



BEWAT[®]



NATURAL CHEMICALS FOR WASTEWATER TREATMENT

INTRODUCTION





BEWAT

From **SERVYECO**, we provide alternatives for the treatment of wastewater that are safe for people, protecting their facilities and the environment. Our commitment to sustainability and to circular economy defines our core strategy. Our objective is to achieve an efficient intersection of environmental and economic factors, which allows improving the quality of life of people and reducing the environmental impact.

In **SERVYECO** we also encourage the rural economy, integrating the use of natural products and extracts in water treatment processes. The treated water and the sludge obtained are not altered by the use of hazardous chemicals, which encourage the reuse of water and the subsequent valorization of sludge for agricultural or energy use.

In accordance with our social, environmental and economic commitments, at **SERVYECO** we have created a range of innovative products of natural origin. In order to replace traditional inorganic chemical products with non-corrosive, non-hazardous and highly effective products for water treatment.

The objective of any industry is to optimize and improve the cost-benefit ratio. Therefore, regardless of the source of the water (wastewater or process water) and its subsequent destination (discharge or reuse), we offer a full range of highly competitive products.

Thanks to our extensive experience and our expert team we offer assistance at a global level. In addition, we have an R&D department constantly working to develop new innovative products and our facilities have large production capacities, making possible to design customized solutions with technical support anywhere.



BEWAT

BEWAT is line of coagulant, multifunctional and flocculant products composed of natural extracts mainly obtained from plants.

BEWAT series is based on polymers of natural origin, mainly polysaccharides, water-soluble substances obtained from materials of plant origin that act as a coagulating and/or flocculating agent.

The natural coagulant, multifunctional and flocculant products of the BEWAT series are environmentally friendly compared to the conventional organic and inorganic agents in use, due to their high degree of biodegradability.

Among the many advantages that they offer in comparison to the traditional coagulants and flocculants, the following can be highlighted:



-
- **BEWAT** series of products helps to optimize the plant operational costs compared to traditional coagulants.
 - They are 100% effective in a pH range 4-10 and do not alter the pH of the treated water. Additionally, BEWAT products allows to minimize or fully eliminate the use of NaOH or Ca(OH)₂.
 - **BEWAT** products do not add salts into the treated water, so the conductivity of the effluent water remains unaltered by their use, favoring also the potential reuse of water in other production processes.
 - **BEWAT** products extend the life-time of the operational elements in the WWTP as they are non-corrosive products.
 - Handling and manipulation hazards are minimized if compared with traditional coagulants.
 - Due to the characteristics of the resultant sludge generated during the water process, the **BEWAT** series of products increases the biogas production by up to 45% when compared to inorganic coagulants.
 - As the products are of natural origin, they respect the environment and promote the circular economy.
 - **BEWAT** series of products do not add additional metals to the treated water, improving, therefore, the effluent water quality and reducing the cost of sludge management.
 - **BEWAT** products favour the reduction of energy costs associated to aeration processes and do not have an impact on the biological processes, favouring the recovery of sludge for agricultural use.
 - The amount of sludge generated during the process is reduced up to 30%.
 - The sludge settling velocity is improved when using the **BEWAT** products, increasing consequently the water treatment capacity in the WWTP.
 - **BEWAT** products enhance the efficiency of total phosphorus removal in secondary settling processes.
 - Due to the low aquatic toxicity of the **BEWAT** products, they do not contribute to damaging the existing fauna and flora of the environment.
 - They are highly biodegradable products.
 - The products of the **BEWAT** series are non-corrosive products, therefore they do not require any specific regulations during their storage and transportation, simplifying and minimizing the subsequent associated logistic costs

BEWAT CT - COAGULANTS PRODUCTS

BEWAT CT series are an environmentally friendly alternative to the traditional inorganic coagulants, such as ferric chloride, aluminum sulfate, aluminum polychloride, etc. Their main highlighted advantages are:

- Highly efficient products whose application reduces or fully eliminates the use of additional pH neutralizers.
- More versatile coagulants than the traditional inorganic ones due to their improved formulation that enhances their coagulant activity.
- Products that can efficiently work with very different waste water qualities thanks to their multi-component nature.
- Liquid products that allows direct dosing or simple pre-dilution systems.
- The specific formulation and selection of the cationic functional groups in the BEWAT coagulants CT series is designed to replace the traditional inorganic coagulants.

