RESEARCHING TECHNOLOGICAL SYSTEMS OF EVAPORATING TOMATO PULP

Narziev Mirzo Saidovich
Candidate of Technical Sciences, Associate Professor, Bukhara engineering-technological institute
Ergasheva Muhabbat Komil kizi
Researcher, Bukhara engineering-technological institute

Abstract. *Some of the assorted equipment that will be available includes the ultrasonic washer, stainless steel kettles and tanks, dicers, micro-cut machine, pH meters, refractometers, and tools such as buckets, spoons, and ladles. Put them in boiling water for 3 to 4 minutes. Remove and immerse them in cold water for some time. When the tomatoes are cool, peel and discard the skin and seeds. Chop roughly and blend in a mixer to a smooth pulp. Spread the tomato slices on a clean, raised platform to sun dry. Use a solar dryer for a better-quality product. To prevent contamination during open sun drying, cover with mosquito netting. For commercial-scale production, drying tomatoes using a hot-air dryer is advisable.*

Key words: *evaporation, water vapor, concentration, extraction, processing*.

Introduction. During tomato paste processing the tomato fruit is crushed and subjected to an initial heat treatment for the inactivation of the endogenous tomato enzymes that degrade pectic substances; the resulting juice is then exposed to further prolonged heating during concentration. Grafting: In this method, a twig is or bud plant called scion is inserted or tied over the stem part called stock. Wax is applied to stop the infection. The tissues of the stock and scion join together to form one new plant. Plants like tomato, mango, watermelon, are grown by grafting method. The acid method of seed extraction is the best method for tomato seed extraction. In this method, the fruits are to be crushed into pulp and taken in a plastic containers (or) cement tank. And then add 30 ml of commercial Hydrochloric acid per kg of pulp, stir well and allow it for ½ hour. The food mill is a terrific tool for creating tomato sauces, by removing the skin, pulp, and seeds, while collecting all juices. It can be used for mashing potatoes or for grinding up apples to make applesauce without the headache of picking out seeds. Tomato concentrate, paste or puree are products produced by evaporating tomato juice. For this production, it is extremely important to keep the processing lines work without expensive shutdowns, process the tomatoes without delay to preserve their taste and quality properties, and comply with stringent sanitary and hygiene standards. Tomato concentrate is produced by removing water content with the help of single or multiple-stage evaporation. The juice is moving inside the evaporator through different stages until the required concentration level is achieved. Here, the tomato paste is automatically extracted via a pump controlled by the process refractometer. An evaporator is fed with10000 kg/hr of a solution containing 1% solute by weight. It is to be concentrated to 1.5% solute by weight. The feed is at a temperature of 37oC. The water is evaporated by heating with steam available at a pressure of 1.34 atm absolute, corresponding to a temperature of 108.3oC. The operating pressure in the vapor space is 1 atm absolute. Boiling point elevation and other effects can be neglected. The condensate leaves at the condensing temperature. All the physical properties of the solution may be taken to be same as that of water.

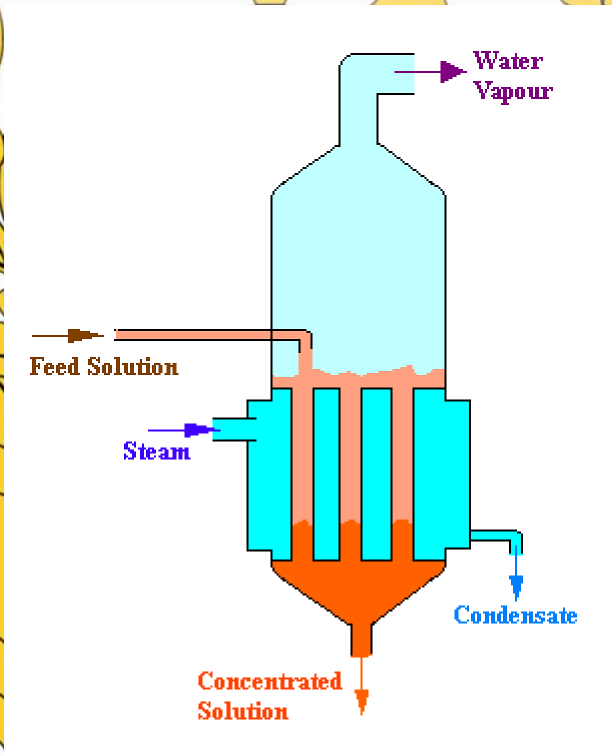

Figure 1. Steam Requirement for Evaporation

Evaporation differs from distillation in that the concentrated solution, rather than the condensed evaporate, is typically the valuable product. A common exception is the evaporation of solutions with a high mineral content, where the vapor is condensed as the product and the concentrated brine is discarded. This process is commonly referred to as water distillation, although the process is more akin to a thermally driven liquid-solids separation operation. Evaporation may be carried out as a batch or continuous process. This article focuses on evaporation as a continuous process, in which the feed and product streams are continuous and their concentrations remain constant. All evaporators are comprised of two sections: a heating section (called a steam chest) and a vapor/liquid separation section. These sections can be located within a single vessel (body), or the heating section may be external to the vessel that houses the vapor/liquid separation section.

