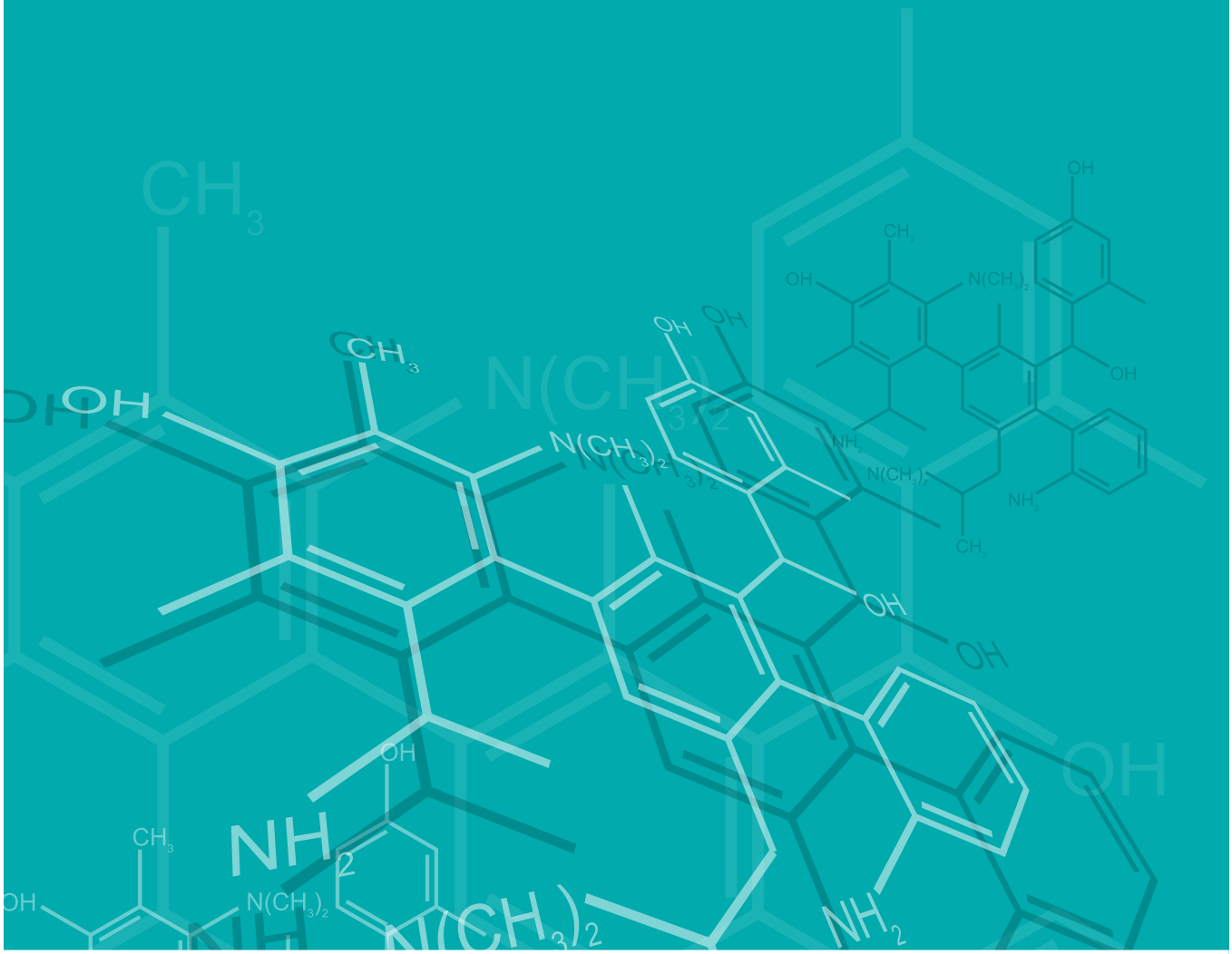
a passion for maritime life

TRITON

The
TRITON method



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The TRITON method

Ehsan Dashti

This guideline provides detailed information on the **TRITON method**.

A core component of TRITON's company philosophy is the very highest degree of transparency and functionality of the product portfolio. TRITON only sells products that are used in its own showrooms in Düsseldorf and which the whole company supports.

Would you like to explore this subject matter in more detail or sell and recommend TRITON products yourself?

All the answers to questions on its definition and objectives, as well as the principle of the TRITON method, can be found below.

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Definition of the TRITON method

The TRITON method is a "method to develop and permanently maintain a complete reef ecosystem in an aquarium".

Consistently maintain a successful ecosystem with TRITON.
On the one hand, the TRITON approach takes into account that developing a successful ecosystem in an aquarium takes a certain amount of time and special measures when setting up the aquarium for the first time. This start-up phase is indispensable, since you cannot integrate all the necessary creatures into the complex operation of an ecosystem right from the start.

On the other hand, the TRITON method enables a reef ecosystem that has been successfully set up to be permanently maintained in an aquarium. The most important factor in this is constancy, just as it occurs in the marine environment that is being replicated. This applies both in terms of the parameters and creatures present in the system (minimal fluctuation), as well as to biological or chemical toxins that may arise and to additional concentrations of chemicals.