BEWAT MT · MULTIFUNCTIONAL PRODUCTS

Besides of the mentioned advantages of the BEWAT CT series of products, the BEWAT MT series presents a multifunctional product-line that can either be used as coagulants or flocculants.

- High cationicity level (%), enhancing their coagulant property in different water qualities.
- Due to the polymeric structure of the products, big and consistent flocks are formed which in turn reduces the flocculant dosage.
- The volume of the sludge generated in the process is significantly reduced (sludge with reduced humidity obtained), reducing the subsequent handling and management costs associated.

BEWAT MT multifunctional series of products are organic polymers of natural origin and they are free of acrylamides. Their chemical structure is based on quaternary amines that contribute to the high positive charge density and confers the coagulant/flocculant property, eliminating the need to use a flocculating agent.



BEWAT FT · FLOCCULANTS PRODUCTS

To complete the range of natural products, we present the BEWAT FT series that are flocculants based on natural extracts of plants origin.

They are either anionic or cationic solid and liquid products that require dilution prior its use, by means of a simple stirring.

They are natural based polymers, obtained from seeds, tubers and leaves that are chemically modified to be soluble using cold water and present excellent flocculating activity in drinking water treatments.

BEWAT ADVANTAGES

Contrary to inorganic coagulants, **BEWAT** products are metal free, so they do not provide metals to the sludge, thus, they enhance the performance of biological treatment, as well as the production of biogas and allowing the management of sludge as non-hazardous, and even its subsequent valorization for agricultural use.

They can be used as an alternative to polyacrylamide based products that are potentially carcinogenic.

The BEWAT FT series of products enhances the flock formation of colloids and solids in drinking water and does not provide dangerous substances. municipalities generate a large quantity of wastewater that must be purified for its later discharge or reuse. In this way, the high water demand in cities and the need to maintain a good quality requires the pre-treatment of water before consumption.

	Product	Urban wastewater treatment plants	Drinking water treatment plants
COAGULANTS	BEWAT CT 22	✓✓✓	
	BEWAT CT 120	✓✓✓	
	BEWAT CT 6410	✓✓✓✓	
	BEWAT CT 32	✓✓	
	DOSE (mg/L)	70 - 120	
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓	
	BEWAT MT 150	✓✓✓✓	
	BEWAT MT 5480	✓✓✓	
	BEWAT MT 6450	✓✓✓✓✓	
	DOSE (mg/L)	100 - 400	10 - 30
FLOCCULANTS	BEWAT FT 820		✓✓
	BEWAT FT 2015		✓✓✓✓
	BEWAT FT 860		✓✓✓
	DOSE (mg/L)		1 - 3
	RESULT TURBIDITY (NTU)	4 - 6	1 - 2

FOOD INDUSTRY

The agri-food sector is an important consumer of water for different stages of the process. The water is used as cleaner, means of transport, refrigeration, heating for heat treatments, ingredient etc. Within the agri-food sector there is a great diversity in water typology, two large groups stand out, that of processed products and slaughterhouses.

The main problem with treated water in this sector is the solids content, COD and BOD, total nitrogen, total phosphorus and oils and fats.

BEWAT ADVANTAGES

One of the advantages of the **BEWAT** products for these sectors is that they are metal free and, therefore, do not provide metal to the sludge. Due to the organic nature of the products, a valuable sludge is obtained that can be used in agriculture. Finally, the quality of the sludge produced is maximized, which optimizes the amount of biogas generated.



