

SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

The STSM applicant submits this report for approval to the STSM coordinator

Action number: FP1405

STSM title: Production of Nano Fibers Using Hydrocolloids for Active Packaging Applications

STSM start and end date: 03/09/2018-12/09/2018

Grantee name: Dr. Halil Mecit Oztop

PURPOSE OF THE STSM

During the 10 days of STSM, I worked in the laboratory of Prof. Margarida Cortez Vieira to produce nanoparticles from different hydrocolloids and mixtures using electro spraying. These nanoparticle exhibit antioxidant properties which could be used as active agents in packaging materials. I brought the particles with me t back to Turkey and will add try to infuse them to cellulose paper sheets.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

Obtaining nanoparticles through electro spraying is quite challenging. There are several factors that requires significant attention. Viscosity of the spray solution is the most important one. That is why several concentrations were tested to produce the particles. Below is the set-up of the electro spraying equipment (Fig 1).



Figure 1. Electrospaying Set Up

Flow rate of 1 mm/hr, distance of 7 cm from the tip of the syringe to the center of the plate and current of 28 kV were used based on a previous study conducted at Prof. Vieira's laboratory. 10 ml sample volume was used for all experiments. Spraying was lasted until most of the solution was depleted. Microscope slides were taped on aluminum plate so that particles would be scrapped of easily from the glass. Light microscope images of the particles were obtained using the light microscope at Microbiology laboratory

DESCRIPTION OF THE MAIN RESULTS OBTAINED

Chia seed mucilage, chia seed mucilage + cricket powder and gum tragacanth were used for producing particles. Insect powder contained significant insoluble parts; that is why centrifugation was applied however the viscosity was not sufficient to produce particles. that is why it was mixed with chia seed mucilage. Gum tragacanth was also used to produce particles but the initial viscosity of the 0.5% solution was too high to be sprayed from the syringe. That is why it was diluted 100-fold. Some of the light microscope images of the particles are given in the appendix part.

I brought he particles with me and the following experiments will be performed in my home institution:

1. Rheological properties of the hydrocolloid solutions (Shear Stress vs Shear Rate plots)
2. Scanning Electron Microscope Experiment
3. Particle size measurements through Laser Diffraction
4. Antioxidant properties of the particles.

FUTURE COLLABORATIONS (if applicable)

Upon completion of the all experiments at the home institution it is expected to have either a poster or Oral presentation in a conference .

In addition to my experimental work; I also gave a seminar on my research to Departmental faculty. I believe that that was fruitful and will bring further collaboration within 2 institutions.

Private Policy STSM Consent Form and a video regarding the experiments will also be sent to STSM coordinator and action chair.

APPENDIX

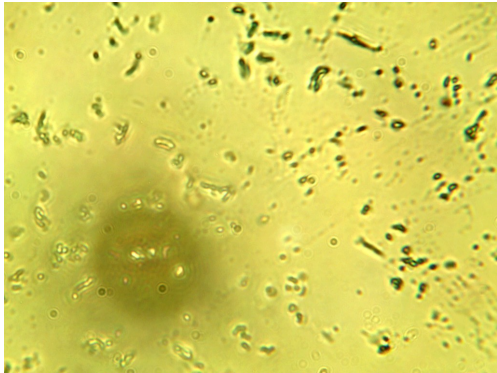


Figure A1. Light microscope images of chia seed mucilage particles.

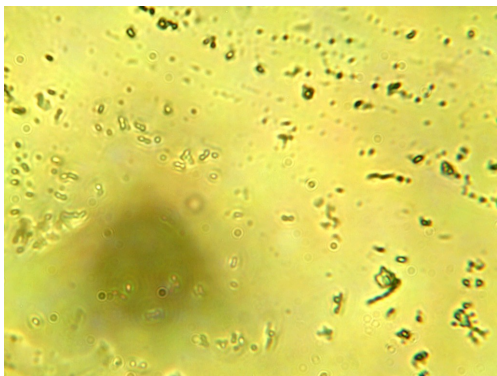


Figure A2. Light microscope images of chia seed mucilage+ insect powder particles.

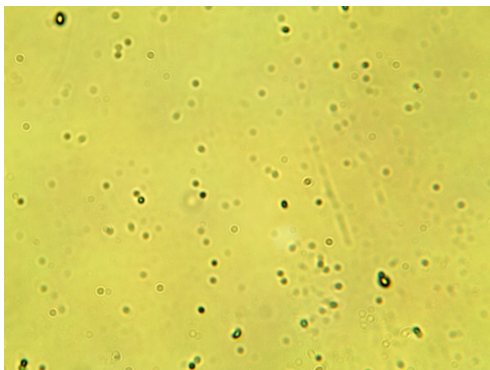


Figure A3. Light microscope images of gum tragacanth particles.