Uva Wellassa University
Faculty of Animal Science and Export Agriculture
B.Sc. in Export Agriculture
Bachelor of Animal Science

End-Semester Examination, July/August 2016
Year III - Semester I

Food and Biochemical Engineering (EAG 346 - 2)

Instructions
Answer **all** questions
No. of questions : Two (02)
No. of pages : Two (02)
Time : One (01) Hour
Total marks allocated :50 %

PART III - ESSAY

Question 01

a) Write the law of conservation of mass and energy. (10 marks)

b) What are the factors need to be considered when drawing a process flow diagram? (10 marks)

c) Explain what unit operation is and give 5 examples for it. (10 marks)

d) The description of a biscuit production process is given below.

Process 1 -

Wheat flour, sugar solution (40% w/w) and water are mixed thoroughly in a mixer. The proportion of wheat flour: water: sugar solution is 5 kg: 2 L: 1 kg. The wheat flour feeding rate into the mixer is 10 kg/min. The mixture is then sent through a roller to make it flat.

Process 2 –

During the rolling process extra water is removed from the mixture and the mixture is converted to a thin layer to make biscuits. The moisture content of the final output is 20 %.Then the mixture layer is sent to the molder.

Process 3 –

The biscuits are cut into the desired shapes by the molder. During this process, the sheet of mixture is cut by the molder and excess mixture is again sent to the mixer. For every one kilogram of mixture, 10% is sent to mixer.

(42)

Process 4 –

Finally the mixture is sent through an oven to reduce the water content. The hot air is sent through the oven and the water is removed from the biscuit. The hot air flow rate into the oven is 5 m^3/ min. The specific volume of the air mixture at this temperature and pressure is 0.5 m^3/kg dry air. The final moisture level of the biscuit is 5%.

I. Draw the process flow diagram for the entire process described above.

II. Find out the amount of water and sugar solution need to be added to the mixer for a minute.

III. Find out the amount of water removed and moisture content of the mixture coming out of the mixer during process 2. (Neglect the initial moisture of the wheat flour for this calculation).

IV. Calculate the amount of mixture sent to the process 4.

V. Find out the amount of water removed from the process 4.

VI. Calculate the water removal rate of 1 kg of dry air from the biscuit that sent through the oven.

VII. Mark all the calculated data to the drawn process flow diagram in question I at the right places.

(7 x 10 marks)

Question 02

Write short notes on following

a. Removal of insoluble particulates

b. Product purification

c. Solvent extraction

d. Heat transfer in bioreactors

(4 x 25 marks)