The innovation: A holistic maintenance approach.
The mode of operation of the TRITON method extends far beyond simply adding calcium and hydrogen carbonate for corals, which has previously also been possible by using a calcium reactor or the balling method. The innovative aspect of the TRITON concept is the claim to a holistic maintenance approach that guarantees performance components that include the following:

Filtering of pollutants (nitrates, phosphates, etc.) Constancy of all other chemical and biochemical parameters Supply for the most varied creatures in the reef ecosystem (bacteria, macroalgae, phytoplankton, zooplankton, crayfish and crustaceans, molluscs, etc.)

Research in the field of aquaristics has not yet revealed all the relationships between the living creatures such as corals, fish and other microorganisms present in the complex functioning of an ecosystem.
A simple, natural and successful replication of the marine environment, however, can only be achieved by considering all these creatures and their correlations. That's why TRITON takes into account as many interactions and parameters in its system as possible.

Every aquarium is different.
No aquarium is the same, from its size and the composition of the creatures kept in it, to many other additional parameters. In addition to the very apparent differences, such as stocking, the size of the aquarium or care-taking behaviour, numerous questions immediately arise when trying to understand the mode of operation and qualities of a tank:

Is reverse osmosis equipment or are mixed bed resins being used for ultrapure water?
Are there more stony corals or only soft corals present?
Are small polyp (SPS) or large polyp (LPS) stony corals being maintained?
Is the stock of fish large or small?

Which salt is being used?
What additional trace elements or amino acids are being added, which might result in further reactions to each other?
Is zeolite used or are algae relied upon?
What does the lighting in the aquarium look like?

For the aquarium owner who wishes to set up and maintain a new and successful ecosystem, comparison with other systems for orientation purposes is almost impossible due to the many different parameters and characteristics. Some systems are based on filtering and some on supplementing trace elements, while others are based on supplying calcium. Very different framework conditions apply from one case to the next, which can lead to the most varied problems.

Individualization instead of generalization.
When looking at the manufacturers' product series available on the market, it quickly becomes apparent that: The variety of aquaria and thus also the variety of ecosystem configurations is not taken into consideration by any of the suppliers. The dosages noted on supplements for water treatment that are found on the market are based only on the size of the aquarium and are thus the same for every aquarium – regardless of all other aspects that should be taken into account. The same applies to filtering, the addition of trace elements and calcium supply.

It is not surprising then that this generalized approach results in problems in reef aquaristics: Over-dosing and under-dosing and accumulation of chemical substances is bound to happen; changing the water is supposed to compensate for this. Yet the most important component for an ecosystem – its constancy – is not considered in this approach.

The TRITON method is based on an individual approach that takes into account the idiosyncrasies and parameters of individual aquaria. The simple operation and the precise operating principle is described in more detail in the sections on "Mode of operation".

Objective of the TRITON method

The Dashti family wants everyone interested in aquaria to be able to realize their dream of having a beautiful, naturalistic reef aquarium. This is what is behind the conceptual design and ongoing development of the TRITON method, which lets you care for your aquarium without any prior knowledge of chemical or biological processes. At the same time, the aim is to make "saltwater aquaristics" an easier, more appealing and more popular hobby for both experienced and new aquarium owners.

Making "saltwater aquaristics" an even more pleasurable hobby.
Who doesn't dream of having a small piece of the sea for themselves at home? Or to enhance an office, shop or public space with a miniature living reef in all its magnificent colours? And yet many are kept from fulfilling this dream because they are concerned about the effort, complexity, costs and, not least, the functionality problems outlined above regarding the product lines available to date.

Ehsan Dashti, the owner of TRITON, is an experienced saltwater aquarist who has succeeded in either partly or entirely eliminating many of these disadvantages by developing the TRITON method, an individual, innovative concept tried and tested over many years. A number of new paths have been taken along the way, ones that had not been established in this form to date.

The following objectives were a constant priority during the many years of research, analysis, laboratory work and continuous development of the TRITON method:
- Make it possible to keep and care for aquatic creatures in a naturalistic and sound environment without prior chemical or biological knowledge.
- Increase energy efficiency in aquarium operation.
- Reduce the amount of work so that owners have more time to enjoy the aquarium and the creatures in it.
- Reduce maintenance costs and improve the ability to estimate the costs of the hobby on the whole in advance.
- Create a space-saving solution that fits in any aquarium cabinet.

Trust the safety and effectiveness of the TRITON method.
Now everyone can take advantage of the TRITON method, which greatly simplifies the amount of work needed to take care of an aquarium while assuring the greatest safety in functionality. All TRITON show tanks are operated exclusively using the TRITON method and all products available for sale are perfected to such an extent that it is possible to keep and care for aquatic creatures in a way that, until now, seemed almost impossible.

With the TRITON method, corals exhibit remarkably strong growth, an excellent polyp structure and vibrant colour – with the least amount of maintenance. Doctor fish such as A. leucosternon and a variety of anthia species are kept in the TRITON show tank in Düsseldorf without the use of UV or ozone and without extreme feeding.

The TRITON method continues to be developed with a view to enhancing and simplifying the hobby of "saltwater aquaristics".

Principle of the TRITON method

Introduction

The TRITON method is based on an approach that incorporates cycles and chains typical to the sea or aquaria and correlates them with aquarium tools. The concept of this method aims at ensuring that these cycles, relationships and chains – including the practical use of all tools – are kept as error-free as possible.

