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# ANALYSIS OF EXPERIMENTS ON THE PROCESS OF DEODORIZATION OF VEGETABLE OIL USING FLOATING NOZZLES

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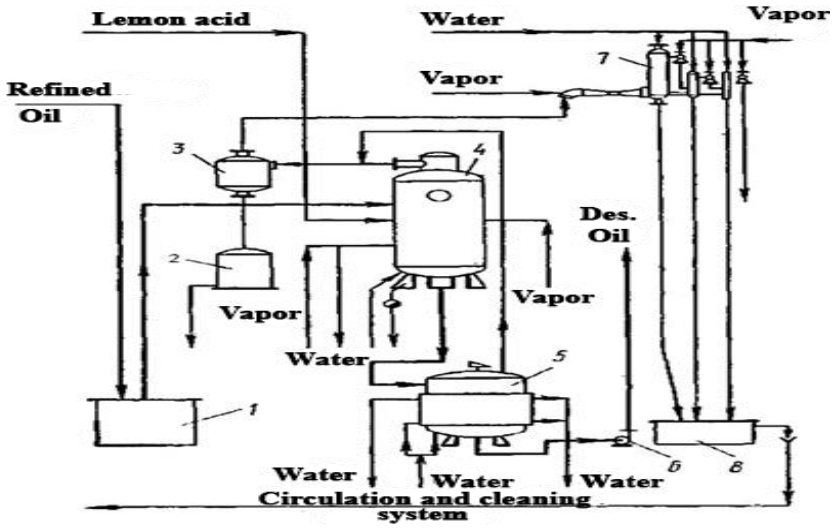
**Abstract**: One of the main factors in obtaining quality oil in the process of deodorization of vegetable oils is the short-term processing of this oil .Prolonged storage of oil at the high temperatures leads to darkening of the color, changes in its composition. Therefore , it is necessary to increase the contact surface between the liquid and vapor phases in order to carry out metabolic processes in a short time . There are several methods to increase the contact surface. In this study, ways to increase the use of floating movable wooden nozzles were studied.

**Keywords:** periodic deodorization, refrigerator, vacuum, nozzles, temperatures, metabolism.

**Introduction.** Technological scheme of periodic deodorization is shown in 1-picture. The refined oil to be deodorized is filled from the tank (1) by vacuum in a volume of 5 t into a floating wooden nozzle deodorizer (4) .Befor using the deodorizer a vacuum is created in the system and an open water bottle is supplied from the drum at the bottom of the deodorizer while the oil temperature continues to be heated after the oil temperature exceeds 100° C in order to prevent condensation of the supplied open water vapor when the deodorization process is complete ,the deodorized oil to cool to the refrigerator (5) . In the refrigerator, the oil is cooled by water and pumped (6) falls into a tank designed for the deodorized oil. The vacuum in the system is generated using a block of ejectors (7) The steam-air mixture coming out of the deodorizer is sucked into the vacuum system through the drip tray (8).Oil droplets trapped in the drip tray (3) are collected in the drip tray (2).The water supplied to the capacitors of the ejector system flows continuously to the barometric tank (8).




**Picture 1.** Technological scheme of periodic deodorization of vegetable oil

In the aperiodic deodorizer and precooling are performed in series .Given that the main heat and metabolic process in the process. Line are carried out in the deodorizer and the floating wooden nozzles are tested in this deodorizer .We will explain the device in a detail .The deodorizer consists of body, nozzles, cover .The desolator cap has greenhouse (2) and is equipped with a nozzle (3) for connection to the vacuum line, it serves to expel the used idol, along with the odorous substances. At the bottom of the tank is a drop separator (2) which traps oil drop lets that are combined with the idol phase.

On the outside of the hard ware wall a heating coil is installed to prevent condensation of volatile vapors. In order to accelerate the process of heat and metabolism, movable wooden nozzles (4) were placed inside the column. At the bottom of the desolator is mounted the open flat drum (7) in order to distribute water vapor across a liquid phase. The wall of the apparatus is a two-row zmeevik (6) in the form of a close circle, each of which has a heating surface of 6-8m2

The intensive movement of floating wooden nozzles and the size of the heating surface allow to heat the oil at a speed of 160-270 C accelerating the processes of heat and metabolism .Also installed in parallel with these zmeeviks, zmeeviks serve to cool the deodorized oil .Zmeevik is supplied with closed water vapor (8) through a pipe and condensate is removed through a pipe .The oil is fed to the apparatus through the nozzle (5) and the processed oil is discharged through the nozzle( 10)for a certain period of time .The total capacity of the deodorizer is 9m3 and,5 t of refined oil is poured into it before starting the process. Deodorizator thermometer equipped with a vacuum meter and a sampling device. Indicators of floating moving wooden nozzles are given in .Once the temperature reached 180 C , the deodorization process began . The residual pressure in the apparatus should not exceed 0.65 kPa (5mm wire top)

