHEAT LEAF EXTRACT improved blood fluidity and restored peripheral body temperature that had been reduced under cold conditions.

BUCKWHEAT LEAF EXTRACT-P contains a standardized amount of rutin (≥ 5%) and can be used not only for suppliments that aim at improving cold sensitivity, stiff shoulders, and swelling but also for those that aim at preventing disorders associated with vascular aging such as atherosclerosis, hypertension, strokes, and myocardial infarction.

2. What is buckwheat leaf?

The history of buckwheat leaf as food is long. In 984, the "Ishinpo", the oldest medical book in Japan edited by Yasuyori Tanba, mentions that buckwheat washes away dirty wastes in the 5 major visceral organs and connects the sprit and God, its leaves can be boiled and eaten as a vegetable, and buckwheat markedly improves the function of the ears and eyes and reduces excessive spirit. Thus, buckwheat has been recognized as a food that is good for health.

In China, buckwheat leaves are also used as a medicinal suppliments. Concerning efficacy, the Great Chinese Medical Dictionary mentions that buckwheat leaves used for hypertension due to fragile capillaries prevent cerebral bleeding, and they also prevent various types of bleeding due to fragile capillaries and non-tuberculosis pulmonary bleeding, and can be used for the treatment of diabetic retinopathy. Thus, buckwheat leaves have effects on impaired circulation.

There are some kinds of buckwheat. Our BUCKWHEAT LEAF EXTRACT is made from *Fagopyrum esculentum* Moench and *Fagopyrum tataricum* L.

Buckwheat leaves (*Fagopyrum esculentum* Moench)

3. Components of buckwheat leaves and blood flow improving effects

The principle component of buckwheat leaves is rutin, a flavonoid glycoside (Fig. 1, left). Recent studies on the effects of rutin on blood flow shown below[1-4] have clarified that rutin improves blood flow by acting on the vascular smooth muscle and blood components. In clinical practice, oxerutin (Fig. 1, right), as a rutin derivative, is used for disorders associated with impaired blood circulation, and its effects on economy class syndrome have been reported[5]. The absorption of rutin in humans is relatively slow, and metabolites appear in the blood 4-8 hours after its intake. The metabolites reach peak concentrations after 8-12 hours and disappear after 20-35 hours[6,7].

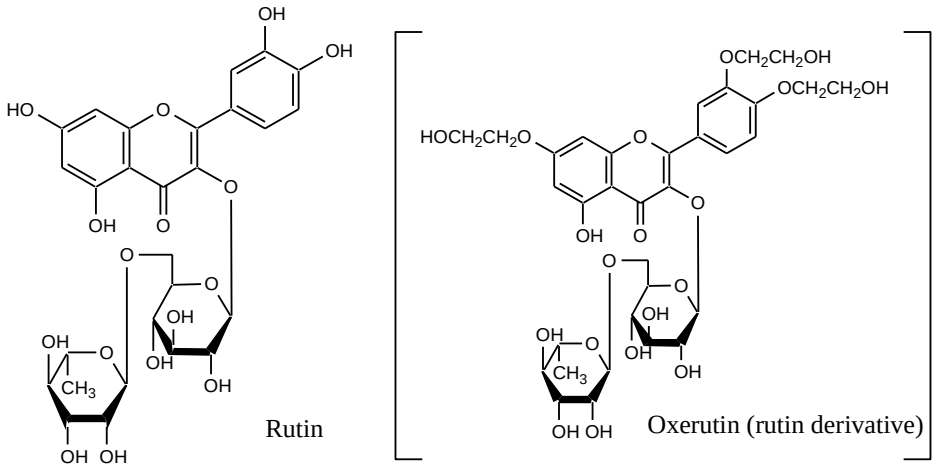


Fig. 1. Chemical structures of rutin (left) and oxerutin (right)

1) Fusi F., Saponara S., Pessina F., Gorelli B., Sgaragii G. Effects of quercetin and rutin on vascular preparations. A comparison between mechanical and electrophysiollogical phenomena. *Eur. J. Nutr.* **42**, 10-7 (2003).
2) Chen W. M., Jin M., Wu W. Experimental study on inhibitory effect of rutin against platelet activation induced by platelet activating factor in rabbits. *Zhongguo Zhong Xi Yi Jie He Za Zhi* **22** (4), 283-5 (2002).
3) Laemmel E., Stucker O., Pons C., Duverger J.P., Dedieu F., Leutenegger E. Microcirculatory consequences of a venous striction in the rat. Effect of a coumarine-rutine association. *J. Mal. Vasc*. **23** (3), 176-82 (1998).
4) Young G. L., Jewell D. Interventions for varicosities and leg oedema in pregnancy. *Cochrane Database Syst. Rev*. **2**, CD001066 (2000).
5) Cesarone M. R., Belcaro G., Incandela L., Geroulakos G., Griffin M., Lennox A., DeSanctis M. T., Acerbi G. Flight microangiopathy in medium-to-long distance flights: prevention of edema and microcirculation alterations with HR (Paroven, Venoruton; *O*-(beta-hydroxyethyl) -rutosides): a prospective, randomized, controlled trial. *J. Cardiovasc. Pharmacol. Ther.* **7** Suppl. 1, S17-20 (2002).
6) Sawai Y., Kohsaka K., Nishiyama Y., Ando K. Serum concentration of rutoside metabolites after oral administration of a rutoside formulation to humans. *Arzneim-Forsch./Drug Res.* **37** (I), 729-32 (1987).
7) AbsorptionGraefe E. U., Wittig J., Mueller S., Riethling A. K., Uehleke B., Drewelow B., Pforte H., Jacobasch G., Derendorf H., Veit M. Pharmacokinetics and bioavailability of quercetin glycosides in humans. *J. Clin. Pharmacol.* **41** (5), 492-9 (2001).

4. Function of BUCKWHEAT LEAF EXTRACT

(1) Improvement of blood flow

① MC-FAN method (humans)

The effects of ingestion of BUCKWHEAT LEAF EXTRACT (120 mg) on blood fluidity were evaluated by a microchannel array and an MC-FAN in 9 male and female volunteers (age, 26-60 years) of our company. As a parameter of blood fluidity, slit passage time (whole blood passage time)/100 μl blood was used.

