**Study the ability of the rotary evaporator pressure to remove reagent from collagen hydrolyzed fish skin.**

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**1. Introduction**

In order to remove excess acetic acid (HAc) from the reaction product between Nile Tilapia skin and said reagent, a laboratory scale distillation process was carried out by means of a rotary evaporator. Due to the stability of the collagen at low pressures, only the H2O / HAc mixture was evaluated in the distillation process. Given this premise, the Antoine equation was used to know in which pressure the Water and the Acetic Acid would present the vapor state and the operating pressure of the process.

Where A, B and C are the Antoine parameters which are tabulated and, T the temperature operating in degrees Celsius (ºC).

For plotting the H2O / HAc equilibrium curve, the fundamental equation of Raoult's Law (equation 2.2) was used. For the fractions of the substance and the total pressure of the system (eq. 2.3)

(eq. 2.2)

(eq. 2.3)

Onde:

vapor fraction of substance *i*;

*xi*: Fraction of liquid from the substance*i*;

*P:* Operating pressure;

*Psat*: Saturation pressure of substance i

**2. Methods**

**2.2. Collagen Extraction by Acid-Base Method**

The extraction were used 100g fish skin, where the methodology was developed from the technique described by Monteiro and Gómez-Guillén. Skin samples were treated using three different solutions, NaCl solution (0.8M) to remove excess water in the skin, and some surface proteins, a solution of NaOH (0.1M) for partial removal of fat in the skin and other impurities, and finally, a solution of acetic acid (0.05M) for the process of decoupling or breaking of the tissue chain which is also composed of collagen resulting in the hydrolyzed extract.

**3. Results and discussion**

To determine the operating pressure was used eq. 2.1 for both Water and Acetic Acid (Table 1).

|  |
| --- |
| Antoine Parameters  |
| Acetic Acid | **water** | **Temperature (°C)** |
| A | 15,0717 | **A** | 16,3872 | 25 |
| B | 3580,8 | **B** | 3885,7 |  |
| C | 224,65 | **C** | 230,17 |
|  | **kPa** | **atm** | **mbar** |
| Psat H2O | 3,187741617 | 0,031460564 | 31,877416175 |
| PsatHAc | 2,071803341 | 0,020447109 | 20,718033408 |

Table 1: Antoine parameters the HAc e H2O to determine the saturation pressure in 25ºC

Source: Van Ness, 2007

For better understanding the system pressure, equations 2.2 and 2.3 were used in the range of the molar fractions and the saturation pressures of the substances analyzed in order to plot the liquid vapor equilibrium curves of said reagents (Figure 1).

Figure 1: (a) Liquid-Steam Balance for Water at 25ºC (b) Liquid-Steam Balance for Acetic Acid at 25ºC

The region below the blue curve is the region where the water is in the superheated vapor state, while in the region above the orange curve it indicates the state of the subcooling liquid. The region below the blue curve is the region where the Acetic Acid is in the superheated vapor state, while in the region above the orange curve indicates the state of the subcooling liquid.

**4. Conclusions**

Since the reaction is in equilibrium, the displacement has formed for the reactants, thus generating more associated acetic acid, thus facilitating distillation the hydrolyzate without excess acid.

5. **References**

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