



## Just 25 differences between Dutrion® and Chlorine

<b>dutrion®</b>	<b>Chlorine</b>
Very high Disinfection activity against Bacteria, Virus, Protozoa, Algae and Fungi.	Low Disinfection against Virus, Protozoa, etc.
Chlorine Dioxide exhibits long term residual disinfection effectiveness.	Chlorine exhibits much shorter effectiveness in water systems.
Its action is rapid and takes 1-10 minutes to act on microbes.	Chlorine takes ½ - 1 hour to act on microbes.
The residual effect CLO <sub>2</sub> remains high from starting point of dosing to the end point in supply (this depends always on field trials and water quality too).	Chlorine very often shows only 20% residual at the tail end of distribution system, which means high dosing at the front end.
Dutrion penetrates the biofilm, strips it out of the lines and prevents re-growth.	Chlorine in drinking water concentrations can not penetrate the biofilm and hence it can not strip biofilm (especially not at tail end).
No corrosion effect on pipeline materials in contact and dosing pumps and other instruments in line.	Chlorine is highly corrosive in nature, especially in combination with lower pH values.
No reaction with ammonia.	Chlorine forms toxic THM with the reaction of ammonia.
No resistance building of microbes imparted against dutrion®.	Microbes have developed high resistance against chlorine and chlorine products.
Water taste won't be affected after treatment at disinfection concentrations, hence "fresh water".	Chlorine changes the taste of water badly.
No smell at disinfection levels.	Chlorine changes the odor of water negatively.
Persistence of disinfectant is very high, decomposed through hydrolysis, much much slower than chlorine.	Low persistence of disinfectant, rapidly decomposed in the distribution system and low residual levels at the tail end.
Dutrion® dosing is very flexible and depends on optimization process. Dosing 0.05 – 0.5 ppm is common.	Typically 1-2 ppm for drinking water disinfection, but never less than 0.5 mg/ltr. Taste and smell issues above 2 ppm start to develop.
Broad spectrum germicidal activity.	Among disinfectants chlorine present low efficacy and has narrow spectrum antimicrobial activity.

**Powerful Water Treatment**

<b>dutrion®</b>	<b>Chlorine</b>
Dutrion® does not release free chlorine	It reacts with water and generates free chlorine (HOCL) that finally acts on microbes.
Among disinfectants chlorine dioxide presents best efficacy at wide range of pH values (4-10).	Chlorine reactions are greatly affected with the change of pH.
Chlorine dioxide shows good efficacy at low temperatures.	Chlorine shows low efficacy at cold temperatures.
Chlorine dioxide shows good efficacy at high temperatures (> 45° C. ).	Chlorine shows low efficacy at high temperatures (> 30° C. disturbs chlorine).
Dutrion® is not explosive in any way.	Chlorine (gas) is very explosive and dangerous.
Operational safety is high with minimum precaution.	Operational safety is low.
High efficiency to oxidize iron and manganese compounds.	Very low efficiency to oxidize iron and manganese compounds.
Very efficiency oxidizes hydrogen sulphide, phenol, mercaptans, cyanide, pesticides, etc.	Chlorine is not efficient to oxidize these substances.
Ct value for 99% inactivation of Giardia at 25° C. for chlorine dioxide is 7.3 mg.min/L at pH 6-9.	Chlorine is not very effective against Giardia.
Ct value for 99% inactivation of Cryptosporidium at 22° C. for chlorine dioxide is 40 mg.min/L at pH 6-9.	Chlorine does not kill cryptosporidium.
Dutrion® improves, food safety, animal health, water intake and improves technical results on farms.	Chlorine does not improve food safety, animal health and high dosage decreased water consumption of productive animals.
Eco friendly, no undesirable residues; > chlorine dioxide has the future.	Chlorine destroys the environment and was important the last 100 years.

