Minutes of the Technical Awareness Group Meeting (4th meeting)

For the Seaweed Composting Research

Supported by the Hinkley Center for Solid and Hazardous Waste Management

Meeting held, March 7th, 2023, 10:00 to 11:30 am (eastern)

Meeting Participation was through Virtual Connection (Zoom)

Attendees:

Speakers:

Afeefa Abdool-Ghany, University of Miami
Amanda Oehlert, University of Miami-RSMAES
Helena Solo-Gabriele, University of Miami
Peter Swart, University of Miami-RSMAES
Trent Blare, University of Florida-IFAS-Homestead

Attendees via computer webinar:

Aliza Karim, Miami WaterKeeper
Amede Dimonnay, Broward Engineering and Permitting Division
Ana Zangroniz, Florida Sea Grant Extension Agent for Miami Dade-County
Chip Jones, Beach Raker
Chris Snow, Consolidated Resource Recovery, Inc.
Christopher Perry, Florida Department of Environmental Protection
Danielle Jimenez, Division of Environmental Resource Management (DERM)
Daniel Meeroff , Florida Atlantic University
David Hill, Co-Chair Organics Recycling Committee
Elizabeth Kelly, Martin County
Emilio Lopez, SOP Technologies
Evan Blanchard, Brizaga
Fanny Navarro, Miami- Dade County Parks, Recreation and Open Spaces; Sea Turtle Conservation Program
Isaac Bearg, Organic Waste Management Consultant
Jairo Gonzalez
Karen Moore, Florida Department of Environmental Protection
Kimberly Moore, University of Florida, IFAS
Lauren O'Connor, Florida Department of Environmental Protection
Libbie, Farmer in the British Virgin Islands
Mark Richards, Miami-Dade County
Mary Beth Morrison, Solid Waste Authority of Palm Beach County
Nandra Weeks, Geosyntec Consultants
Rachel Harris, Loxahatchee River District
Roland Samimy, The Village of Key Biscayne
Shelly Krueger, University of Florida, Florida Sea Grant Agent for Monroe County
Steve Laux, Hinkley Center for Solid and Hazardous Waste Management
Susan Noel, Loxahatchee River District
Tom Morgan, Miami-Dade County Parks
Vincent Encomio, Florida Sea Grant Agent for Martin and St. Lucie County

Agenda
Hinkley Center for Solid and Hazardous Waste Management TAG Meeting
Sargassum Composting

Date: March 7th, 2023
Time: 10:00 am to 11:30 am (Eastern)
Location: Virtual

1. Welcome and Introductions
2. Year 1 Updates
    a. Tumbler Composters, Phase I
    b. Hallandale Compost piles, Phase II
3. Year 2 Updates
    a. Objectives for Hinkley Study Year 2
    b. Management Styles
    c. Cost Analysis
    d. Market Analysis
    e. Conclusions
4. Year 3 Plans
5. Additional questions and answers, wrap up
6. Adjourn

Questions: hmsolo@miami.edu

Minutes

Questions, Answers, and Comments (After item 2 on agenda, Year 1 Update)

1. Q: Was there any kind of control experiments looking at radishes growing as they typically grow here?
   A:There were control experiments set up when growing the radishes. The control corresponded to 100% potting soil. When the radishes were ready to harvest there were no radishes in the control consisting of 100% potting soil, even though there was growth in the beginning of the project. As a result there were no radishes produced to test for arsenic in a controlled experiment.
2. Q: Did the outdoor unwashed piles have rainfall on it throughout the study and thereby have water added to it?
   A: The outdoor piles were done in collaboration with the City of Hallandale Beach. Both piles were open to and exposed to environmental factors. The piles were open and so they received natural rainfall.
3. Q: Would arsenic levels be of concern for insects or animals that may consume the plants?
   A: In terms of vectors that would be attracted to the *Sargassum*, we did not see any. How the arsenic levels could potentially affect them is not something that we focused on for this study. There can be further studies that look at how the vegetables grown in the *Sargassum* compost can impact animals on terms of arsenic levels and the transference between the two.
4. Q: Was temperature monitored throughout the experiments, and in particular in the tumblers? Was the temperature tracked to see if the temperature required to reach further reduction of pathogens was achieved? .
   A: Within the small scale tumbler style composter we did not have a constant temperature gauge in place to keep track of the temperature. Within the large scale outdoor piles, we did have a gauge in place that constantly measured the temperatures of both piles. The large scale outdoor piles were hotter than the small scale tumbler composters. For the small scale tumbler composters, they were also housed on a shaded area, so direct sunlight did not reach them as compared to the large scale outdoor piles. This could be a potential reason as to why the temperature was not reached in the small scale experiments.
5. Q: What is/was the C:N ratio of the *Sargassum*?
   A: The C:N ratio for pelagic *Sargassum* is typically very high and can be in the range of 40-60. The carbon is very high in *Sargassum,* and the nitrogen is very low, which results in a high C:N ratio. If *Sargassum* comes from a benthic source, which has been seen in Biscayne Bay, then the *Sargassum* may have a lower C:N ratio.
6. Q: There was a press release that summarized a study that compared various vegetables grown in Sargassum amended soil. They reported relative levels of arsenic among the vegetables grown. One of the vegetables was bok choy and it had the highest levels of arsenic. Was this study published?