PROCESSED PRODUCTS

	Product	Ice cream production	Juices production	Sauces preparation	Preparation of meat products	Canning industry	Dairy processing	Extraction of edible oils
COAGULANTS	BEWAT CT 22	✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓
	BEWAT CT 120	✓✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓✓	✓✓✓
	BEWAT CT 6410	✓✓✓✓	✓✓✓✓	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓✓	✓✓✓
	BEWAT CT 32	✓✓	✓✓	✓	✓✓	✓	✓✓✓	✓✓
	DOSE (mg/L)	400 - 700	350 - 650	300 - 600	40 - 70	250 - 450	400 - 700	350 - 650
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
	BEWAT MT 150	✓✓✓✓	✓✓✓	✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓✓
	BEWAT MT 5480	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓✓	✓✓✓
	BEWAT MT 6450	✓✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓✓
	DOSE (mg/L)	400 - 600	400 - 600	300 - 500	50 - 100	300 - 500	300 - 500	300 - 600
	RESULT TURBIDITY (NTU)	20 - 10	10 - 20	30 - 40	5 - 10	20 - 30	10 - 20	30 - 40



SLAUGHTERHOUSE

	Product	Sheep slaughterhouse	Pig slaughterhouse	Poultry slaughterhouse (chickens)	Poultry slaughterhouse (turkeys)
COAGULANTS	BEWAT CT 22	✓✓	✓✓	✓✓✓	✓✓
	BEWAT CT 120	✓✓✓	✓	✓✓✓	✓✓✓
	BEWAT CT 6410	✓✓✓✓	✓✓✓	✓✓	✓✓✓
	BEWAT CT 32	✓✓	✓✓	✓	✓✓
	DOSE (mg/L)	1000 - 2000	400 - 700	1000 - 2000	150 - 350
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓✓	✓✓✓	✓✓✓✓	✓✓✓✓
	BEWAT MT 150	✓✓✓✓	✓✓	✓✓✓	✓✓
	BEWAT MT 5480	✓✓✓✓	✓✓✓	✓✓	✓✓✓
	BEWAT MT 6450	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓✓
	DOSE (mg/L)	1000 - 2000	400 - 600	1000 - 2000	200 - 400
	RESULT TURBIDITY (NTU)	5 - 10	20 - 50	30 - 40	15 - 25



PAPER AND PAPERBOARD

The paper industry has a high consumption of water for its production process. This is used in production, refrigeration, transportation and other processes, which demonstrates the need to ensure and control the quality of process water to warrant the life of the equipment and the optimal productive performance of the plant. The main pollutants that affect this type of water are organic matter and detergents.

BEWAT ADVANTAGES

Due to the need to reuse water in this industrial sector, treatments with **BEWAT** allow improving water quality. These series of products do not modify the treated water with the incorporation of dissolved salts such as sulfates or chlorides from inorganic coagulants. In this way, we maintain very low levels of conductivity, without corrosion in the installations and optimizing the productive process, due to the reuse cycles can be incremented and without danger for the operators that handle the products, besides metals to the sludge are not added.

	Product	Cardboard manufacturing	Recycled Paper production	Production of virgin paste paper
COAGULANTS	BEWAT CT 22	✓✓	✓✓✓	✓✓
	BEWAT CT 120	✓✓✓	✓✓	✓
	BEWAT CT 6410	✓✓✓	✓✓✓	✓✓✓
	BEWAT CT 32	✓	✓✓	✓
	DOSE (mg/L)	1000 - 2000	400 - 700	1000 - 2000
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓	✓✓✓✓	✓✓✓
	BEWAT MT 150	✓✓✓✓	✓✓✓	✓✓
	BEWAT MT 5480	✓✓✓	✓✓✓	✓✓
	BEWAT MT 6450	✓✓✓✓✓	✓✓✓	✓✓✓✓
	DOSE (mg/L)	1000 - 2000	400 - 600	1000 - 2000
	RESULT TURBIDITY (NTU)	40 - 50	10 - 15	15 - 20

PETROCHEMICAL, CHEMICAL AND PHARMACEUTICAL

The chemical industry includes a wide range of companies that can be divided into two large groups:

Basic chemical industry: They use basic raw materials and elaborate intermediate products that can also serve as raw material for other industries. For example, Petrochemical Industry, Products used by other industries.