The whole blood passage time was 54-103 minutes before ingestion of BUCKWHEAT LEAF EXTRACT but 42-100 seconds 1 hour after ingestion, showing a reduction in 7 subjects. After consecutive extract ingestion for 1 week, the whole blood passage time was 48-71 seconds, showing a reduction in 8 subjects (Fig. 2).

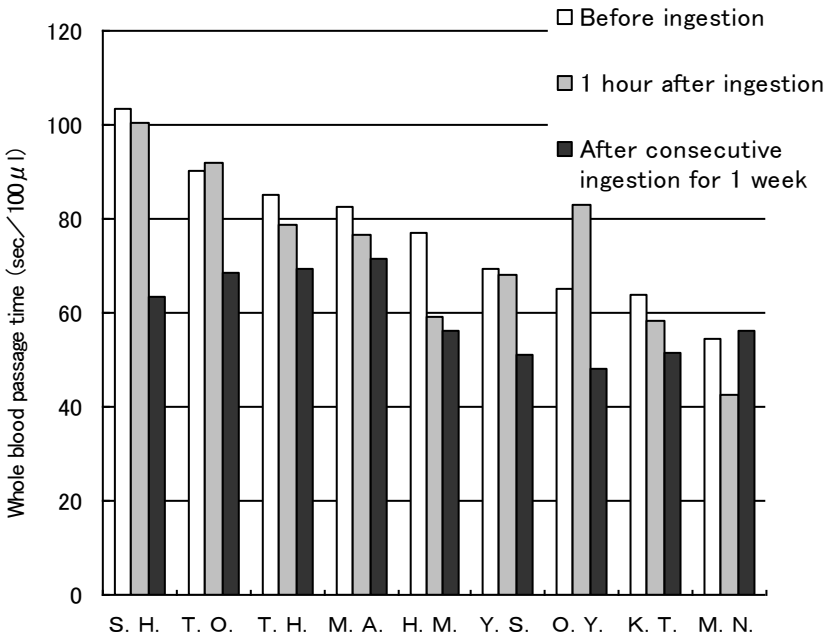


Fig. 2. Whole blood passage time before and after ingestion of BUCKWHEAT LEAF EXTRACT in each subject.

The mean whole blood passage time 1 hour after ingestion of BUCKWHEAT LEAF EXTRACT in the 9 subjects was decreased by about 4.7% compared with the value before ingestion, but that after consecutive extract ingestion for 1 week was significantly decreased (22.4%) compared with the value before ingestion ($p < 0.01$, Student *t*-test; the same test was used below) (Fig. 3).

Fig. 4 shows microchannel images of a subject (S.H. in Fig. 2) who markedly responded to BUCKWHEAT LEAF EXTRACT. Platelet aggregates around the slit observed before

ingestion of BUCKWHEAT LEAF EXTRACT were absent 1 hour after ingestion, and leukocyte passage through the slip became smooth.

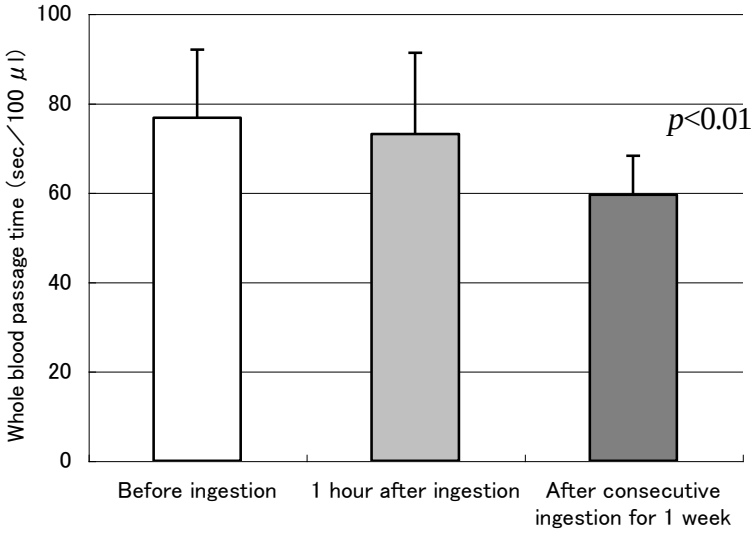


Fig. 3. Mean whole blood passage time before and after ingestion of buckwheat leave extract (*N*=9, mean ± S.D.).