A: To our knowledge a paper was not produced from that study. There was only the press release.

7. Q: Is there is chance that arsenic can be transferred in pollinators?
   A: For this specific study we did not evaluate whether arsenic could be transferred to pollinators or vectors. However, there is potential future research that can come from this.
8. Q: Another area that should be examined in the state of Florida is turf. We have a tremendous need to increase our turf and decrease the water that is used for its growth. We can greatly affect the water usage by getting the organic soil content up. Can this product be used to increase the turf growth and decrease water usage?
   A: Researchers from the University of Florida are working on reducing water for turf growth as well as amendments that can be added to increase growth. Also research on the microbiome underneath the turf grass is being conducted.
9. Q: From how many areas were the *Sargassum* collected from for the study?
   A: Two locations were used for the Sargassum collection, one for the small scale experiments and another for the large scale experiments.
10. Are the arsenic levels the same in all of the samples that you collected? Where is the arsenic coming from (factory/industrial waste) or is something happening in our seas?
    A: In terms of the background levels of arsenic, this is where our year 3 proposal would come into play. In this proposal we want to examine the background arsenic levels at the beach and to see where it is coming from. There are studies that suggest that if the *Sargassum* makes its way through a contaminated area in the ocean then there is possibility that the *Sargassum* can accumulate the contaminants. Overall, the *Sargassum* has high levels of arsenic across the board. Research has shown that there are pelagic samples that contain high levels of arsenic. Being prudent is the better answer here and not use it for food.
11. Comment: Looking at rainfall data will be interesting. If this were to be done in another area, the historical records could be accessed to see if natural washing could take place.
12. Comment: Getting the message out about caution when using the *Sargassum* compost to grow food items is important because there are blogs out there that promote eating the *Sargassum*.
13. Comment: There might be potential with plants that are bioaccumulators that may be used to remove the contaminants from the compost first, and see if the standards are met.
14. Comment: There needs to be a discussion on vermicomposting since it is used in soil remediation. The metals accumulate in the worms. When interviews were conducted, the individuals that were interviewed were interested in the lowering arsenic concentrations by vermicomposting.

Questions, Answers, and Comments (After item 3 on agenda, Year 2 Update)

1. Q: A viable compost product can be created from *Sargassum*, but the arsenic is still an issue in vegetable plants. What are some of the other applications of the *Sargassum* products that have been produced?

A: Since arsenic is still an issue and levels are not within the FDEP SCTLs for residential use, we recommend that the *Sargassum* compost be used in areas where there is limited human contact. Alternatively, there are other plant industries, such as ornamentals where this *Sargassum* compost can be used.

2. Q: Are there legal limitations or best practices for a municipality before they sell the *Sargassum* compost product?
   A: There are labs that are approved by the USCC that can certify the product that is made. In order to gain this seal of approval the requirements that are outlined by the USCC have to be met. Composting has to be done under state rules (62.709)
3. Q: When will the draft of the amended rule 62.709 be available to the public for comment?
   A: The rule will be open to the public in about 2 months and then the public will be able to provide comments to the changes.
4. Q: Were the plastics examined in the *Sargassum* that was used?
   A: We did observe that there were items such as flip flops and other larger debris that was in the *Sargassum* once onshore, however no formal analysis was performed to specifically examine the plastics in the *Sargassum*. In an example given by a company that manages *Sargassum*, about 20% of the debris that is found is not recyclable and therefore is to be disposed as landfill debris.
5. Q: In another pilot study that examined composting of *Sargassum*, initially the pile exhibited an arsenic concentration of about 80 mg/kg and by day 60 the concentration decreased to about 15 mg/kg. Where do we think the arsenic is going?
   A: For this study we measured the piles every two weeks and monitored it for the metals. What we found with the experiments is that the *Sargassum* that was collected was not 100% *Sargassum,* because of this there was variations in the concentrations. When completing the elemental analysis, we tried our best to homogenize the samples to mix everything that was collected. An end member analysis is being conducting to see how much other end members are contributing to the arsenic concentration. As to where the arsenic is going, it is something to think about. If you lose arsenic, then it somehow is volatizing and going somewhere or lost to runoff.
6. Comment: The arsenic levels can be lowered in the compost when other feedstocks are added. There are studies that have looked at adding other feedstocks, such as fish waste to the *Sargassum* and the arsenic concentrations were not as high and could be used on a consumer level.
7. Comment: Recently there was a remediation project that was completed on a ball field due to high levels of arsenic, so there should be more research conducted in terms of adding the *Sargassum* compost to growth turf before it can be used.

Questions, Answers, and Comments (After item 4 on agenda, Year 3 Update)

1. Q: Were the soluble salts measured in the small and large scale experiments?
   A: Yes, the conductivity was measured in this project. We found that there was not an issue with the salts found in the compost. In fact, the conductivity was lower in both experiments than what is recommend by the USCC. We initially thought it was going to be an issue, that is why we initially set up the small scale experiments to test between washed and unwashed *Sargassum*.

2. Q: Where there any other vegetables that were tested to see if there was growth in the *Sargassum* compost other than radishes, such as tomatoes?
   A: We used radishes solely for the purpose of a bioassay and assessing whether plants could grow at all. In the future other plants can be tested to measure the concentration of arsenic, if any, that may be bioaccumulated.