The TRITON method is divided into four main sections in the guideline below:

- Chemical principle (main supply)
- Catalytic/biological principle (main filtering/supply)
- Adaptation, chain and buffer principle (safety/supply)
- Practical principle (safety/maintenance)

Aquarium tools

The TRITON method covers the most varied activities and equipment used in aquaristics under the generic term “aquarium tools”.

This includes, for instance, the well-known changes of water, the calcium reactor, macroalgae, phytoplankton, ozone and live rock. Each and every one of the tools presented in this guideline was created for a specific purpose and has an individual scope of application in modern aquaristics. Both the advantages and disadvantages of these tools are analysed in terms of the TRITON objectives explained above.

Innovations developed by TRITON, such as the TRITON HPLC laboratory, which started operating at the beginning of 2008, or the “BASE ELEMENTZ” and “TRACE BASE” product series, are also defined as “aquarium tools”.

Advantages of the holistic approach

The TRITON method uses various coordinated tools based on the premise of enhancing efficiency to the greatest possible degree and combines them into a novel concept that is effective without additional supplements.

The TRITON method carries no risk of the negative reactions associated with using other, previous methods or product series, such as the use of substances or trace elements that do not belong together and the resulting overdoses and poisoning. Ion shifts or pollutants are almost completely ruled out when using “BASE ELEMENTZ” and “TRACE BASE” products.

Macroalgae are used in the TRITON method not only as filters, but also as a catalyst for various substances. Filtering performance is also enhanced by adding TRITON “BASE ELEMENTZ” products.

Customers who use the TRITON method use considerably less laboratory services, since it is almost impossible to misuse the products. However, in the event that problems in an aquarium do arise, the TRITON team can quickly provide assistance to address the specific problem thanks to the availability of precise information on product composition and individual dosages. This, combined with the type of symptoms, enables the TRITON team to immediately analyse the cause.

The TRITON laboratory

TRITON was the first company to use an ionic chromatograph (IC) to measure aquarium parameters. The HPLC laboratory housed in the Düsseldorf business premises since 2008 continues to be world's only set-up of this type in the specialized aquarium trade.

Measurements conducted since then for the most varied international partners and customers as well as the associated knowledge gained about reef systems and their requirements have been integrated into the development process of the TRITON method, which is thus based on the most recent, practice-supported research data.

Customers also benefit in many ways from the availability of the HPLC lab: In addition to the precise analysis of aquarium water, the experienced TRITON team is ready to assist users with expert advice regarding the evaluation of results and corresponding recommendations for action for the naturalistic cultivation of animals.

Structure of "BASE ELEMENTZ"

The TRITON "BASE ELEMENTZ" product line is composed of a total of 102 different ingredients. The diagram below (Fig. 1) provides an overview of the key components, objectives and care/supply benefits.

Structure of BASE ELEMENTZ

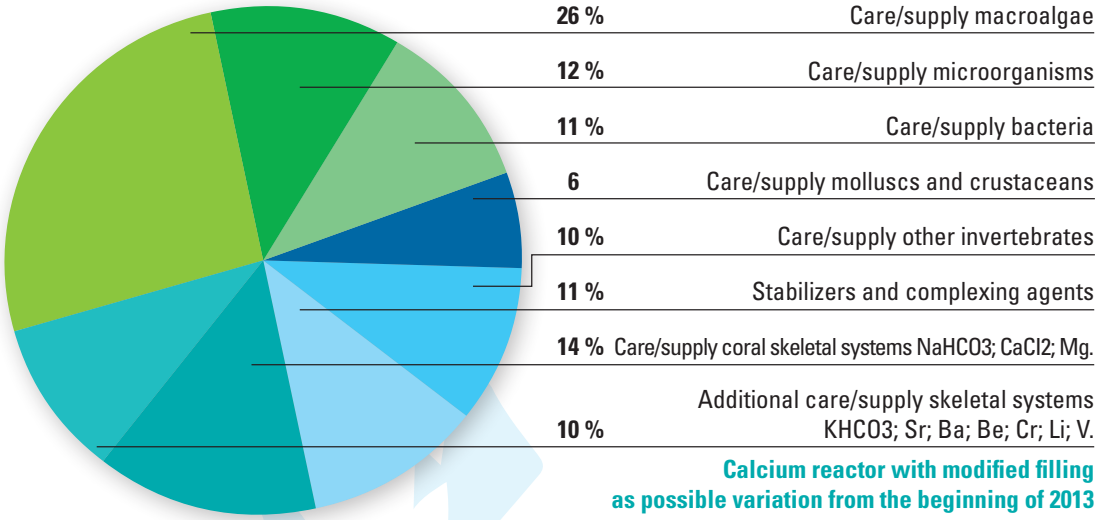

Fig. 1

There are numerous positive effects for animals and plants thanks to the intentional overlapping effects. These extend beyond this classification of care objectives. For instance, some substances or groups of substances classified under algae care in the figure above also have a positive effect on the growth of coral. Calcium supplements on the other hand, listed above under corals, are just as vital for molluscs. In reviewing the composition of the "BASE ELEMENTZ" product line one should also take into account that many substances for the care of corals and other aquatic creatures must first be catalysed by the algae and are only made available through this process.

