Patented Dec. 11, 1934 1,983,908

UNITED STATES PATENT OFFICE

1,983,908

METHOD OF DENICOTINIZING TOBACCO

Ludwig Max Lippmann, Berlin, Germany

No Drawing. Application August 7, 1934, Serial No. 738,864. In Germany April 1, 1931

5 Claims. (Cl. 131—6)

It is known that the fermentation of tobacco involves a reduction of the proportion of nicotine originally contained in the tobacco leaves. It is impossible, however, to denicotinize tobacco completely or remove all nicotine contained therein simply by way of fermentation, a considerable proportion of nicotine remaining in the fermented tobacco leaves in an even more firmly adhering state.

Furthermore, it is known that nicotine can or will be partially degraded by removing from tobacco upon addition of suitable substances for securing an alkaline or acid condition, but denicotinization to a complete or even to a predetermined extent cannot be attained in this way either.

In the known reduction of the proportion of nicotine contained in tobacco leaves by means of fermentation the denicotinizing action of the fermenting bacteria soon ceases.

Now I have found that tobacco acquires, during the fermentation process, a high degree of alkalinity by which the vital functions of the microbes acting to decompose the albuminous substances of the tobacco and reduce the proportion of nicotine contained in the latter will be checked, while those microbes or bacteria present in the tobacco and capable of counteracting said decomposition and reduction even may come to predominate over the former.

Furthermore, I have found and ascertained that a slight alkalinity of the tobacco will afford or involve the most favorable vital conditions for the bacteria acting to denicotinize the tobacco.

Accordingly the chief object of my invention is to provide a method of subjecting tobacco, in the form of leaves or parts thereof, to the action of fermentation with admission or introduction of air and balancing or neutralizing the excess of alkalinity resulting from the action of the bacteria or microbes by addition of a suitable acid or the like.

Highly alkaline tobacco can be treated, prior to said fermentation, with pure water, whereas tobacco of any other character, particularly of acid nature, will preferably be treated with a slightly alkaline liquid especially slightly alkaline water, in order to be in the desired initial condition. In the case of acid tobacco, particularly cigarette tobacco, however, pure water without any addition of alkali may just as well be used in the preliminary treatment provided that care will be taken for a sufficient admission of air. The fermentation setting in thereafter in the subsequent step will automatically produce the required basic condition in such a case.

According to my present method it is sufficient in many cases to only moisten the tobacco so that a solution or extract will not form, but if desired or required, in other cases, water in excess may be used so that the tobacco will be submerged or covered by a layer of water and will be subjected to the fermentation and denicotinization process in the presence of the excess water or extract formed, a separation of the latter from the tobacco not being required.

The reiterated or continuous addition of suitable acids during the fermenting process will prevent the alkalinity of the tobacco from rising too high while at the same time the escape of volatile bases, particularly aroma bases, will be avoided thereby.

A slighly alkaline condition of the tobacco and extract formed and consequently the denicotinizing action of the microbes can be maintained also without any addition of acids, since if the air is continuously supplied or admitted, the evolved volatile bases will be removed by the air current which obviously must be passed through forcibly, or the volatile bases may be removed by suction. The water escaping due to evaporation at the same time should be replaced by continuous supplies until the required degree of denicotinization or complete denicotinization is attained.

In a previously filed application (Ser. No. 490,827) filed October 23, 1930, now Patent No. 1,876,214 by Faitelowitz as sole inventor, there has been described and claimed a method consisting in lixiviating tobacco, squeezing out the extract from the tobacco, subjecting the extract to fermentation with admission of air and neutralizing the same by adding a suitable acid thereto, and uniting the said extract, partially or totally freed from nicotine and partially concentrated by evaporation, with the lixiviated tobacco leaves.

According to the present invention the said excessive or additional alkalinity of the tobacco extract can be reduced by passing a powerful current of air therethrough, while the water lost by evaporation is replaced from time to time by fresh water supplies until all or part of the nicotine, as desired, has been removed from the tobacco leaves. The volatile bases evolved and expelled in this way from the extract are collected in any appropriate manner and returned together with the extract, either partially or totally, to the tobacco leaves for aromatizing

purposes, or aroma-conferring substances from any other source may be added.

According to the present invention a strong tobacco extract of alkaline reaction containing microbes acting to decompose albuminous substances and to decompose nicotine, can be used in lieu of a slightly alkaline liquid. This will be of particular advantage when obnoxious microbes predominate over the microbes acting to denicotinize the tobacco. As compared with the usual addition of tobacco bacteria, the vitality of the useful microbes always present in tobacco leaves will be promoted thereby at the same time.

The following examples will serve to illustrate the nature of the invention, but they are merely typical cases and can be varied without departure from the nature of the invention.

Example 1

A batch of tobacco leaves moistened with pure water, slightly alkaline water or an alkaline tobacco extract so as to be in a soft condition and easy to cut, and having an average pH value of about 8, is divided into heaps of about 100 kg., each piled up to afford ready access of air to the leaves. To this end the tobacco may be stacked in superposed layers upon a perforated support. The temperature of the room in which this is done is kept preferably at 30° to 40° C. and a cloth soaked in a suitable organic acid, such as acetic acid, is spread over in contact with each of the several individual layers of the heap, the height of the single layer amounting to about 30 cm.

The organic acid will tend to pass over from the cloth to the tobacco leaves adjacent to the cloth, by diffusion, so that volatile bases present in the leaves will be precipitated in the form of salts. After six to twelve hours the heaps are relaid, depending upon the effect brought about by the reaction. As the leaves thus come in contact with other leaves again and again the acid will disperse throughout and act on the bases adhering to leaves of other portions of the heap.