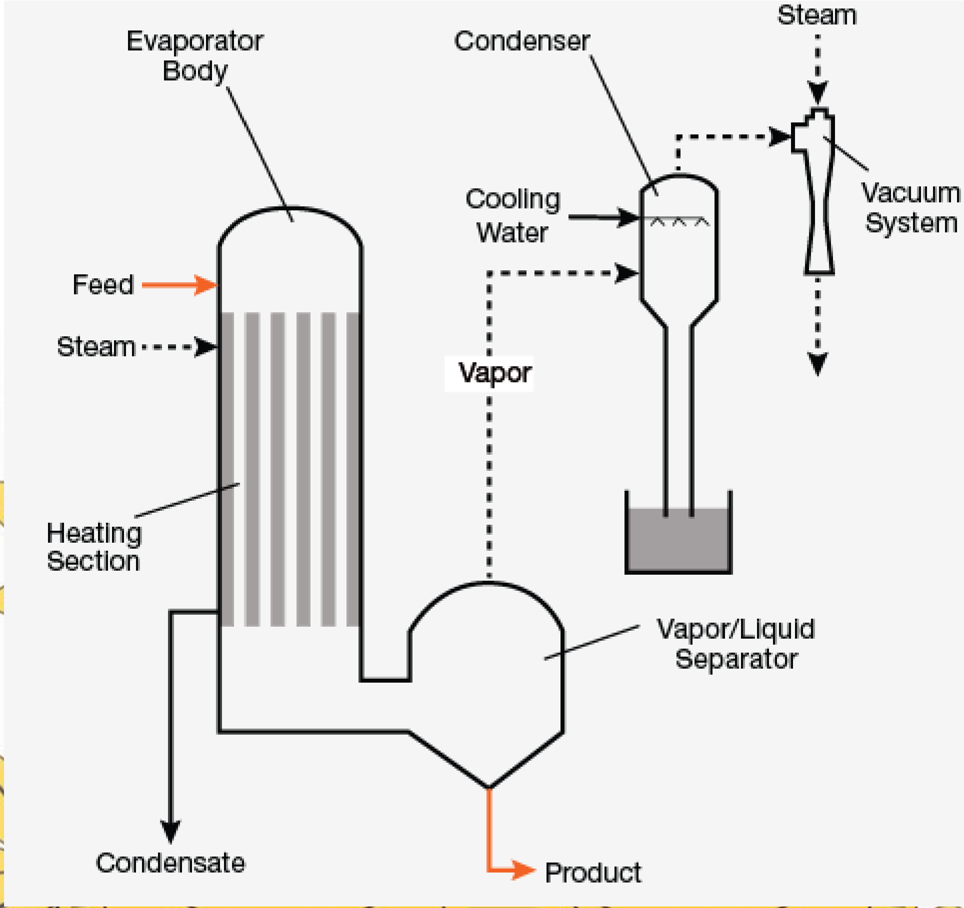

Figure 2. The heating and vapor and liquid separation sections are separated

Evaporators may be composed of one or more effects, where an effect is defined as one or more bodies operating at the same boiling temperature. In a multiple-effect evaporator, vapor from one body heats a second body at a lower boiling temperature. The first effect is heated directly with steam, and the additional bodies are ordered based on descending boiling temperature and pressure. Evaporator bodies are typically operated under vacuum to reduce the temperature of boiling 85°C. Steam ejectors or mechanical vacuum pumps are often used to create a vacuum. Depending on the level of vacuum required for the last effect, which has the lowest boiling temperature, a single pump or a series of pumps may be used. Vacuum systems also remove nonconsensual gases that originate as dissolved gases in the feed or from air leaking into the evaporator body. Most evaporation systems include either a direct or indirect water-cooled condenser to condense the vapor leaving the last evaporator effect. This increases the vacuum of the system. Evaporators that use mechanical vapor recompression do not need an external condenser because the vapors generated are fully condensed within the heating section of the evaporator. If the water vapor from the first effect of a multiple-effect evaporator can be introduced into the steam chest of a second effect operating at a lower boiling point, the latent heat in the water vapor can be reused. Lowering the vapor pressure of the second effect relative to the first effect lowers the boiling point of the second effect. This arrangement of reusing vapor latent heat is called multiple-effect evaporation.

REFERENCES:

1. Morison, K. R., and R. W. Hartel, “Evaporation and Freeze Concentration,” Chapter 8 in “Handbook of Food Engineering,” 2nd ed., Heldman, D. R., and D. B. Lund, eds., CRC Press, Boca Raton, FL (2007).
2. Smith, P. G., “Evaporation and Drying,” Chapter 12 in “Introduction to Food Engineering,” Kluwer Academic/Plenum Publishers, New York, NY (2003).
3. Saravacos, G. D., and A. E. Kostaropoulos, eds., “Handbook of Food Processing Equipment,” Kluwer Academic/Plenum Publishers, New York, NY (2002).
4. Мамаджанов, А. М., & Султонов, С. (2023). ЛЬГОТЫ ВОЕННОСЛУЖАЩИМ И ЧЛЕНАМ ИХ СЕМЕЙ. THEORY AND ANALYTICAL ASPECTS OF RECENT RESEARCH, 2(14), 156-164.
5. Мамаджанов, А. М. (2023). Изучение Проблемы Информационной Безопасности В Контексте Национальной Безопасности. Miasto Przyszłości, 36, 254-257.
6. Мамаджанов, А. М. (2023). Изучение Проблемы Информационной Безопасности В Контексте Национальной Безопасности. Miasto Przyszłości, 36, 254-257.