The above diagram (Fig. 1) also clearly shows that the calcium supply represents only approximately a quarter of all supplements within the "BASE ELEMENTZ", but in fact represents a much larger proportion in terms of mass. A special product in the "BASE ELEMENTZ" line should be available by the middle of 2013 for use in combination with the utilization of a specific calcium reactor. It is currently under development.

Chemical principle | main supply

The aim of the chemical principle of the TRITON method is to guarantee a constant and natural quality of the aquarium water allowing the greatest possible control for the user and the least possible potential for error.

The most frequent chemical errors in closed aquarium systems include overdosing, ionic shifts, accumulation of toxic substances, and erroneous measurements – all of these are almost completely ruled out by the TRITON method.

How do "BASE ELEMENTZ" work?
Adding "BASE ELEMENTZ" supplements the water with the desired substances (refer to page 8, Fig. 1). This means that substances are consciously introduced into the tank by using "BASE ELEMENTZ". The removal of aquarium water based on an established quotient in turn keeps these values stable.

The functional factors of the operating principle include:

1. The quantity of substances in "BASE ELEMENTZ" (controlled)
2. The quantity of substances in the aquarium
3. The quantity of water removed from the aquarium (controlled)

Example:
10 mg/l of substance X is contained in TRITON "BASE ELEMENTZ" and 1 mg/l in the aquarium water. The TRITON method effectively increases substance X in the aquarium water to 10 mg/l. The quotient of the quantity removed from the tank water is directly linked to "BASE ELEMENTZ". This means: The controlled removal of water ensures that the content of substance X in the aquarium water cannot rise above this dosage (refer to Fig. 2.1).

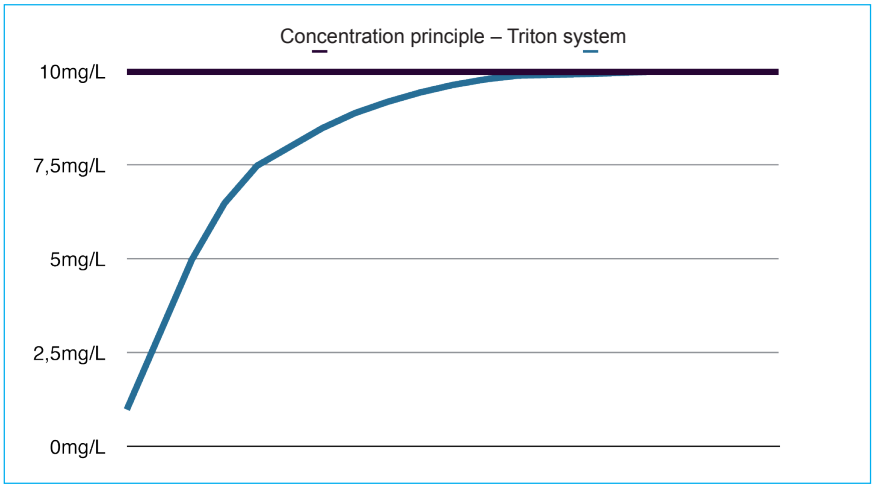

Fig. 2.1

The TRITON method also applies in the opposite case:

For instance, 10 mg/l of substance X is contained in “BASE ELEMENTZ” and 19 mg/l in the aquarium water. The effective result of the TRITON method is to reduce substance X in the aquarium water to 10 mg/l (refer to Fig. 2.2).

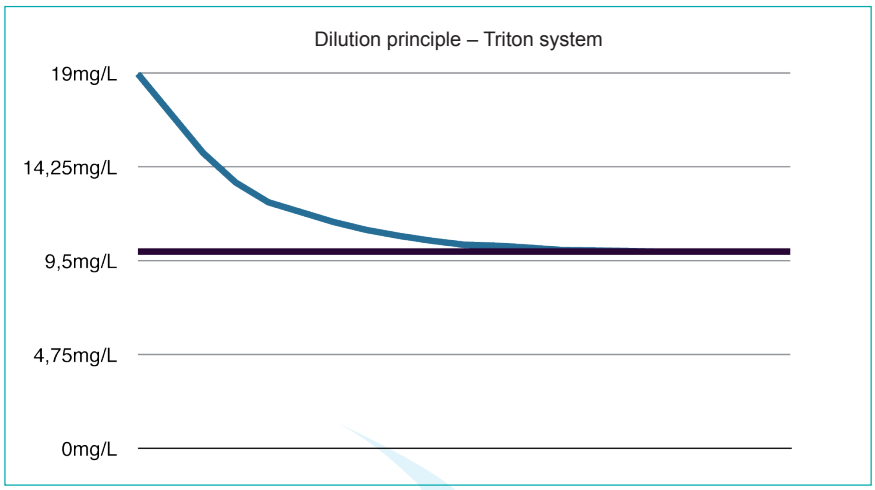

Fig. 2.2

Figures **2.1** and **2.2** show examples of the concentration curves and dilution curves in the TRITON system.

Advantages of the TRITON method

As explained, the TRITON method’s mode of operation makes it possible to control two of the three factors of the complete operating principle. This means every user – even those with no previous experience – can create and maintain the chemical properties and stability of the aquarium water according to the example of the marine living environment with far greater assurance than in the case of all other concepts and product lines available on the market to date.