Instead of using a cloth for the introduction of the organic acid, the latter can be supplied to the tobacco leaves immediately in the form of a mist or spray by sprinkling or by atomization. Intensive supply of air will act to promote the progress of the reaction, particularly in case of employing air enriched as regards its oxygen content.

The process, that is the piling up, relaying and acidifying of the heaps constituting the batch of tobacco leaves under treatment, is discontinued when the desired degree of denicotinization and decomposition of albuminous substances has been attained. Judging from our practical experience, about 66 per cent of the nicotine originally contained in the tobacco leaves is removed in this way, on an average, after eight days of treatment. The process or treatment may be continued for a longer period when it is desired or preferred to decompose and remove all of the nicotine present in the leaves.

Example 2

125 g. of tobacco leaves, containing about 2.16 per cent of nicotine, are placed in a suitable vessel and water is added sufficient to cover the leaves. At the bottom of the vessel there are provided a number of aerating devices equipped with fine nozzles so as to cause the air forced therethrough to rise in the liquid in the form of minute bubbles. Pure air is continuously forced by means of a suitable pump or the like through the said devices so that the noise of the effervescing air will be audible and a dense, creamy foam will be produced on the liquid. At the same time acetic acid is added slowly in the form of minute drops, say about 300 droplets per cubic centimetre of acetic acid, but sufficient as regards the total amount not to allow the alkalinity of the liquid to grow too high.

After 47 hours no nicotine can be detected any longer in the liquid or extract which subsequently is neutralized by means of acetic acid and inspissated by evaporation in any suitable manner without being separated from the tobacco leaves.

Example 3

Tobacco leaves are treated in the same way as described in Example 2 until they are completely denicotinized, which, as above stated, will take about forty-seven hours. Subsequently the tobacco leaves are taken out of the vessel and squeezed out moderately. The liquid or extract left in the vessel is neutralized by means of acetic acid and thereafter concentrated moderately by evaporation. The tobacco leaves then are subjected to a drying treatment and subsequently impregnated with the partly or moderately condensed extract in any appropriate manner so as to be reunited therewith.

Example 4

Tobacco leaves containing about 1.3 per cent of nicotine are placed in a suitable vessel and three times the amount or weight of water is added thereto, whereupon a strong current of air is injected into the liquid to pass therethrough. Water lost by evaporation is continuously replenished, while the temperature of the injected air and of the water is kept at such a point that approximately the temperature provoked by fermentation will be maintained. After about fifty-four hours all nicotine has disappeared so that further addition of water is to be discontinued and the tobacco leaves can be dried, preferably by means of an air current. The volatile organic bases absorbed by the air current are collected in the usual manner and may be returned to the tobacco leaves for aromatizing purposes.

Example 5

1000 g. of tobacco leaves containing about 1.5 per cent of nicotine are lixiviated in a suitable vessel until they are absolutely free from nicotine, and subsequently squeezed out and dried. The extract thus recovered and amounting by volume to about 6000 cm. is treated with air by passing an intensive current of air therethrough, while at the same time the water lost by evaporation is replenished continuously. The temperature of the injected air and of the water is kept at such a point that approximately the temperature provoked by fermentation will be maintained. After about twenty hours all nicotine has disappeared, when addition of water is stopped and the extract condensed to about 1000 g. by evaporation. The thus inspissated extract then is united with the dried tobacco leaves, either partially or totally, just as desired or preferred. The volatile bases escaping with the current of air are intercepted and recovered by

means of a suitable organic acid, such as tartaric acid, in order to be added again, partially or totally, to the dried tobacco leaves for aromatizing purposes.

From the foregoing it is believed that the advantages and novel features of my invention will be readily understood, and therefore further detail description is deemed unnecessary. It will be evident, however, that my invention, while still adhered to in its main essentials, may be varied and adapted in many ways, according to the requirements desired or most suitable under different circumstances, and I therefore aim in the appended claims to embrace all modifications falling fairly within the scope of my invention.

This application is disclosed in and is derived from the co-pending application, Serial No. 600,557, filed March 22, 1932.

I claim as my invention:

1. A method of denicotinizing tobacco comprising the steps of: fermenting tobacco containing the usual bacteria and submerged in liquid, forcing air in fine subdivision through the liquid, continuously adding acid to the extent necessary to neutralize the amino bases resulting from the fermentation, evaporating the liquid, and drying the tobacco.

2. A method for denicotinizing tobacco comprising the steps of: treating tobacco containing the usual bacteria with a weak alkali to bring it into weakly alkaline condition, submerging the tobacco in a liquid and fermenting it therein, forcing air in a state of fine subdivision through the liquid, continuously adding acid to the extent necessary to neutralize the amino bases resulting from the fermentation, evaporating the liquid, and drying the tobacco.

3. A method for denicotinizing tobacco comprising the steps of: fermenting tobacco containing the usual bacteria and submerged in a liquid, expelling the amino bases resulting from the fermentation by passing an air current through the liquid, collecting said amino bases and returning them to the tobacco.

4. A method for denicotinizing tobacco comprising the steps of: treating tobacco containing the usual bacteria with a weak alkali to bring it into a weakly alkaline condition, fermenting said tobacco while submerged in a liquid, expelling the amino bases resulting from the fermentation by passing an air current through the liquid, collecting said amino bases and returning them to the tobacco.

5. A method for denicotinizing tobacco comprising the steps of: fermenting tobacco containing the usual bacteria and submerged in a liquid, expelling the amino bases resulting from the fermentation by passing an air current through the liquid, and adding aroma-conferring substances to the tobacco.

LUDWIG MAX LIPPMANN.