**Methods.** The whole device is heated by means of a nozzle. Steam consumption after heating is 0.07 kg\ sec is optimized. The pressure is monitored by a vacuum meter on the line. In order to heat the first oil, the coil is first supplied to the coil by means of a valve and when the first oil is heated to 180 C , the process is continued in the second stage , and a high-pressure water bottle is given .The heating process is controlled by a thermocouple mounted on the pan and heated to temperatures above 220 C . When the planned value is reached , the valve closes and the steam consumption is adjusted to the mode by means of the valve. The system is created by means of a vacuum ejector block. The foot- air mixture from the deodorizer is pumped into the vacuum system through a dropper .Droplets of oil trapped in the drip tray collect in the drip tray.The chaotic movement of the nozzles in the open foot column ensure the intensive mixing of the liquid and these phases and halves the duration of the heating process (figure 2)

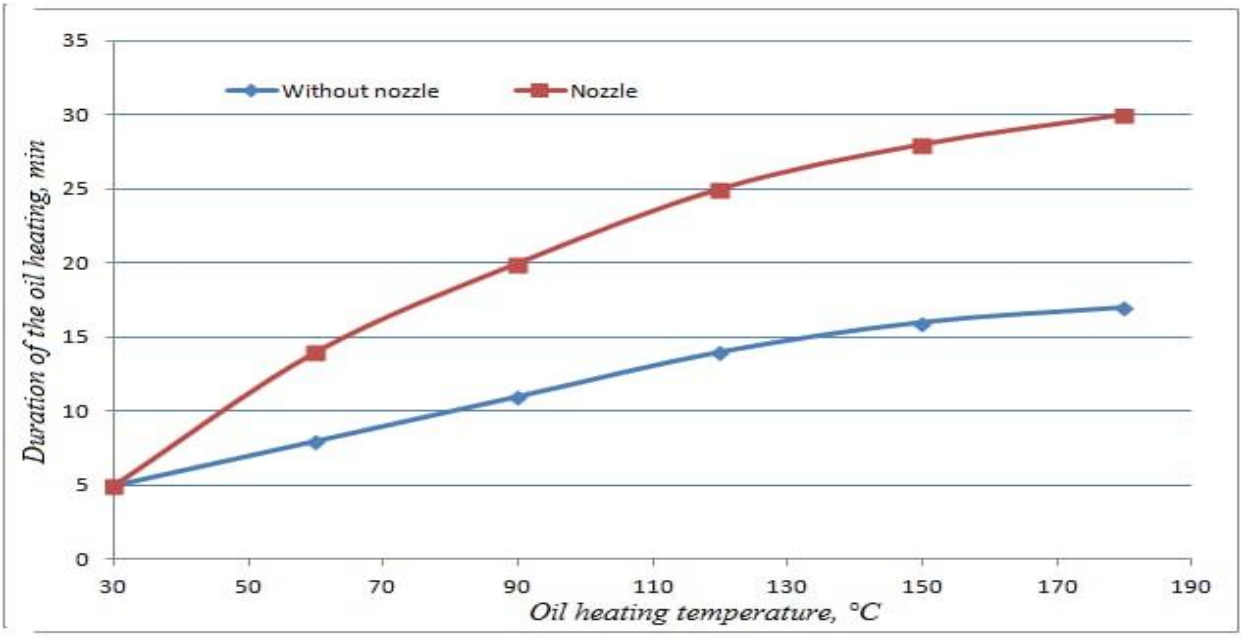



**Figure 2.** Changes in the process of heating the oil over time

After the deodorization process is commpleted a closed water bottle is used to cool the nack of the given ammevik .In order to accelerate the cooling process, an inert gas is expected to be cooled by an inert gas from an open water bottle .At the same time , the movmement of the nozzles reduced the duration of the cooling process from 60 to 35 minutes .At the end of the experiment ,vacuum valve in the line is closed. Ready-made oil samples are taken from the tank by to 1.75 hours.During the process , fluid flows are monitored through surveillance windows.