And by using “BASE ELEMENTZ” it is no longer necessary to add individual substances to the aquarium, which cannot be measured on their own. This is the case with fluoride, for example, which produces drastic consequences if dosages are excessive.

The TRITON method almost entirely eliminates potential measurement errors: Our in-house TRITON HPLC laboratory not only offers support in determining current water values for customers, but can also pinpoint any errors that may have been made with regard to dosages and measurements. For the customer this means:
If he measures his aquarium water with a droplet test shortly before it is removed for the TRITON test, these values can be compared with the lab results immediately upon receipt.

Degree of purity of the replenishment water

When using the TRITON method, it should be noted that the replenishment water should have a very high degree of purity. The mode of operation of this concept is based on the premise of using as little foreign matter, i.e. matter foreign to the sea, as possible in the naturalistic "reef" ecosystem in order to simultaneously rule out inadvertent pollutants.

Tap water, reverse osmosis water or distilled water are not appropriate for aquarium operation. Aquarium owners should prepare ultrapure water in a controlled manner themselves, ideally by using suitable mixed bed resins offered by TRITON or recommended partner companies, coupled with the use of reverse osmosis equipment.

Adaptation to biomass and biodiversity: "Every aquarium is different."

As already mentioned in the introduction, every aquarium is different. This depends on various parameters, including the composition of species and the quantity of fish stocked.
Manufacturers base the composition of the mixtures they sell on rough estimates of the "average aquarium". When dosages are given in quantities of chemical substances derived strictly from the size of the aquarium (e.g. 10 ml of substance mixed into 100 l of tank volume), this almost always results in undesirable, negative developments in the aquarium.

TRITON is different. With its novel methodology of saltwater aquaristics, TRITON creates a precise relationship between the actual, individual consumption of the reef being maintained and the substances required. As presented above, overdoses are impossible when using the "BASE ELEMENTZ" product line, and the greatest possible degree of safety is guaranteed by the HPLC laboratory available on site.

In addition, the TRITON "TRACE BASE" product series offers a reliable supplement for use in aquaria that, for any number of reasons, have higher consumption rates for substances such as potassium, fluoride or magnesium. These substances are added in precisely the consumed quantities with "TRACE BASE".

In order to accurately determine the substance quantities required, TRITON offers the free TRACE BASE calculator on the company website:
http://www.triton.de/english/triton-method/calculators-for-triton-method/methodenrechner.html

However, the TRITON team's experience shows that, as a rule, aquaria up to 600 l can operate without the use of TRACE BASE products, since a certain proportion is also included in the BASE ELEMENTZ. In general, most aquaria are maintained very well with BASE ELEMENTZ and the addition of TRACE BASE is not needed. Additional dosing by users is usually aimed at generating more intense colours and greater coral growth and/or at being able to keep and care for very unique creatures and plants in the aquarium.

Unlike other manufacturers, TRITON products do not include dosage instructions thanks to this special and innovative method. If you wish to convert to the TRITON concept, contact the TRITON team or specialist partners to determine a benchmark value to start with.

Disadvantages of the "water changing" tool for the chemical principle

You do not need to change the water regularly to ensure that the TRITON method functions properly. On

the contrary: Changing aquarium water represents a non-controllable factor that threatens the stability of the system.
The concentration of substances within the chemical salt used to change the water cannot be precisely determined. As a result, many aquarium specialists advise changing the salt frequently. In turn, this results in a further loss of control as the necessary constancy of the ecosystem cannot be maintained.

As a general rule, TRITON recommends changing water only in exceptional cases, e.g. if the dosage pump is fails with the associated consequences, or in the event of sudden death of fish caused by disease.

The TRITON team and its partners are happy to offer advice on whether changing water is the right way to eliminate the problem and can provide "Active Water" (natural saltwater tested in the lab) for a quick exchange.

Safety with regard to the chemical principle
In TRITON's opinion, conventional aquaristics uses chemical methods that work very well in theory, but are ultimately not suitable in practice due to the high potential for user and manufacturer errors. These include approaches for increasing calcium, magnesium and hydrogen carbonate.

Moreover, if one examines the factor of the degree of purity of the salts used, this alone represents a significant source of error, since testing their purity is almost impossible for both suppliers and customers. For instance, salts may be polluted with bromine, fluoride or potassium – a problem that often continues over a lengthy period of time and later is ignored as a cause of error in the event of a systems collapse in the aquarium, which frequently occurs after a period of one to two years.

The flaw is usually not identified, which means the person taking care of the aquarium repeats the same error with the next aquarium: After all, his tank worked well for a long time when he was using salt. An additional aspect is that bromine, fluoride and potassium cannot be traced or can only be traced to a limited extent using common droplet tests.

What's more, chemical solutions are available on the market that cannot even function in theory. In order to simplify supplying calcium in aquaria, it is often recommended that sodium hydrogen carbonate be added to the water if it is not hard enough or calcium chloride if the water contains too little calcium. However, this inevitably leads to an ionic shift in the aquarium.
Thanks to our experienced chemical and pharmaceutical experts and the strict quality and end control in our in-house HPLC laboratory, the TRITON team assures customers and users the highest degree of quality and safety in the products offered and in using the TRITON method.