Chemical industries of transformation: They are destined to the direct consumption of the people, use products elaborated by the chemical industries of base. Fine chemistry includes many specialized industries; medicines, fertilizers, pesticides, dyes, etc.

Water discharges constitute the main environmental impact caused by chemical and petrochemical plants. The pollutants of these waters are very diverse, including organic matter, hydrocarbons, oils and fats, etc.

BEWAT ADVANTAGES

The **BEWAT** products enhance treatment of inlet water to productive processes and wastewater treatment. They do not increase the conductivity. Sulfates or chlorides are not added to the treated water unlike other traditional inorganic coagulants. In addition, they improve the biological processes and their performance, increase the safety of the operators that manipulate the products and prolong the lifetime of their facilities. These advantages enhance the reuse of water.



	Product	Oil Refinery	Production of Biodiesel	Fine Chemicals	Manufacture of Pharmaceutical Products	Extraction of natural substrates
COAGULANTS	BEWAT CT 22	✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓
	BEWAT CT 120	✓✓	✓✓	✓✓	✓✓	✓✓
	BEWAT CT 6410	✓✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
	BEWAT CT 32	✓✓	✓✓	✓✓✓	✓✓	✓✓
	DOSE (mg/L)	200 - 300	2000 - 3000	2000 - 3000	1500 - 2000	400 - 500
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓✓
	BEWAT MT 150	✓✓✓	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓
	BEWAT MT 5480	✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
	BEWAT MT 6450	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓✓
	DOSE (mg/L)	250 - 350	2000 - 3000	2000 - 3000	1500 - 2000	500 - 600
	RESULT TURBIDITY (NTU)	5 - 10	10 - 30	20 - 40	30 - 50	30 - 50

TEXTILE AND TANNING

The great consumption of water in the textile industry takes place in two stages: the dyeing of the fibers and the finishing processes of the fabrics. Obtaining raw materials (cotton, linen, etc., or wool, silk and similar animal origin) is another step that requires greater water consumption. Therefore, the wastewater produced has to be cleaned of fats, oils, colors and other chemical products, which are used during the many stages of production.

In general, the polluting substances in wastewater in the tanning industry are salts, manure and dirt from dirty skins. We also find dissolved organic matter from fats, hair, keratin, leftovers of meat, skin and dissolved proteins of animals, as well as remains of products such as tanning agents, synthetics, grease, dyes used in tanning. Finally, we find mineral salts used in conservation and tanning.

BEWAT ADVANTAGES

BEWAT products remove solids in suspension and help to eliminate color in water. In addition, they enhance biological processes and do not increase conductivity like inorganic coagulants. In this way the water quality is improved, allowing complying discharge parameters and adapting them for reuse.



	Product	Manufacture of textiles and derivatives	Tanning Production
COAGULANTS	BEWAT CT 22	✓✓	✓✓✓
	BEWAT CT 120	✓✓✓	✓✓
	BEWAT CT 6410	✓✓✓	✓✓✓
	BEWAT CT 32	✓✓	✓✓
	DOSE (mg/L)	300 - 500	500 - 800
MULTIFUNCTIONALS	BEWAT MT 20	✓✓	✓✓✓✓
	BEWAT MT 150	✓✓✓✓	✓✓✓
	BEWAT MT 5480	✓✓✓	✓✓✓
	BEWAT MT 6450	✓✓✓✓	✓✓✓✓
	DOSE (mg/L)	300 - 500	500 - 800
	RESULT TURBIDITY (NTU)	20 - 30	10 - 20

CONSTRUCTION

The consumption of water in the sectors derived from construction such as the ceramic sector (manufacture of tiles, toilets and tableware) is an environmental aspect to consider, since water is an indispensable element in its processes. Water is used as raw material, as a heat exchange vehicle in the fritting or cooling operations of engines such as in the grinding, cutting and polishing processes of ceramic tiles or in the cleaning processes of glaze mills or production lines.

