

## Multi Functional High Polymer Flocculant

### PG $\alpha$ 21Ca

PG $\alpha$ 21Ca is a kind of flocculants that has both organic and inorganic characteristics of flocculants. It is made of organic cross-linked polyglutamic acid and inorganic substances like calcium compounds. Compared to other flocculants, it has multi-functional effects, so it can be used for purification of various types of contaminated and waste water.

#### ● Special Features

- Fast formation of flocs and their fast precipitation (compared to our other products).
- Can be used for a wide range of pH(4-12) of water.
- Small changes in pH compared to other flocculants.
- Safety has been confirmed by several examinations at the institutions recognized by environment ministry.
- Can effectively remove heavy metals in water.
- Can reduce cost of sludge treatment since proportion of water in flocs is quite low.
- Can be used together with other flocculants, such as PAC.

#### ● Safety Test

Evaluation test as medicine for use in city water ( Japan Food Analysis Center )

Item	Result
Aluminum and its compounds	Within range
Cadmium and its compounds	Within range

Safety Test ( Tanabe R&D Services )

Test Name	Item	Result
Poison Test by giving oral dosage to both male and female mouse.	LD <sub>50</sub> (mg/kg)	> 2,000
Mutation Test by using microbe (Ames test)	Genetic Mutation	No induction

Water Poison Test (Center for Safety Evaluation of Agro medicine used in food)

Test name	Item	Result
Acute toxicity test of killifish	LC <sub>50</sub> (mg/L)	> 10,000

※ MSDS (Material safety data sheet ) is provided separately.



PG  $\alpha$  21Ca (20kg)

Flocculants can separate water from dirt by flocculating suspended Particles of contaminated water.

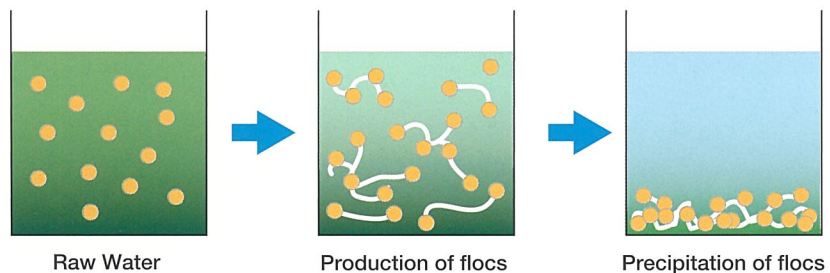


#### What is flocculant?

Flocculant is a kind of medicine used to flocculate minute particles that cause filthiness dispersed in water and, to facilitate settling or floating of flocculated particles. The aggregate of minute particles is called floc. Clear water can be obtained by separating water from solid flocs.

In contaminated water, large number of minute particles floats dispersedly. The small particles always remain dispersed because they are charged negatively and they repulse each other.

#### ● Flocculation Process



When PG $\alpha$ 21Ca is added to water, flocs are formed for its two functions.

#### Function of inorganic ingredients

Inorganic ingredients of PG  $\alpha$  21Ca neutralize the function of negative charging and inactivate repulsing power among particles and finally condense the particles.

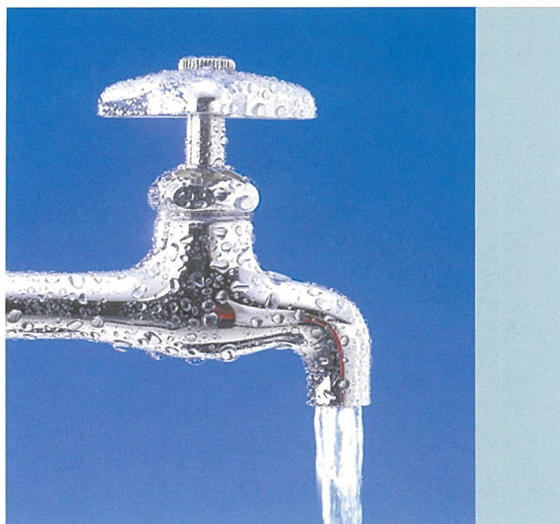
#### Function of Polyglutamic Acid (Anion polymer)

Polyglutamic acid with its function of carboxyl group (active group) works like glue that forms bridges among small particles.

Turbidity of water gets improved when contaminated particles form flocs and the flocs settle in the bottom or float on the top of water.

**PG $\alpha$ 21Ca can treat all kinds of contaminated water.**





## We offer purification plans for all kinds of contaminated water.

“PG $\alpha$ 21Ca” as a flocculant is very effective to any kind of contaminated water. We, in only six years since our company establishment, have received over 1,700 requests for treatment of contaminated water.

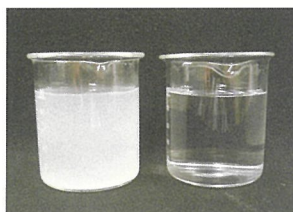
We serve each customer very carefully and propose solutions based on customers' needs.

