CENE 486 Capstone Project—Adsorption of Copper and Lead from Mine Wastewater Using Mushrooms as a Bio sorbent

Environmental W.W. Engineering

Created by: Sara Danielle Gallaher

Procedure: Mushroom Preparation and Pretreatment Procedures

Application: Prepare a mushroom biomass to be for adsorption experiments

Summary: Before the mushrooms can be used in the experiment, they must be properly prepared and pretreated. Mushrooms should be cut into even pieces and dried. Additionally, to break down cell walls in the mushroom, it is pretreated with NaOH to increase sorption and removal efficiency.

1.0 Equipment

(a) 10 Evaporating Dishes
(b) 1 Knife to chop up mushrooms
(c) Drying Oven
(d) Hot Plate
(e) Scales
(f) 1 Pot to be used with the hot plate
(g) Filter Paper - #691
(h) 1 1000 mL Erlenmeyer Flask
(i) Fume Hood
(j) DI Squirt Bottle

2.0 Reagents and Materials

(a) 50 g of *Agaricus Bisporus* (White Mushroom)
(b) 500 mL of 0.5 M NaOH

3.0 Mushroom Preparation Procedure

1. Once mushrooms have been purchased, they must first be washed and scrubbed of any dirt and/or other contaminants that may be present on the mushrooms.

2. Whole mushrooms should be chopped into small pieces using a knife. Pieces should be approximately 1 cm across so that once they are dried, they are not too small to impede filtering in later steps.

3. Prior to drying, weight the raw chopped mushroom and record data in the Mushroom Preparation and Pretreatment Data Sheet

4. Approximately 50 grams of wet mushroom biomass should be placed in each evaporating dish to be placed in the drying oven in batches

5. Set the oven temperature to 60℃ for 24 hours to allow all moisture to evaporate from the biomass

6. Once dried, mushrooms should be weighed again and recorded in the Mushroom Preparation and Pretreatment Data Sheet to account for water loss and prepare for further testing and predicting the amount of raw mushroom biomass needed for all samples.

4.0 Mushroom Pre-Treatment Procedure

> Note: The prepared biomass from above should be pretreated with sodium hydroxide (NaOH) to increase the sorption rate of the mushroom biomass. The procedure for this process is identified below.

1. Approximately 500 mL of 0.5 M NaOH solution should be added to 20 grams of dried biomass

2. This combination will be boiled on a hotplate under the fume hood at 100℃ for 5 minutes and then left to cool for 10 minutes.

3. Once the biomass and NaOH have cooled, it is to be filtered to separate the biomass from the NaOH over a large beaker.

4. While the biomass is still on the filter, it should be rinsed briefly with deionized water from a squirt bottle to remove any remaining basic solution. Additionally, the biomass should be soaked in 500 mL of DI water, separated, then soaked again. This process should be conducted at least two times.

5. The biomass should be dried over 24 hours, then it will be ready for use in sample vials