Chemical standard filtering | carbon and phosphate adsorber
To support biological filtering by chemical means and thus guarantee an additional safety factor, TRITON filters its own systems using activated carbon and phosphate adsorbers.
Please contact the TRITON team or a specialized TRITON partner. They are happy to help you choose a suitable adsorber and appropriate activated carbon for optimum combination with the TRITON method.

Catalytic/biological principle | main filtering/supply

The range of biological and biochemical products for dosing a saltwater aquarium has grown enormously in recent years. Bacteria, amino acids and a variety of sugars are available on the market. TRITON takes a critical view of their use, due to the lack of measuring capabilities, dubious usability and the instability of the concentration, not to mention the inability to properly control growth or the displacement of other aquatic creatures (bacteria).

Viewed from the perspective of the biological mode of operation of an aquarium, numerous possible sources of error exist, similar to those in the chemical realm. The following sections of this guideline show how TRITON confronts this problem area with respect to strong filter performance.

Adaptation to biomass and biodiversity: "Every aquarium is different."
The premise elucidated under "Chemical principle" also applies from a biological perspective: "Every aquarium is different."

TRITON's biological focus is mainly on algae, which can be considered the natural main filter system in a saltwater aquarium.

Every type of algae growing in an aquarium is used as a filter in the TRITON method. The growth level and dominance in the algae refugium alternate constantly depending on the type and quantity of nutrients and toxins that arise, the composition of the species stocked, and the feeding habits in the aquarium.
The supply of TRITON "BASE ELEMENTZ" ensures permanent, healthy algae growth as well as individual adaptation of the macroalgae refugium and thus the necessary consistency of filter performance in the aquarium, despite changes in the environmental conditions of the ecosystem.

Algae as the key to the system
The ingredients in "BASE ELEMENTZ" are intended in large part for the supply and care of macroalgae and phytoplankton. The TRITON method uses algae as a natural filter for nitrates and phosphates.

In principle, the approach of filtering by means of algae is very well known in aquaristics, although to date it has been a difficult challenge to assure strong filter performance on an ongoing basis such as that achieved by the zeolite system (based on bacteria). This was due not least to the fact that growing macroalgae requires substances such as special metals, which are completely depleted in an aquarium over a certain period of operation. The result: algae growth stagnates; filter performance drops.

Under the TRITON method, "BASE ELEMENTZ" supply all types of macroalgae continuously with the required consumables. TRITON is the first method to enable stronger filter performance linked to the nutrient content in the aquarium. This system is completely natural, affordable and delivers the same and in part even better level of performance than other filter systems.

How does the filter performance work when linked to algae?
If many nutrients are present in the aquarium water, algae grow at a rapid pace as well. Growth is correspondingly slower when the nutrient content is low. So the filter system adapts to every aquarium without external influence – even if there are fluctuations in the same system.

How is the lighting handled?
The algae filter is illuminated opposite to the day/night cycle of the main tank and thus keeps the pH value stable and supplies the coral algae (zooxanthellae) with CO2 during the day. TRITON also recommends lighting with T5.

Algae as a catalyst
Algae are plants and use chemical substances that they convert into numerous organic substances in their metabolic processes. These include amino acids, vitamins and various types of sugar that other aquatic creatures and bacteria in aquarium systems can continue to use.

Attempts to dose the organic substances produced by algae by supplementing them externally are based on assumptions regarding consumption, composition and precise selection, which have to date not been scientifically proven. In addition, these substances are often extremely perishable. Information on how corals and other aquatic creatures take in the substances, e.g. directly from the water or via plankton, is also not available.

For this reason, TRITON completely excludes foreign dosage, using the existing algae in the system as a catalyst instead.

How does the natural production of organic substances take place?
By adding TRITON “BASE ELEMENTZ”, algae form greater amounts of amino acids, vitamins and various types of sugar. These are absorbed in metabolic processes, e.g. by the microorganisms living in the algae, which are also supplied with “BASE ELEMENTZ”. In turn, microorganisms such as plankton are a high-quality source of food for other forms of life, including several types of coral. Furthermore, organic substances are released when the algae die off, which gives creatures in aquaria that depend on them another option for absorption.

A metabolic chain, which assures a constant supply of amino acids, vitamins and sugar to the aquarium system, is generated in the tank by the natural process of producing and consuming substances. This principle is also found in nature. Very healthy coral reefs, for instance, are frequently located near areas where seaweed flourishes.

Another advantage of “algae catalysation”: Substances generated directly in an aquarium by algae are considerably more effective than supplements added artificially. As a comparison: The vitamin C contained in a fresh pepper is far better absorbed in the human body and more effectively processed than that in a vitamin pill.

Disadvantages of the “water changing” tool for the biological principle
Water quality kept as constant as possible is the basis for the smooth development of the biological cycles described above.

Almost all chain reactions and cycles in the aquarium interact closely with the individual creatures in the reef ecosystem. Since the latter react very differently to changes and need a certain amount of time – in

some cases up to a year – to adapt to the aquarium system, changes of water with chemical salt should be avoided when using the TRITON method.