BEWAT ADVANTAGES

The **BEWAT** products allow not providing salts in the waters coming from processes of grinding, polishing or cutting of ceramic tiles, natural stone or glass. In this way, the conductivity values remain stable and the cycles of water reuse can be greater, avoiding purges of the circuits. In addition, by not providing salts we improve the reuse of sludge as raw material for atomizers, decreasing the use of dispersants. In other processes such as the treatment of waste water from glaze or paint manufacturers, we eliminate the use of sodium hydroxide and lime, and we enhance the reuse of water in cooling systems such as cooling towers at very low costs.



	Product	Paint Manufacturing	Ceramic Tile Manufacturing	Sanitaryware	Production of glazes and frits	Polishing and grinding processes of ceramic or natural stone
COAGULANTS	BEWAT CT 22	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓
	BEWAT CT 120	✓✓	✓✓	✓✓	✓✓	✓✓✓
	BEWAT CT 6410	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓
	BEWAT CT 32	✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓
	DOSE (mg/L)	40 - 100	100 - 300	50 - 100	100 - 300	20 - 50
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓
	BEWAT MT 150	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓
	BEWAT MT 5480	✓✓✓	✓✓✓	✓✓✓✓	✓✓✓	✓✓✓✓
	BEWAT MT 6450	✓✓✓✓	✓✓✓✓✓	✓✓✓	✓✓✓✓	✓✓✓
	DOSE (mg/L)	60 - 140	200 - 350	50 - 100	200 - 400	30 - 80
	RESULT TURBIDITY (NTU)	5 - 10	10 - 20	5 - 10	10 - 20	5 - 10

WASTE MANAGERS AND RECYCLING

The waste and recycling managers generate wastewater in the cleaning of the waste received with a great variability of pollutant load. The products used in their cleaning processes are usually aggressive products that add pollution and increase the conductivity of the water. Thus, the main pollutants that we find are organic matter, suspended solids and conductivity.

Due to the great variability of the pollutant load it is important to have a wide range of products that can give good results with different waters to be treated.

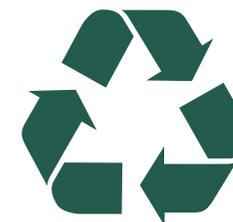
BEWAT ADVANTAGES

The main advantages of **BEWAT** products for this sector is the non-increase in conductivity, especially in processes for recovery and recycling of PET, and other types of plastic materials where cleaning water carries an important part of dissolved salts and detergents.

The use of chemical products of natural base, allows removing the large consumption of sodium hydroxide and acids that these sectors have, reducing costs and ensuring a quality of water suitable for dumping and reuse. For this reason, the use of **BEWAT** products avoids investments for the storage of corrosive products such as aluminum polychloride (PAC) or aluminum sulphate, to comply with current regulations.



	Product	PET recycling processes	Treatment of waste from ship's bilges
COAGULANTS	BEWAT CT 22	✓✓✓	✓✓
	BEWAT CT 120	✓✓	✓✓✓
	BEWAT CT 6410	✓✓✓	✓✓✓
	BEWAT CT 32	✓✓	✓
	DOSE (mg/L)	3000 - 5000	600 - 800
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓✓	✓✓✓
	BEWAT MT 150	✓✓✓	✓✓✓✓
	BEWAT MT 5480	✓✓✓	✓✓
	BEWAT MT 6450	✓✓✓✓✓	✓✓✓✓
	DOSE (mg/L)	3000 - 5000	700 - 900
	RESULT TURBIDITY (NTU)	20 - 30	10 - 20