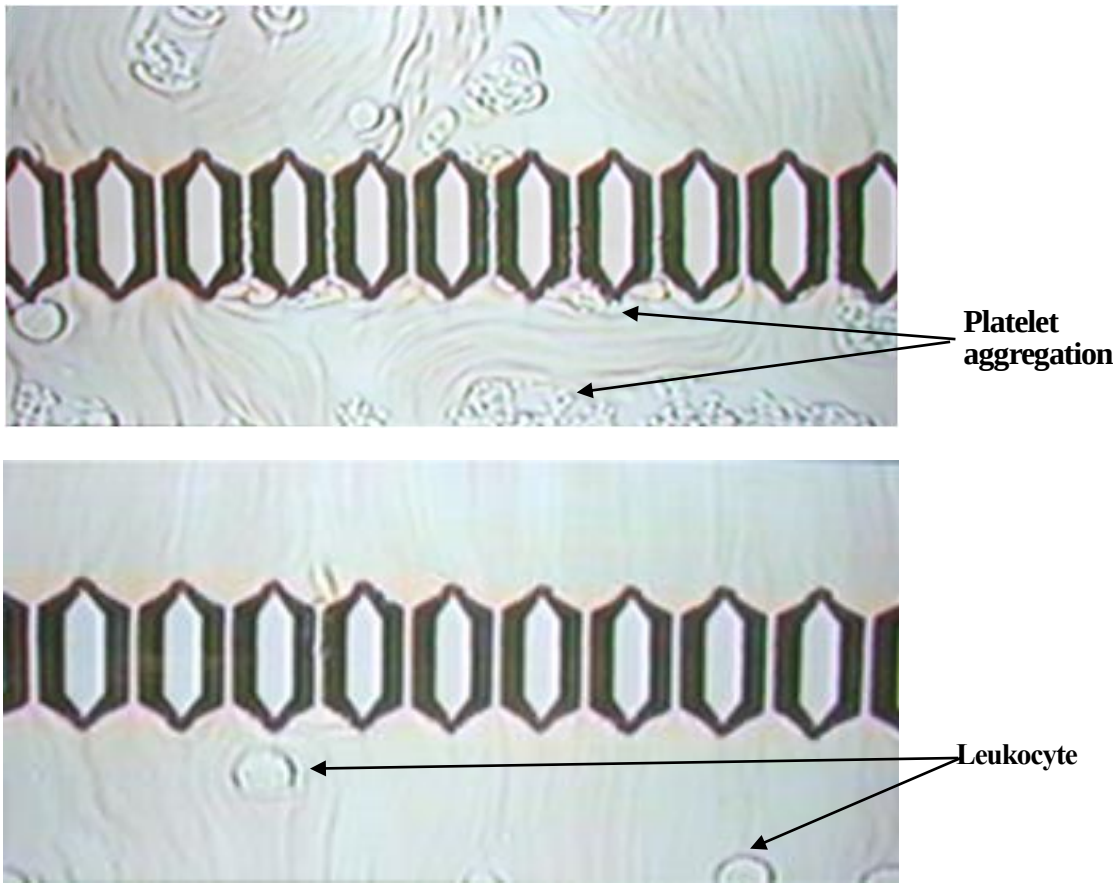


Fig. 4. Microchannel images before and after ingestion of BUCKWHEAT LEAF EXTRACT (upper, before ingestion; lower, 1 hour after ingestion).

One week after ingestion of BUCKWHEAT LEAF EXTRACT, blood components were measured. The total cholesterol and triglyceride levels after ingestion were slightly lower (5.5 and 8.7%, respectively) than those before ingestion. The cyclic AMP (c-AMP) concentration significantly ($p < 0.05$) increased (10.6%) (Fig. 5). The blood c-AMP has been reported to be increased by some phosphodiesterase inhibitors (peripheral vessel dilating effect) that improve renal blood flow. It is possible that BUCKWHEAT LEAF EXTRACT has similar effects.

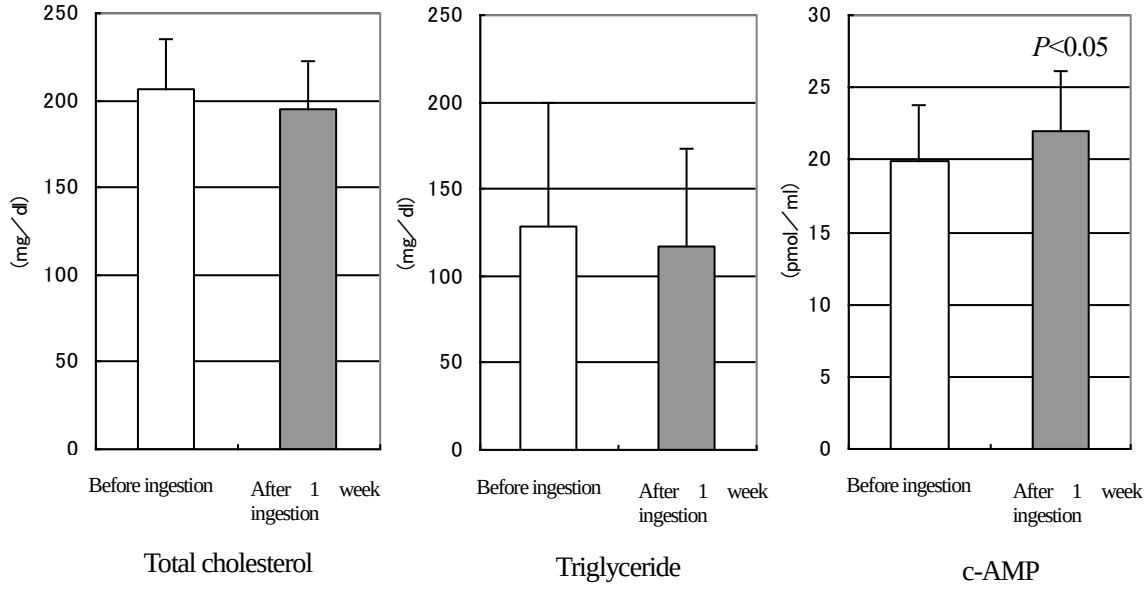


Fig. 5. Changes in blood components after ingestion of BUCKWHEAT LEAF EXTRACT ($N = 9$, mean ± S.D.).

【Test methods】

In the BUCKWHEAT LEAF EXTRACT ingestion test, blood fluidity was measured using blood treated with 5% heparin (1,000 units/mL). A microchannel array (Bloody 6-7, Hitachi Haramachi Electronics Co., Ltd.) and an MC-FAN (Hitachi Haramachi Electronics Co., Ltd.) were used to measure the passage time of 100 μL blood.

The subjects were 9 males and females of our company (age, 26-60 years; mean, 40.8 years). On the first day of the test, the subjects had 3 bread rolls and water (200 mL) for breakfast, and water (100 mL) 2 hours after breakfast. After 1 hour, blood was collected via a cubital vein, and whole blood passage time was measured as the value before ingestion of buckwheat leave extract. Subsequently, BUCKWHEAT LEAF EXTRACT (120 mg) corresponding to 30 mg rutin was ingested with water (100 mL). After 1 hour, blood was collected, and whole blood passage time was measured as the value 1 hour after ingestion. From 6 days from the next day of the test, the subjects freely ingested BUCKWHEAT LEAF EXTRACT (120 mg/day). On the 7th day, whole blood passage time was measured by a method similar to that on the first day

of the test as the value 1 week after consecutive ingestion.

Before and 1 week after ingestion of BUCKWHEAT LEAF EXTRACT, blood samples were also analyzed for the total cholesterol, triglyceride, and c-AMP concentrations.

② Promoting effects on skin temperature recovery (thermography)

A skin temperature recovery test was performed by low-temperature loading on the hands and feet in 2 male volunteers of our company. After the subjects immersed their hands and feet in ice water (14°C) in a constant temperature room, skin temperature was serially measured. Subsequently, they ingested BUCKWHEAT LEAF EXTRACT (120 mg), and after 1 hour, a skin temperature recovery test was performed again in the constant temperature room by a method similar to that in the first test.