Each change of water entails new fluctuations in the ecosystem due to the chemical, and at the same time aggressive salts that are constantly being added and hampers or prevents the process of settling in and adaptation of vulnerable creatures and bacteria. Moreover, due to the absence of biological competition, other very strong species have great advantages. Over time, this results in a biological imbalance. This is evident in varied form and strength in different aquarium systems – some aquaria respond well to changes in water and barely show visible changes, while the imbalance has a significant negative effects in other systems.

Disadvantages of UV or ozone sterilization

UV or ozone sterilization is disadvantageous when using the TRITON method because this process also significantly interferes with the biological ecosystem.
Many of the microorganisms necessary to maintain the biological cycle are killed off.

Live rock

TRITON recommends an appropriate quantity of live rock in the tank in order for the TRITON method and the associated system to function as optimally as possible.
The TRITON team is happy to provide advice on the precise use of live rock in your aquarium.

Safety with regard to the biological principle

The guarantee for, and safety of, the proper functioning of the biological principle is based on systemic chain reactions and cycles as well as buffer reactions, which are explained in more detail in the section below.

Adaptation, chain and buffer principle | safety/supply

The TRITON method (as outlined above) pursues a holistic approach, which means TRITON has been able to optimize the effectiveness of each individual component – whether chemical, biological or practical – in the development of this product line. The ingredients and their operating principles mutually support and strengthen one another.

Example 1 – Reduced coral metabolism
When operating a saltwater aquarium, CO2 and nutrients are required for the photosynthesis of algae and for the growth of healthy coral. This is generally assured in a functioning system by stocking fish and regular feedings.

If, as the result of a negative factor such as a delayed lamp replacement, the use of bad salts, a change of water or the occurrence of disease, the corals "bleach" and stop the metabolic process, they no longer absorb either CO2 or nutrients. Nevertheless, both continue to be added to the aquarium. The consequences: The nutrient content rises and the corals are placed under additional stress.

It is difficult to cope with the negative reactions once they are triggered in a system designed according to traditional methods.

What opportunities and advantages does the TRITON system offer in this case?

The algae would grow remarkably well due to the rising nutrient content in a tank in which the TRITON method is applied. At the same time, a slowdown in growth would be noticed due to the direct linkage of dosage and consumption in the system's mode of operation. Thanks to the increased nutrient absorption of the algae, the negative reaction would be significantly slowed or stopped in a TRITON tank, which creates valuable time. It would be possible to determine and eliminate the precise cause of the underlying problem with analyses and, if necessary, assistance from the TRITON HPLC lab. It would thus be possible to deal with the fluctuation in time.

Also in the opposite case, with a rapid drop in nutrient content in aquarium water, e.g. with very fast-growing corals and a relatively low number of fish: The algae ensure that the negative consequences are mitigated. They reduce tissue according to the supply situation, die off and release the bound nutrients, which in turn are absorbed by corals. The reduction in the nutrient content decelerates significantly, which allows time for analysing and eliminating the cause, for instance, by adding more fish.

Example 2 – pH buffering of algae
pH buffering of algae is another example of the clear advantage of the TRITON method's holistic approach.

Due to the fact that algae produce oxygen at night and CO2 by day, while the zooxanthellae of corals in contrast produce oxygen by day and CO2 at night, they supply one another with carbon dioxide, the prerequisite for photosynthesis. This interaction stabilizes the pH value in the "reef" ecosystem.

The TRITON system – primary and secondary cycles

Both larger and smaller cycles that have fixed interactions with one another exist in an aquarium operated with the TRITON system, much as in the examples just described. These include the adaptation to the biomass and biodiversity addressed above, as well as numerous predator/prey buffer cycles.

Most of the positive, naturally arising cycles occur only as the aquarium ages. The older a system gets with the TRITON method, the fewer fluctuations arise as generally fewer animals are added later than at the beginning. The ecosystem stabilizes as the creation of cycles increases.

