



HIGH SALINITY SOIL – AVOIDING and REMEDIATION



HIGH SALINITY SOIL

Huge areas of fields have been saline in recent decades. In other words, it has de facto become unusable for agriculture because crops hardly grow on such soils. There are more resources, but 5,000 to 10,000 hectares of arable land are lost every day worldwide.

If we irrigate with old methods, that is, with a lot of water and large spray losses, evaporation is very high, especially in very warm parts of this world. Salts that cannot evaporate remain. They salt the earth. If there is a lack of water from the well, it is necessary to drill deeper and deeper. As a result, more and more minerals and salts are added to the extracted water. The problem is escalating all over the world. Once the salinity of the soil reaches a certain level, the land can no longer be used for agriculture.



Nowadays, a lot of drip irrigation is used when this is technically possible and necessary. The poorer countries tend to use rudimentary irrigation, see picture on the left. With this technique, the water reaches the plant in a more targeted way and is used much less. Well water with too many minerals causes problems for the irrigation system. The salts clog the nozzles, resulting in high costs for cleaning and maintenance. If maintenance is not carried out regularly, the nozzles are closed and there is no water at all to the plant. The high salt level in the well remains and the soil continues to salinate, albeit at a slower rate than before.

The first field we have rehabilitated

One of our partners near Esfahan has come into contact with a farmer who was desperate. His fields had become totally white in some places and therefore unusable. Because also his water pipe was calcified he got a ring for testing.

After a few weeks the same farmer came into the office beaming with joy, and reported that all the salt in the fields had disappeared by itself. This news has been circulating. Shortly thereafter, the University mediatized and declared it wanted to make a scientific study on this subject. Since this problem affects the entire region, it rains significantly less in the area from Syria to Pakistan, than it did ten years ago.

The result of the study is clearly positive

For the field trial, one field was irrigated half with untreated water and half with water treated by Merus. Then these two fields were compared with each other.

First the condition of the irrigation, especially the nozzles. The result was very convincing. See drip irrigation for details.

The second and, in our opinion, more important result, while the untreated field showed the first signs of salination, was that the field treated by Merus showed almost nothing of salt.

One of the effects of Merus is to significantly increase the solubility of salts in water. This effect results in less deposits forming on the soils. And that if the water still has free capacity to bind salts, then the existing salt is dissolved and taken along with the water. The mechanisms of action are the same as in technical applications, where pipes and systems remain free of deposits.

This study has been published by the ASCE, the American Society of Civil Engineers. We are not allowed to show this study here, as the rights to it lie with the ASCE.

If you are interested, just click here and search for ‚Merus Ring‘ on the ASCE Library page using the search function. This article is only available in English.

The Merus Ring holds the salt in the water and takes it with it to greater depths

Where the limits of this method lie we cannot say today yet. So neither up to how much TDS in the water we can achieve these results, nor up to what evaporation rate. However, we know from technical applications that several conditions must always be taken into account in order to be able to make such statements.

In another study, the university staff wanted to find out at what depths the salt in the water reaches, or at what depths the salination of the soil takes place. However, this study has not yet been carried out due to a lack of funds.

EVAPORATIVE COOLING

Location: San Juan de los Lagos, Mexico

Trial Period app. 6 weeks in April and May 2021

Background

In more and more barns during the summer, the air is cooled and the humidity increased. With this kind of air conditioning the animals in the barns, whether cow, pig or poultry, thus have less stress and deliver a better yield.

In the current case, in the outer walls of the barn, so-called evaporative cooling system. In the current case, in the outer walls of the barn, so-called evaporative cooling pads are installed. These systems consist of a pump that pumps water in a circuit, and through the actual pads in which the evaporation takes place. Depending on the size of the building to be cooled and the need for cooling, several such evaporative cooler are installed in series. In principle, these systems are an open cooling circuit. The outside air flows through the evaporative cooler. The evaporate water removes heat from the air, and the passing air stream absorbs water droplets in this cooling process. In this way, cooling and humidification of the room is achieved.

The charming thing about this evaporative principle, it is energy-efficient as no additional energy is needed for cooling. As long as you supply the evaporative cooler with water and air, the evaporation takes place by itself.



Problem definition

At the location of this farm, the water quality is not so good. The climate in the subtropics and the many hours of operation also take their toll on the evaporative cooling system. Despite chemical treatment of the water, the evaporative cooling panels tend to have heavy scale deposits. In the summertime, deposits are even more pronounced. These deposits reduce the cooling capacity. As a result, it is much more difficult to maintain the required temperature and moisture in the barns. More and more frequent cleaning is required. Which in turn reduces the service life of the fins and requires increased replacement of the internal fillings – pads. Which comes at a significant cost.

Objective

Less deposits in and on the fins and pads, thus less effort for cleaning. Reduction of corrosion on the metallic parts. The evaporative cooling should work optimally to dissipate as much heat as possible, make the house cooler and costs are reduced.

Process

One Merus ring was installed in the circulation line after the pump. No other changes were made to the system or process flow.

Conclusions

- The existing encrustation on the surfaces became soft. And were thus much easier to remove with a brush.
- The incrustations in the filling of the panels have become less.
- The corrosion on the metal parts of the equipment, especially frames of the pads, are much less.



Observations

According to our customer, the Merus technology showed a positive result and met the expectations. First, the lime incrustation and the existing rust in the plant disappeared by itself. Inspection of the cells of the plant after the installation of Merus showed deposits of more than 1mm on the panels at the beginning. At the end of the time, most of these deposits had disappeared. The color of the few remaining deposits, has changed. They are now water-soaked, quite soft and easy to remove. The barn or the poultry house gets cooler and the cooling happens faster. The temperature on the sensors in the room no longer rise so high. And now meet the quality specifications. The condition of the equipment has improved considerably and cleaning times have been reduced significantly.

Recommendation

Managers at this site recommend to install the Merus technology in the rest of their group's barns and poultry houses.

SAVINGS THROUGH THRE MERUS RING

- The water is no longer chemically treated. The cost of chemicals is completely eliminated.
- Cleaning the panels is much easier and takes less than half the time.
- Far fewer evaporative panels need to be replaced each year.
- Maintenance needs to be performed less than half as often compared to before.
- The pumps use much less energy because the water flows through the panels more easily.
- Less water consumption to maintain the temperature and humidity of the poultry houses.

...MERUS is the solution!

The Merus technology, which basically consists of a ring that is installed around water lines, gives off molecular overlapping frequencies disturbing lime scale, rust, bacteria, algae and barnacles in your fresh- or seawater lines and applications. Afterwards, the substances are flushed away, leaving water lines and applications mostly free of harmful build-up and bringing them back to high performance levels.