Fig. 6 shows thermographs with (right) and without (left) ingestion of BUCKWHEAT LEAF EXTRACT. A marked difference was observed in the fingers. Immediately after low-temperature loading, the temperature distribution was 21.9-25.3°C both with and without extract ingestion. After 15 minutes, the temperature distribution without extract ingestion was 25.3-32.1°C, but that with extract ingestion was 28.7-35.5°C, showing a slight increase. After 30 minutes, the temperature distribution without extract ingestion was 28.7-33.8°C, but that with extract ingestion was 32.1-35.5°C, showing a marked increase.

【Test methods】

A skin temperature recovery test was performed by low-temperature loading on the hands and feet in 2 male volunteers of our company. Two-three hours after breakfast, the subjects ingested 100 mL water and entered a constant temperature room (temperature, 25°C; humidity, 50%). After 1-hour acclimation, they immersed their hands and feet in water (14°C) for 1 minute. Immediately after the discontinuation of immersion, skin temperature was serially measured (at 6.4-second intervals for 30 minutes) using an infrared camera. After measurement, they had lunch, and after 2 hours, ingested BUCKWHEAT LEAF EXTRACT (120 mg) with water (100 mL). They entered the constant temperature room again, and a skin temperature recovery test was performed by a method similar to that in the first test.

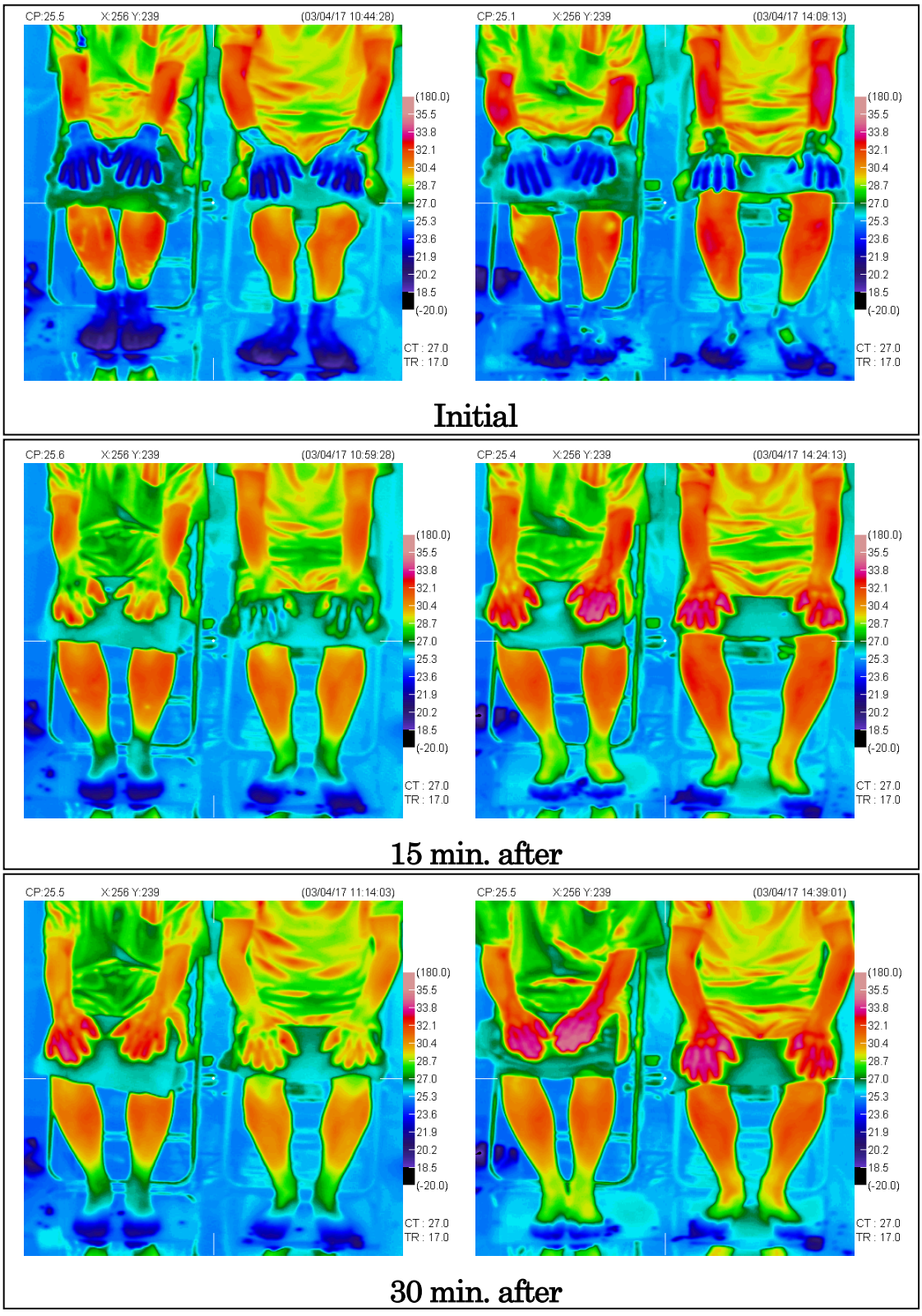
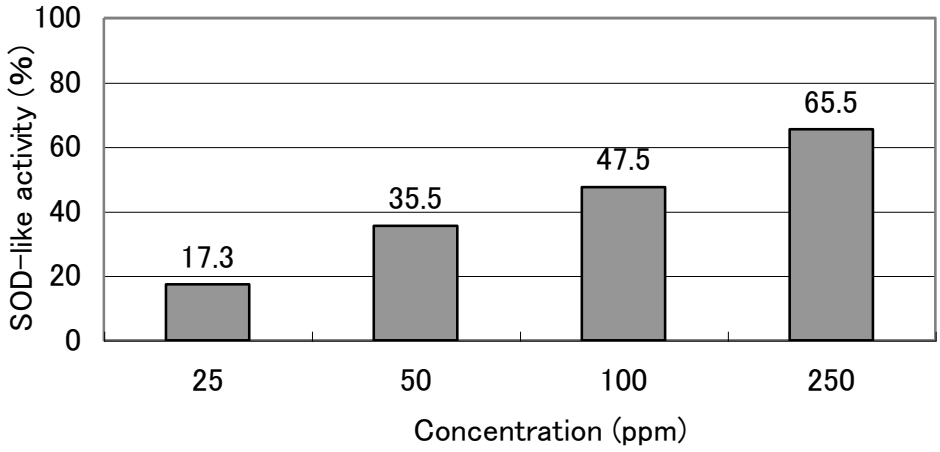