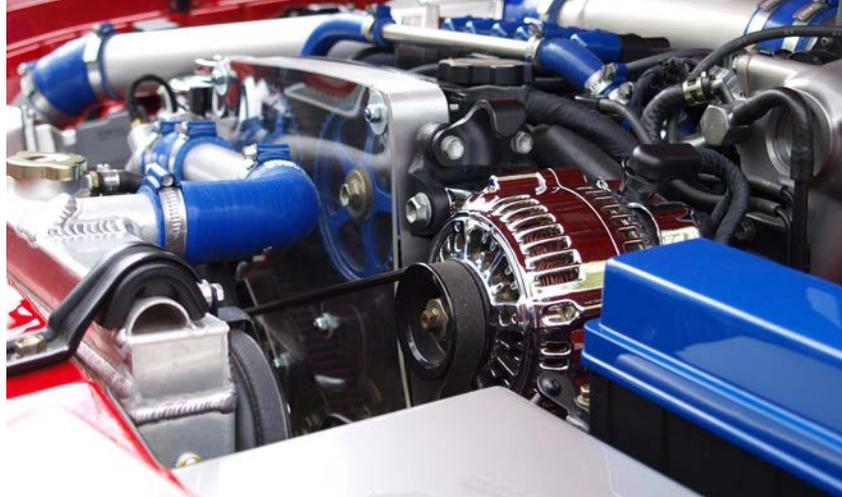
AUTOMOTIVE INDUSTRY

Water pollution is the most important environmental aspect of metal treatment and coating of metal surfaces. The contamination of the water is mainly due to the plating baths or contaminated process baths and to the rinsing functions of the pieces between consecutive process baths, since there is a drag of the reagents of the bath when they are deposited on the piece.

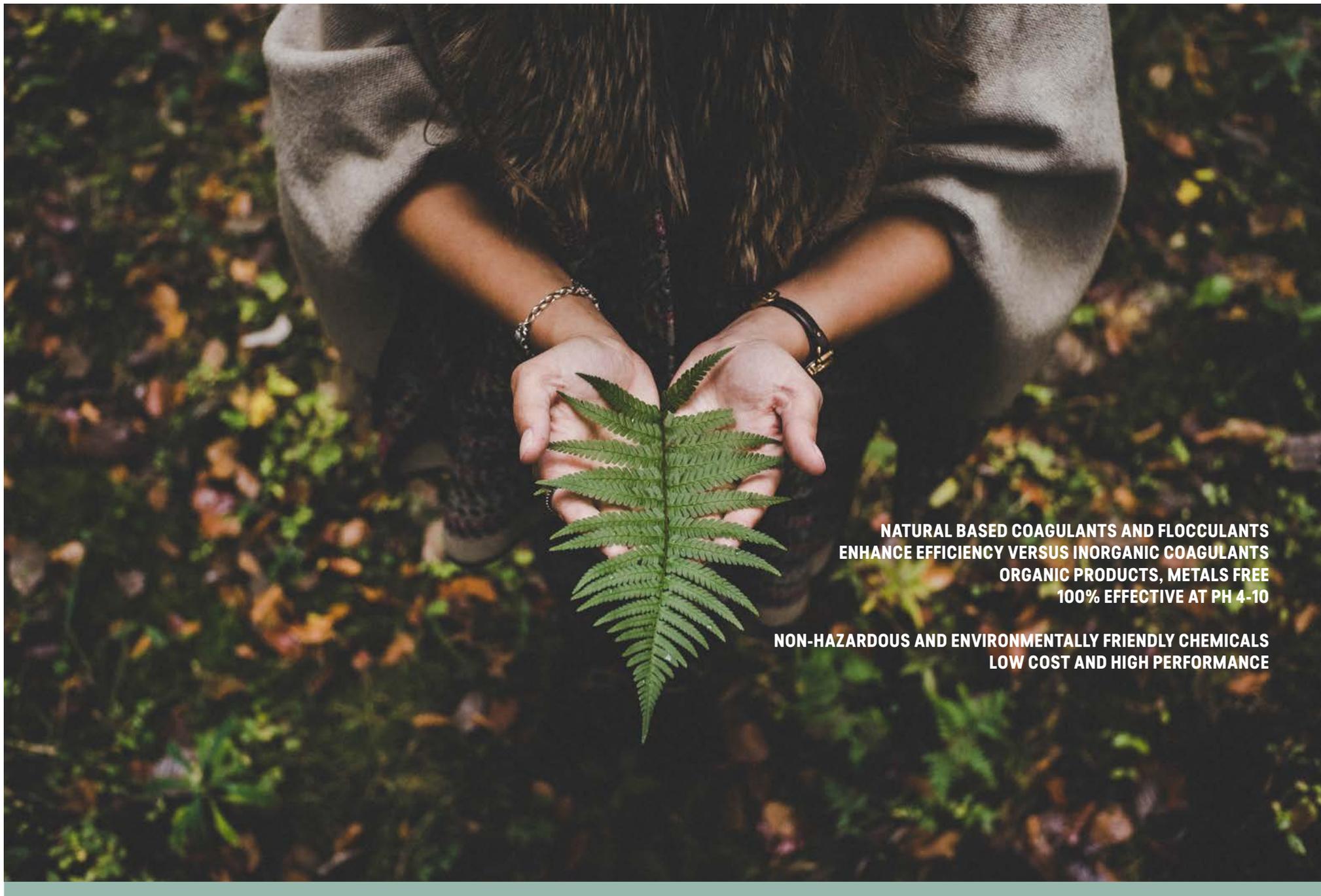
The most important pollutants to consider are dissolved metals and some chemicals. These products can be toxic to aquatic life even at very low concentration levels. The potential pollutant of the spills is due to the toxicity of the compounds that can be discharged.