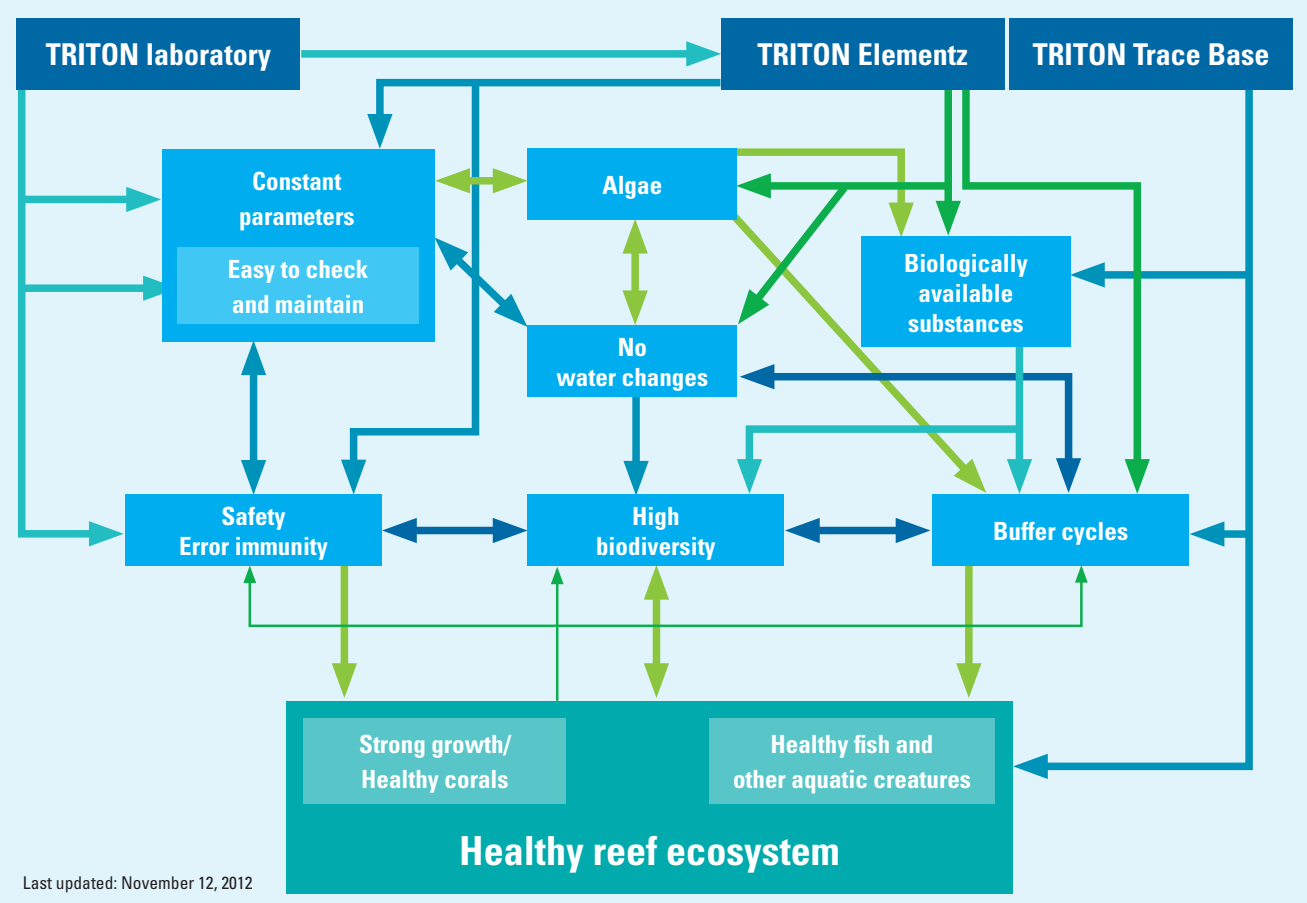

Fig. 3

The above diagram **(Fig. 3)** shows the interrelationships and importance of the different major factors in the TRITON system and their stability in the network of interactions.

It is clear that even if one or two factors are omitted or dysfunctional, maintenance of the fundamental TRITON system is assured. TRITON "BASE ELEMENTZ" are an exception. Hypothetically, removing this from the chain diagram would end the functionality of the approach accordingly.

Practical principle | safety/maintenance

As with any other system, how well the TRITON method functions depends on the correct operation by the person responsible for taking care of the aquarium, i.e. the “aquarist”.

Since the TRITON “BASE ELEMENTZ” product line already contains all substances required for a reef ecosystem and a direct correlation exists with consumption, management of the system is made as easy as possible for the users and the potential for error minimized. Only errors in measurement that might result in an incorrect interpretation of consumption could impair the flawless functioning of the system.

The concept for permanent operation of saltwater aquaria developed by TRITON is one of the simplest and most successful systems on the market: The amount of work it takes to manage the system on a day-to-day basis is compellingly low, and this can be done without additional experience or prior knowledge. The TRITON method also saves time and money.

The TRITON system offers clear advantages for hobby aquarists, businesses with aquaria and public zoos.

Regular monitoring of the system
The TRITON method keeps the daily effort required for care and monitoring to a minimum:

Check that the skimmer is operating properly Compare the daily dose of “BASE ELEMENTZ” with the calculation according to the method calculator on the TRITON website (= easy to check, since it is visible directly in the canisters or dosed by hand) Check of the algae mass in the refugium.

Check the carbonate hardness every two to three days; raise or lower as needed according to the dosage.

Maintenance of the system
Maintain a tank operated using the TRITON method as follows:

- Clean the skimmer at regular intervals
- Remove algae (possibly sell/give away)
- Check the salt content

  Replace the activated carbon and the phosphate adsorber every 1 - 2 months
  Perform a water test in the laboratory every 2 months or as needed: Replenish “BASE ELEMENTZ”, add aquatic creatures as needed.

Conclusion

The method for operating an aquarium with a reef ecosystem developed by TRITON is an innovative approach that is supported both by tried-and-true and completely novel instruments and principles. All integral components, substances and modes of operation in the system have been perfectly coordinated with one another over many years of research and ensure optimum and naturalistic interaction and maintenance of the tank and the creatures it houses. The advantages of the TRITON method are unbeatable and include: Low technical acquisition costs The resulting immunity from error Little or no previous experience or chemical/biological knowledge needed Low amount of work involved Low space requirements Constant availability of the TRITON HPLC lab Reliable service and expert advice by the TRITON team.

Use of the TRITON system is perfect for both newcomers to saltwater aquaristics and all aquarists who would like to have more time to enjoy their tanks or who would like to add hard-to-care-for maritime life to their aquarium without all the work. What's more, the TRITON method is recommended for public businesses and zoological institutions thanks to its numerous advantages.