Fig. 6. Thermographs after low-temperature loading [left, control; right, with ingestion of BUCKWHEAT LEAF EXTRACT (120 mg); upper, immediately after low-temperature loading; middle, after 15 minutes; low, after 30 minutes]

(2) Anti-oxidative activity

In the process of the development of atherosclerosis, damage of vascular endothelial cells by oxidized low-density lipoprotein (LDL) is involved. In addition, in ischemic areas in impaired circulation, various active oxygen species are produced, damaging the blood vessels. To reduce the risk of angiopathy, intake of food with anti-oxidation effects is effective. Therefore, the anti-oxidation effects of BUCKWHEAT LEAF EXTRACT were evaluated using superoxide dismutase (SOD) activity and the ability to scavenge 1,1-diphynyl 2-pycrylhidragil (DPPH) radicals as parameters. As a result, BUCKWHEAT LEAF EXTRACT had SOD activity and DPPH radical scavenging ability in the concentration rage shown in Fig. 7.

① SOD-like activity



② DPPH radical scavenging activity

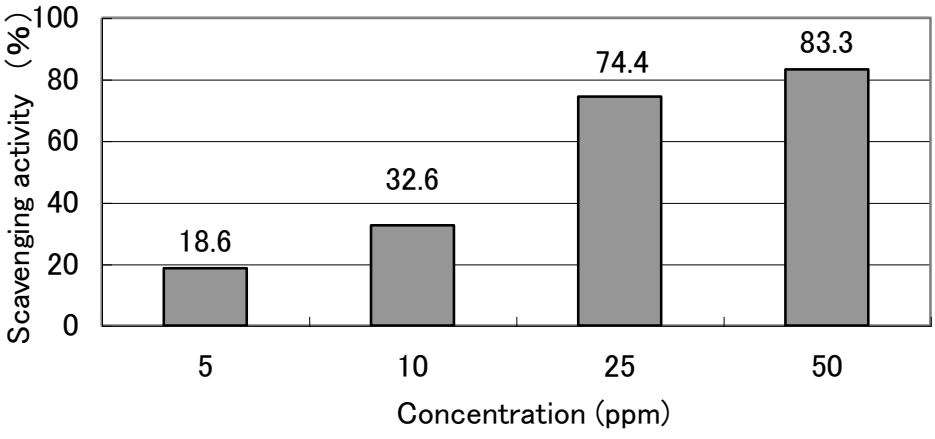


Fig. 7. Anti-oxidation activity of buckwheat leave extract [(1) SOD Test Wako (Wako Pure Chemical Industries, Ltd.) was used. (2) DPPH was used.]

(3) Anti-diabetic activity

On the joint research with Nagasaki prefectural university, we evaluated anti-diabetic effect of BUCKWHEAT LEAF EXTRACT using OLETF rats. The diet containing 5% BUCKWHEAT LEAF EXTRACT was fed to OLETF rats for 5 months. LETO rat was used for normal group. As a result, BUCKWHEAT LEAF EXTRACT reduced water intake and blood glucose (Fig. 8). Moreover, on the glucose tolerance test performed 5 months after BUCKWHEAT LEAF EXTRACT ingestion, maximum blood glucose and 2 hr after-blood glucose levels were improved. (Fig. 9).

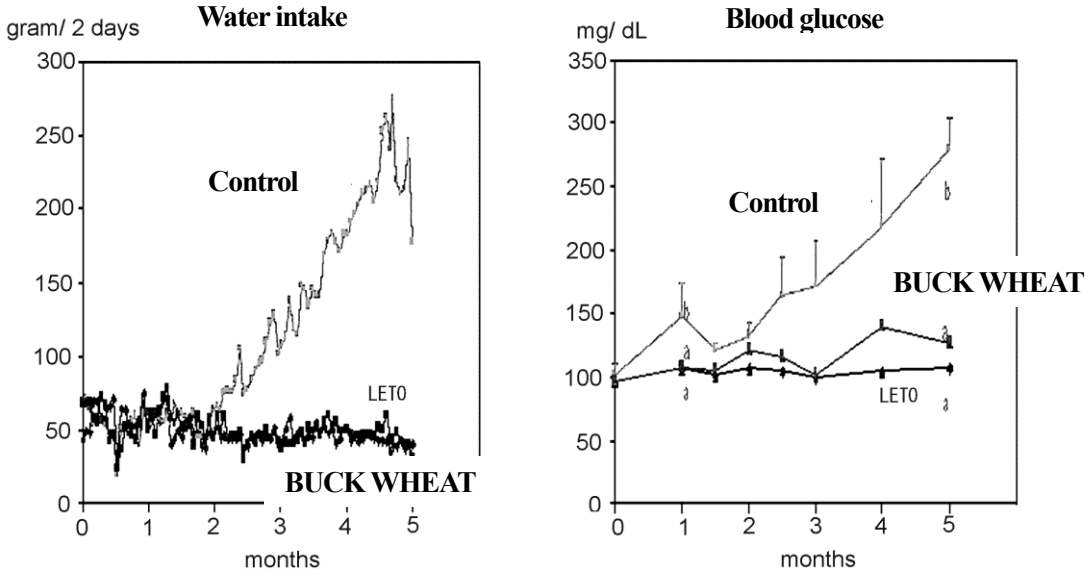


Fig. 8. Effect of BUCKWHEAT LEAF EXTRACT on diabetic rats.
(Significant difference was detected between a and b)