Except improvising water quality, we also offer plan for recycling of treated water.

※We offer testing services of various discharged water to support our customers' needs.

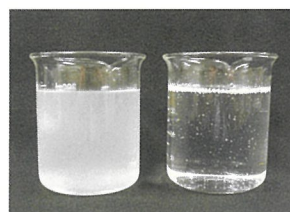
## Following are some important results of water treatment conducted by our company.

### ● Oil-water Separation (Human sewage from S city in Osaka Prefecture)



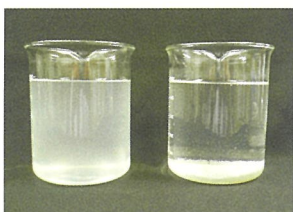
	n-hexane Vegetable Oil (mg/L)
Raw Water	420
Treated Water	< 2

### ● Oil-water Separation (Discharged water from car wash at S city in Osaka Prefecture)



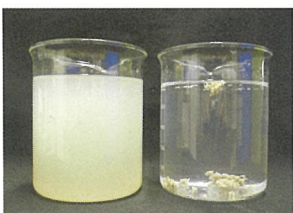
	n-hexane Mineral Oil (mg/L)
Raw Water	89
Treated Water	< 2

### ● Discharged Water from Food Processing (Wakayama Prefecture)



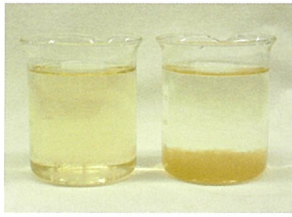
	pH	Turbidity (degree)	Color (degree)	COD (mg/L)
Raw Water	5.85	45.39	483.6	20
Treated Water	6.86	< 20	< 50	15

### ● Discharged Water from Civil Works (Hyogo Prefecture)



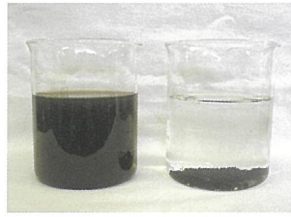
	pH	Turbidity (degree)	Color (degree)	Transparency (degree)	COD (mg/L)	n-hexane (mg/L)
Raw Water	6.59	230	> 1000	< 5	4	> 60
Treated Water	6.57	< 20	83.37	> 100	2	< 5

● Overseas Well Water (Bangladesh)



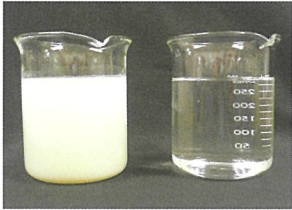
	Arsenic (mg/L)
Raw Water	0.058
Treated Water	< 0.01

● Quality Test Result of Treated Water of Coal Stock Yard in Heat Power Plant



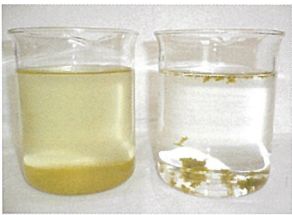
	Color (degree)	Turbidity
Raw Water	> 1,000	1068
Discharged Water	< 50	2.65

● Waste Water from Flouring mill (Kumamoto Prefecture)



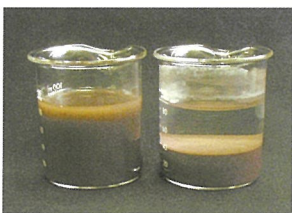
	p H	Turbidity (degree)	Color (degree)	COD (mg/L)	Phosphorus (mg/L)
Raw Water	3.65	> 1100	> 1000	4800	26.4
Treated Water	7.08	2.24	< 50	600	0.066

● Pond (Osaka city)



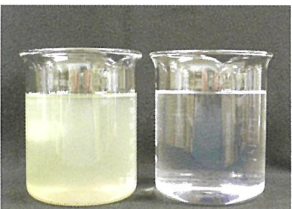
	p H	Turbidity (degree)	Color (degree)	COD (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	SS (mg/L)
Raw Water	6.7	47.8	545.4	29	0.35	4.3	47
Treated Water	7.0	0.96	< 50	7.5	0.010	0.99	1

● Discharged Water from Silicon Cut



	p H	Turbidity (degree)	Color (degree)	COD (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
Raw Water	7.11	275.5	> 1000	798.0	67.0	171
Treated Water	6.93	< 20	116.9	11.72	0.111	37.7

● Waste water from gas station



	p H	Turbidity (degree)	Color (degree)	COD (mg/L)	Total Phosphoric acid (mg/l)	n-hexane Mineral oil (mg/L)	Anion Surfactant (mg/L)
Raw Water	6.75	50.4	533.7	20	0.527	60	4.3
Treated Water	6.69	4.58	< 50	4	< 0.1	0.010	0.99