BEWAT ADVANTAGES

The **BEWAT** products allow working in an efficient and safe way, avoiding the use of neutralizers and in many cases of flocculants, through the use of multifunctional products such as the **BEWAT MT**. In addition to its advantages in terms of performance and improvement of water quality, **BEWAT** products allow operating in the plant safely, both to avoid spills of corrosive products and to protect operators by avoiding the handling of dangerous products, such as ferric sulfate and ferric chloride among others.



	Product	Automobile manufacturing	Manufacture of automotive components
COAGULANTS	BEWAT CT 22	✓✓✓	✓✓✓
	BEWAT CT 120	✓✓	✓✓✓
	BEWAT CT 6410	✓✓✓	✓✓✓
	BEWAT CT 32	✓✓	✓✓
	DOSE (mg/L)	50 - 100	2000 - 3000
MULTIFUNCTIONALS	BEWAT MT 20	✓✓✓✓	✓✓✓
	BEWAT MT 150	✓✓✓	✓✓✓✓
	BEWAT MT 5480	✓✓✓	✓✓
	BEWAT MT 6450	✓✓✓✓✓	✓✓✓✓
	DOSE (mg/L)	50 - 100	2500 - 3500
	RESULT TURBIDITY (NTU)	20 - 30	10 - 20



**NATURAL BASED COAGULANTS AND FLOCCULANTS
ENHANCE EFFICIENCY VERSUS INORGANIC COAGULANTS
ORGANIC PRODUCTS, METALS FREE
100% EFFECTIVE AT PH 4-10**

**NON-HAZARDOUS AND ENVIRONMENTALLY FRIENDLY CHEMICALS
LOW COST AND HIGH PERFORMANCE**



BEWAT[®]

BY





BEWAT[®]



 **Servyeco**

Crta. Castellón - Alcora, km. 19,5
12110 Alcora (Castellón), Spain
Phone: (+34) 964 25 74 95
Fax: (+34) 964 25 34 18
E-mail: export@servyeco.com
www.bewat.eu