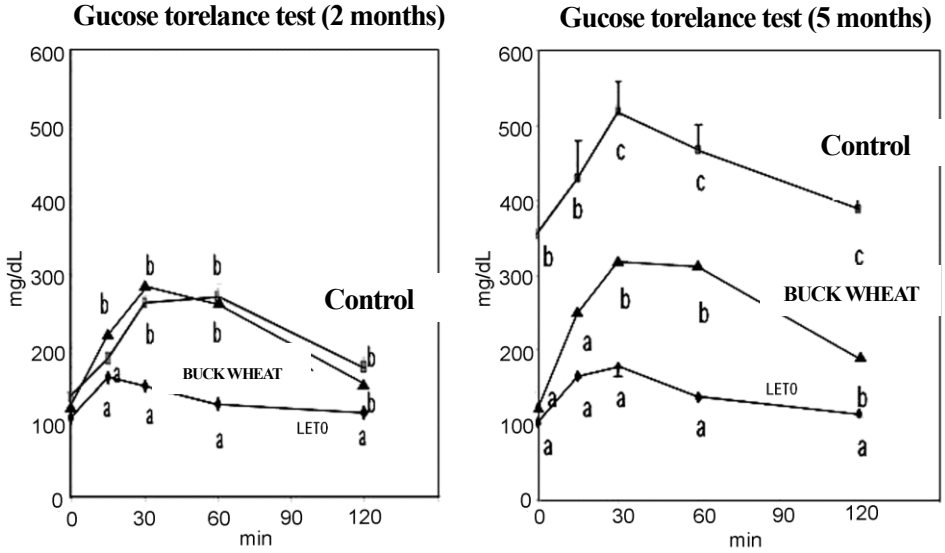


Fig. 9. Glucose tolerance test in OLETF rats fed BUCKWHEAT LEAF EXTRACT
(Significant difference was detected among a, b and c)

On the other hand, BUCKWHEAT LEAF EXTRACT significantly reduced liver cholesterol and triglyceride (Table 1). As BUCKWHEAT LEAF EXTRACT did not affect to the activity of hepatic fatty acid synthases, the extract may affect to beta-oxidation or change of sugar to lipid. Thus, BUCKWHEAT LEAF EXTRACT is suggested to be effective for type 2 diabetes.

Table 1. Lipid parameters

	Normal		Diabetic			
	LETO		Control		Buckwheat Leaf Extract	
Increase In body weight(g)	195 ± 16	NS	205 ± 51		252 ± 52	
Mean diet consumption (g)	21.2 ± 0.6	a	28.8 ± 0.5	b	26.8 ± 0.8	b
Mean water consumption (g)	49.8 ± 2.3	a	117.2 ± 30.4	b	51 ± 2.4	a
Liver weight（g）	16.0 ± 0.6	a	29.6 ± 1.9	b	28.5 ± 2.9	b
Relative liver weight (g/100g body weight)	2.90 ± 0.3	NS	2.61 ± 0.3		2.51 ± 0.3	
Small Intestine weight（g）	2.73 ± 0.1	a	4.70 ± 13.7	b	4.63 ± 0.4	b
Adipose tissue weight (g)	38.2 ± 2.1	a	88.1 ± 11.4	b	116.9 ± 15.4	b
Peri-renal (g)	19.6 ± 1.5	a	24.5 ± 2.5	b	91.2 ± 13.4	b
Epidydimal (g)	18.6 ± 0.7	NS	24.5 ± 0.9		25.7 ± 2.1	
Relative adipose tissue weight (g/100g body weight)	6.04 ± 0.21	a	14.53 ± 0.87	b	14.30 ± 0.79	b
Peri-renal	3.09 ± 0.17	a	11.33 ± 0.77	b	11.10 ± 0.78	b
Epidydimal	2.95 ± 0.07	NS	3.20 ± 0.12		3.20 ± 0.03	
Serum HDL (mg/dl)	63.9 ± 2.2	a	88.5 ± 5.4	ab	99.3 ± 11.9	b
Serum T-Chol (mg/dl)	147 ± 5	a	242 ± 13	b	263 ± 34	b
Serum HDL/T-chol (%)	43.6 ± 1.2	b	36.7 ± 1.5	a	37.8 ± 1.4	a
Serum TG (mg/dl)	56 ± 8	b	234 ± 44	a	196 ± 23	b
Serum PL (mg/dl)	193 ± 11	a	328 ± 22	b	358 ± 37	b
Serum Chol/PL (ratio)	0.767 ± 0.019	a	0.745 ± 0.022	b	0.723 ± 0.031	b
Serum FFA (mEq/L)	0.470 ± 0.038	NS	0.624 ± 0.059		0.667 ± 0.076	
Serum Insulin (ng/ml)	7.30 ± 0.60	NS	2.54 ± 0.8		7.23 ± 1.05	
Serum Leptin (ng/ml)	24.2 ± 2.4	a	25.6 ± 5.1	a	35.7 ± 5.5	b
Liver Chol (mg/g Liver)	3.28 ± 0.08	a	5.98 ± 0.43	c	4.62 ± 0.38	b
Liver TG (mg/g Liver)	9.78 ± 1.19	a	52.8 ± 4.5	c	33.3 ± 4.0	b
Liver PL (mg/g Liver)	33.3 ± 1.0	b	27.1 ± 0.9	a	28.3 ± 1.1	a
FAS	8.48 ± 0.62	NS	15.63 ± 5.23		24.1 ± 4.6	
Malic	31.5 ± 2.8	a	63.0 ± 18.0	ab	96.7 ± 13.8	b
G-6-P	15.9 ± 1.8	a	44.9 ± 19.5	ab	74.2 ± 16.3	b
PAP (cytosol) Mg^{+}	2.89 ± 0.18	NS	3.08 ± 0.18		2.87 ± 0.23	
PAP (cytosol) Mg^{-}	1.63 ± 0.07	NS	1.66 ± 0.17		1.33 ± 0.19	
PAP (microsome) Mg^{+}	8.53 ± 1.01	NS	10.83 ± 0.85		13.07 ± 1.15	
PAP (microsome) Mg^{-}	4.00 ± 0.47	a	3.98 ± 0.25	a	5.40 ± 0.43	b

Mean ± S.E., NS: non significance, Significant difference was detected among a, b and c

5. Stability of BUCKWHEAT LEAF EXTRACT

(1) Thermal resistance

Evaluation of the heat stability of BUCKWHEAT LEAF EXTRACT showed no changes in the rutin content even after heating at 120°C for 1 hour.

