EVALUATION OF INVASIVE AQUATIC PLANTS AS AGRICULTURAL SUBSTRATE IN THE PRODUCTION OF TOMATO SEEDLINGS

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Abstract

Eichhornia crassipes is a floating aquatic plant widespread worldwide; due to its fast growth, it creates serious ecological and economic problems in the bodies of water where it flourishes. As well as this plant, there are others such as *Azolla* and *salvinia* that also invade bodies of water. And yet these plants are an excellent source of organic matter that can be used in different industries.

In the present work, the objective was to evaluate the use of biomass from these plants and their agricultural use in the germination of tomato (*solanum lycopersicum*). The experiment was carried out at the Higher Technological Institute of Tlatlauquitepec, Puebla, México. There the plants were collected in aquaculture ponds. They were processed by drying, grinding and sterilization to obtain the substrates to which their mechanical features were categorised. They were mixed in different proportions to obtain ten treatments, one of them being the control treatment (75% peatmoss and 25% agrolite). The mixture of substrates was used to obtain *S. lycopersicum* seedlings. Eight replicates were used for each treatment. After sowing in treatment six with a mixture of *E. crassipes* (25%), *azolla* (50%) and *salvinia* (25%) the first emergencies were found on day ten after sowing. An 88% emergency was obtained in Treatment six, while 81% emergency was obtained in the control treatment, with treatment six being the best of all

Background

Macrophyte plants (Eichhornia crassipes sp., Salvinia and Azolla sp.), Considered pests are aquatic plants with a very high reproduction rate and growth rate, for which they spread rapidly and form mats, they compete with submerged and floating native plants in the bodies of water (Harun et al., 2008), reduces the entry of light and reduces dissolved oxygen in the water.

Azolla sp.   Eichornia crassipes   Salvinia sp.

In many bodies of water worldwide, a large amount of biomass is produced from these plants that can be used in different industries, such as the proposal of the present work that aims to produce an agricultural substrate for the production of tomato seedlings.

## Materials & methods

Fresh biomass   Drying   Sterilization   Evaluation

E. Crassipes (EC), Azolla sp. (AZ), and salvinia sp. (SV), were collected in aquaculture ponds at the Instituto Tecnologico Superior de Tlatlauquitepec in Puebla, México. The fresh matter was dried, ground sterilized, and mixed with cow manure (EV), agrolite (AG) and PeatMoss (PM) to obtain 10 tratments: T1: 75% PM + 25% AG, T2:50% SV + 50% PM, T3: 50% EC + 50% PM, T4:50% EV + 25% EC + 25% PM, T5:50% EV + 25% SV. + 25% PM, T6: 50% AZ + 25% SV + 25% EC, T7:50% S + 25% EV+25%AG, T8:50% EC + 25% EV+25% AG, T9:50% SV + 50% EC, T10:50% EV + 25% SV+ 25% EC . All treatments were tested in tomato seeding's emergence using 7 replicates with two seed in each pot.

Results

Seedling emergence percentage 10 days after sowing
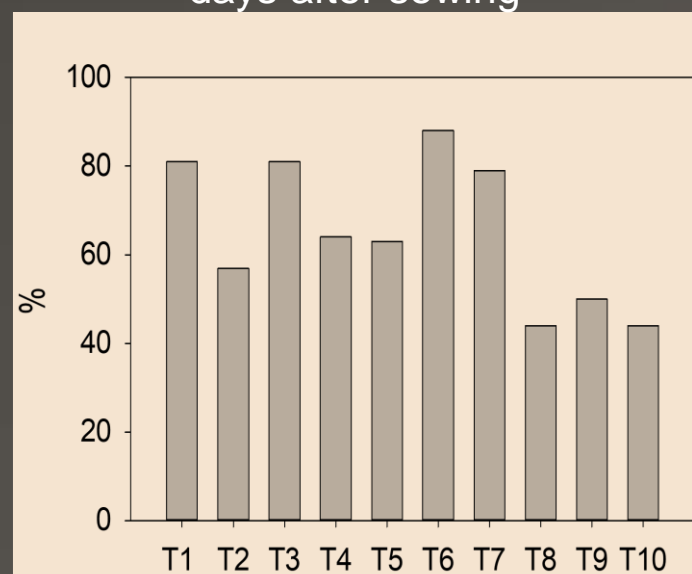
Percentage of seedlings with true leaf 10 days after sowing
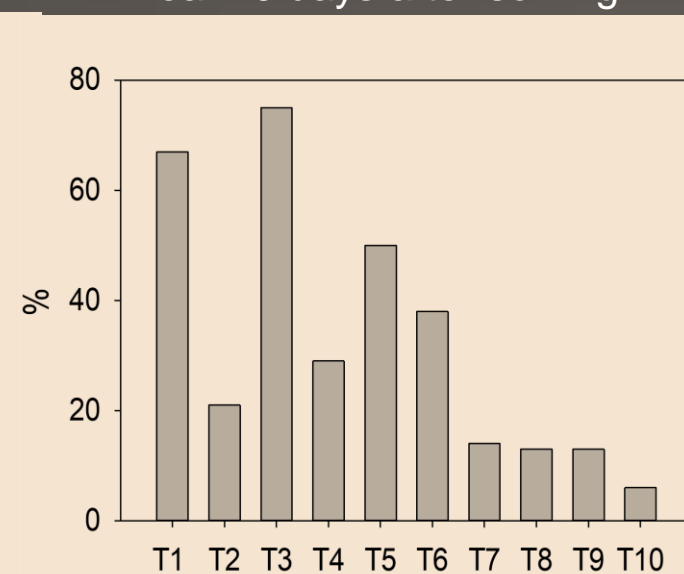
At day 3 after sowing in treatment six with a mixture of *E. crassipes* (25%), *azolla* (50%) and *salvinia* (25%) the first emergencies were found. On day ten after sowing. An 88% emergency was obtained in treatment six, while 81% emergency was obtained in the control treatment, with treatment six being the best of all.

After 10 days of sowing, percentage of seedlings with true leaves was T1 67%, T2 21%, T3 75%, T4 29%, T5 50%, T6 38%, T7 14%, T8 13%, T9 13%, T10 6%.

Conclusions

It is concluded that the use of macrophytes as an agricultural substrate is ideal for the rapid germination and emergence of tomato plants, generating added value to this aquatic biomass, contributing to the sustainability of aquaculture activity.

References

Harun, N. H., P. M. Tuah, N. Z. Markom, and M. Y. Yusof. 2008. Distribution of heavy metals in Monochoria hastata and Eichhornia crassipes in natural habitats. International Conference on Environmental Research and Technology. pp: 550-553.