Who invented steam distillation

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Distillation is an ancient process which separates mixtures by using the relative boiling points of two substances. It is proved that the distillation process has been used by experimentalists from very earliest times. Aristotle explained the use of distillation form extraction of pure water by evaporating seas water [1]. As the distillation process is based on the difference in different physical properties as boiling points, vapour pressure and volatility, and then it is a physical process instead of chemical.

Two liquids having a boilingpoint difference of 25 degree Celsius or more are usually well separated bydistillation. In case of substances which are non-volatile in nature,distillation is used to separate a liquid from that compound by using the propertyof viscosity.

The basic principle behind it is; heating a mixture till the boiling point of volatile compounds and vapors or gas produced by this process are collected back by condensation [2].

Steam distillation is used to distil compounds at a temperature lower than the normal boiling point. In this method, the desired material distilled at a temperature of fewer than 100 degrees [3].

In this way it is possible to obtain a greater percentage of one of the two liquids in the condensate. We can repeat this operation time and time again to separate more and more liquid from the other one [4].

Different modifications are made in steam distillation apparatus to get our desired results in separating different types of substances. Some of these modifications are discussed as under [5]:

In External steam distillation, Steam is generated outside the tankin a steam generator or some boiler. The Sample to be extracted or separated issupported above the steam inlet. Standard apparatus used in external steamdistillation is shown in figure 2.

This is a relatively simple type of steam distillation and is used in various organic chemistry laboratories. In this method, substance to be separated and water is placed in a flask and thus steam source is present inside the apparatus. The standard apparatus used for internal steam distillation is explained in figure 3.

Microwave assisted steam distillation (MSD) is improved distillation technique which was produced to extract flavours from plant material. This method involves combination of steam distillation technique and microwave heating technique. This technique helps in initiation and further increasing in size of production of substance [8].

To avoid damage to the sample (to be distilled) by continuous intact with water, a new modification in steam distillation was made and it is called water and steam distillation. It involve the transfer of heat from steam to

the material to be distilled and release of end product. After that, these prepared end product molecules are caught by vapor flow produced by water and as a result, a mixture of water and end product plus water is formed. These vapors are then shifted to the condenser to get the end product in pure form. [9]

In case of external steam distillation, Dry steam is passed out through material to be distilled (especially plants) and after that, the steam volatile compounds are volatized, condensed and collected [11].

In case of internal steamdistillation, the water along with material to be distilled is boiled and theresultant vapours contain both water and the volatile component.