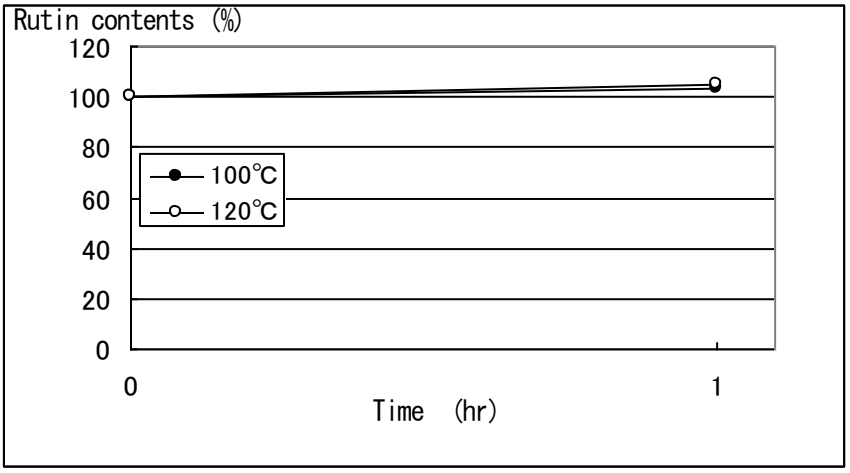


Fig. 10. Thermal resistance of BUCKWHEAT LEAF EXTRACT (100% as initial value)

(2) pH stability

After storing of 16% alcohol solution of BUCKWHEAT LEAF EXTRACT without light shielding at room temperature for 1 week, the rutin content was measured. Rutin in BUCKWHEAT LEAF EXTRACT was found to be stable from neutral to acid field of pH.

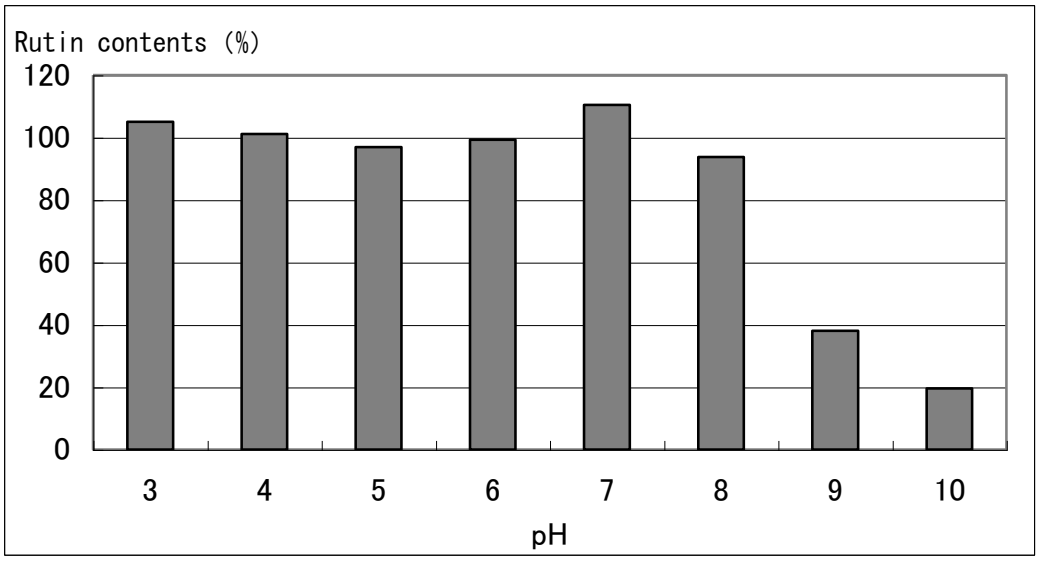


Fig. 11. Influence of pH on rutin contents

6. Daily dosage of BUCKWHEAT LEAF EXTRACT

It is recommended to take 240 to 600mg/day of BUCKWHEAT LEAVE EXTRACT-P.

7. Nutrition facts of BUCKWHEAT LEAF EXTRACT

	Results
Moisture	3.6g/100g
Protein*1	1.0g/100g
Fat	0.9g/100g
Ash	1.1g/100g
Carbohydrate*2	93.4g/100g
Energy*3	386 kcal/100g
Dietary fiber	<0.5g/100g
Sodium	18.0 mg/100g

*1) *N*=6.25
*2) 100 - (moisture + protein + fat + ash + dietary fiber)
*3) Factors for calculating the energy value: protein, 4; fat, 9; available carbohydrate (carbohydrate + dietary fiber), 4
Test trustee:
Japan Food Research Center Foundation
Date of issue of the test result report:
December 5, 2002
Research result issue number:
No. 302110638-001

8. Safety profile of BUCKWHEAT LEAF EXTRACT

(1) Residual agricultural chemicals

	Results	Detectable limit	Method
BHC	Not detected	0.02ppm	GC
DDT	Not detected	0.02ppm	GC
Aldrin	Not detected	0.01ppm	GC
Dieldrin	Not detected	0.01ppm	GC
Endrin	Not detected	0.01ppm	GC
Diazinon	Not detected	0.05ppm	GC
Parathion	Not detected	0.05ppm	GC
Marathion	Not detected	0.05ppm	GC

Test trustee: Japan Food Research Center Foundation
Date of issue of the test result report: December 25, 2002.
Research issue number.: 302110748-001

(2) Acute toxicity (LD_{50})

BUCKWHEAT LEAF EXTRACT (5000 mg/kg) was orally administered to male and female ICR mice aged 5 weeks under fasting, and the mice were maintained and observed for 14 days. Neither deaths nor abnormal changes in body weight compared with the controls were observed. Autopsy performed after the discontinuation of the experiment showed no macroscopic abnormalities in organs. Therefore, in male and female mice, the LD_{50} of

BUCKWHEAT LEAF EXTRACT by oral administration is ≥ 5,000 mg/kg.

9. Practical Applications of BUCKWHEAT LEAF EXTRACT

Applications	Health claim	Example
1. Healthy foods for women	1.Improving cold sensitivity/stiff shoulders	Hard and soft gel capsule, tablet, candy, chewing gum, cookies, chocolate, wafers, jelly, drink, etc.
	2.Cure women's diseases	
	3. For diet and reducing edema	
	4. Skin beauty	
2. Healthy food for prevention of life style associated disease	Prevention of atherosclerosis, hypertension, cerebral and myocardial infarction	

10. Packaging

BUCKWHEAT LEAF EXTRACT –P , -WSP (Powder, for food)

BUCKWHEAT LEAF EXTRACT –PC (Powder, for cosmetic)

5kg Interior packaging: aluminum-coated plastic bag

Exterior packaging: cardboard box

BUCKWHEAT LEAF EXTRACT –LC (Liquid, for cosmetic)

5kg Interior packaging: cubic polyethylene container

Exterior packaging: cardboard box

11. Storing Method

Store in cool and dry place. Avoid humidity.

12. Examples of the indications of buckwheat leaf extract

The specified material "buckwheat" means buckwheat seeds and their processed materials and does not include buckwheat leaf extract. Therefore, the description, "A specified material is contained." is not necessary as material indications. However, to avoid mistaking buckwheat leaf for buckwheat seeds, "buckwheat leaves" should be clearly mentioned.

BUCKWHEAT LEAF EXTRACT –P, -WSP

Expression: Buckwheat leaves extract

BUCKWHEAT LEAF EXTRACT –PC
INCI Name : Dextrin, Polygonum Fagopyrum (Buckwheat) Leaf Extract

BUCKWHEAT LEAF EXTRACT –LC
INCI Name : Butylene Glycol, Water, Polygonum Fagopyrum (Buckwheat) Leaf Extract

PRODUCT STANDARD

PRODUCT NAME

BUCKWHEAT LEAF EXTRACT-P

(Food)

This product is extracted from buckwheat leaf, the leaves of (*Fagopyrum esculentum* Moench. or *Fagopyrum tataricum* L.) with aqueous ethanol. It guarantees a minimum of 5.0% of rutin.

Appearance	Light brownish or brown powder with unique smell	
Rutin	Min. 5.0 %	(HPLC)
Loss on drying	Max. 8.0 %	(Analysis for Hygienic Chemists, 1g, 105℃, 2h)
Purity test		
(1) Heavy metals (as Pb_2)	Max. 10ppm	(Sodium Sulfide Colorimetric Method)
(2) Arsenic (as As_2O_3)	Max. 1ppm	(Standard Methods of Analysis in Food Safety Regulation, The Third Method, Apparatus B)
Standard plate counts	Max. 1×10^3 cfu/g	(Analysis for Hygienic Chemists)
Moulds and Yeasts	Max. 1×10^2 cfu/g	(Analysis for Hygienic Chemists)
Coliforms	Negative	(Analysis for Hygienic Chemists)

Composition

Ingredients	Contents
Maltodextrin	65 %
Buckwheat leaves extract	35 %
Total	100 %

PRODUCT STANDARD

PRODUCT NAME

BUCKWHEAT LEAF EXTRACT-WSP

(Food)

This product is extracted from buckwheat leaf, the leaves of (*Fagopyrum esculentum* Moench. or *Fagopyrum tataricum* L.) with aqueous ethanol. It guarantees a minimum of 5.0% of rutin. It is water-soluble

Appearance	Light brownish powder with light unique smell	
Rutin	Min. 0.1 %	(HPLC)
Loss on drying	Max. 8.0 %	(Analysis for Hygienic Chemists, 1g, 105℃, 2h)
Purity test		
(1) Heavy metals (as Pb_2)	Max. 10ppm	(Sodium Sulfide Colorimetric Method)
(2) Arsenic (as As_2O_3)	Max. 1ppm	(Standard Methods of Analysis in Food Safety Regulation, The Third Method, Apparatus B)
Standard plate counts	Max. 1×10^3 cfu/g	(Analysis for Hygienic Chemists)
Moulds and Yeasts	Max. 1×10^2 cfu/g	(Analysis for Hygienic Chemists)
Coliforms	Negative	(Analysis for Hygienic Chemists)

Composition

Ingredients	Contents
Dextrin	50 %
Buckwheat leaves extract	50 %
Total	100 %

PRODUCT STANDARD

PRODUCT NAME

BUCKWHEAT LEAF EXTRACT-PC

(Cosmetic)

This product is extracted from buckwheat leaf, the leaves of *Fagopyrum esculentum* Moench. or *Fagopyrum tataricum* L. with aqueous ethanol. It guarantees a minimum of 5.0% of rutin.

Appearance	Light brown or brown powder with light unique smell	
Rutin	Min. 5.0 %	(HPLC)
Loss on drying	Max. 8.0 %	(1g, 105℃, 2h)
Purity test		
(1) Heavy metals (as Pb_2)	Max. 10ppm	(The Second Method of The Japanese Standards of Quasi-Drug Ingredients)
(2) Arsenic (as As_2O_3)	Max. 1ppm	(The Third Method of The Japanese Standards of Quasi-Drug Ingredients)
Standard plate counts	Max. 1×10^2 cfu/g	(Analysis for Hygienic Chemists)
Moulds and Yeasts	Max. 1×10^2 cfu/g	(Analysis for Hygienic Chemists)
Coliforms	Negative	(Analysis for Hygienic Chemists)

Composition

Ingredients	Contents
Dextrin	65 %
Polygonum Fagopyrum (Buckwheat) Leaf Extract	35 %
Total	100 %

PRODUCT STANDARD

PRODUCT NAME

BUCKWHEAT LEAF EXTRACT-LC

(Cosmetic)

This product is extracted from buckwheat leaf, the leaves of *Fagopyrum esculentum* Moench. or *Fagopyrum tataricum* L. (Polygonaceae) with aqueous ethanol and dissolved in aqueous 1,3-butylene glycol.

Appearance	Light brown or brown liquid with light unique smell.	
Identification (Polyphenols)	Dissolve 30 μL of this product in 3.5 mL water. Add 0.2 mL Folin-Denis Polyphenols reagent into the solution followed by 0.4 mL saturated Na2CO3. The solution will turn into blue color..	
Purity Test		
(1) Heavy Metals (as Pb_2)	Max. 10 ppm	(The Second Method of The Japanese Standards of Quasi-Drug Ingredients)
(2) Arsenic (as As_2O_3)	Max. 1 ppm	(The Third Method of The Japanese Standards of Quasi-Drug Ingredients)
Standard Plate Counts	Max. 1 $\times 10^2$ cfu/g	(Analysis for Hygienic Chemists)
Moulds and Yeasts	Max. 1 $\times 10^2$ cfu/g	(Analysis for Hygienic Chemists)
Coliforms	Negative	(Analysis for Hygienic Chemists)

Composition

Ingredients	Contents
Butylene Glycol	59 %
Water	40 %
Polygonum Fagopyrum (Buckwheat) Leaf Extract	1 %
Total	100 %

ORYZA OIL & FAT CHEMICAL CO., LTD. striving for the development of the new functional food materials to promote health and general well-being.

From product planning to OEM - For any additional information or assistance, please contact：

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