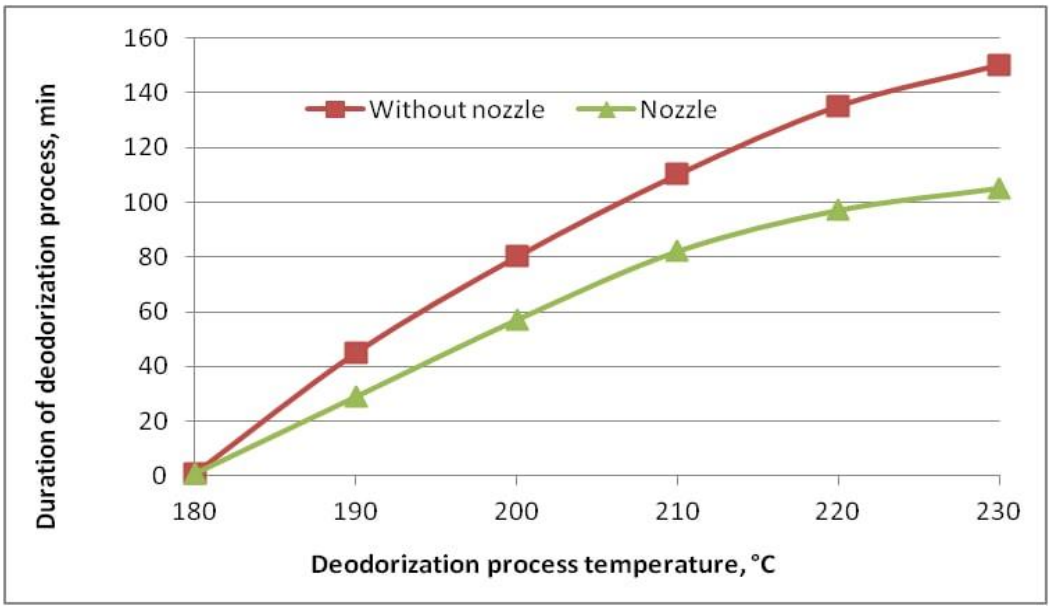



**Figure 3.** Changes in the process of oil deodorization over time

After the deodorization process is commpleted a closed water bottle is used to cool the nack of the given ammevik .In order to accelerate the cooling process, an inert gas is expected to be cooled by an inert gas from an open water bottle .At the same time , the movmement of the nozzles reduced the duration of the cooling process from 60 to 35 minutes .At the end of the experiment ,vacuum valve in the line is closed. Ready-made oil samples are taken from the tank by to 1.75 hours.During the process , fluid flows are monitored through surveillance windows.

It is obtained from refined 1st grade cottonseed oil as first deodorizing oil. Its acid number is 0.3 mg KOH. According to the state standard, the number of deodorized fatty acids should not exceed 0.2 mg KOH.

The experiment were carried out at constant fluid flow , oil temperature 240 C ,ammunition pressure 0.67kPa, open water vapor 0.06-0.08 kg\sec .The results of experiments with modified technological parameters are shown in 1table

**The results of the experiments**

| № | Temperature°C | Pressure kPa | Oil quatity, | Open water vapor consumption, kg\sec | The number of acid seconds in the fineshed oil determined in the experiment *mg KON* |
|---|---|---|---|---|---|
| 1 | 180 | 0,67 | 5 | 0,07 | 0,24 |
| 2 | 200 | 0,67 | 5 | 0,07 | 0,21 |
| 3 | 220 | 0,67 | 5 | 0,07 | 0,20 |
| 4 | 240 | 0,67 | 5 | 0,07 | 0,19 |
| 5 | 180 | 1,33 | 5 | 0,08 | 0,28 |
| 6 | 200 | 1,33 | 5 | 0,08 | 0,25 |
| 7 | 220 | 1,33 | 5 | 0,08 | 0,22 |
| 8 | 240 | 1,33 | 5 | 0,08 | 0,21 |
| 9 | 200 | 2,0 | 5 | 0,06 | 0,28 |
| 10 | 220 | 2,0 | 5 | 0,06 | 0,24 |

Initially, the experiments were performed when the oil temperature was heated to 220C . When the average pressure in the apparatus is 0.67 kPa , the number of acids in the finished oil is reduced to 0.020 mg KOH when the consumption of open water is given at a rate of 0.07 kg\sec. When the oil consumption was increased to 0.08 kg\ sec,220 mg KOH was obtained. When the pressure was 2.0 kPa and the open water but consumption was reduced to 0.06 kg \sec .acid count was 0.28 mg KOH. Deodorizer efficiency is determined by the cycle duration . The duration (min) of the deodorization cycle without and without nozzles is given in table 2 below

**Duration of the deodorization cycle without nozzles**

| Indicatior | Without nozzle | nozzles |
|---|---|---|
| Heating (200 °C until ) and on deodorization | 40 | 25 |
| Deodorization | 150 | 105 |
| Cooling (attaching to the receiving cooler ) | 60 | 35 |
| Cycle duration , min (hours ) | 250 (4,17) | 165 (2,75) |

At the present, Namangan Tola Texstil LLC uses periodic adjusters. With it, parameters of the new deodorant can be observed in 3.5 Table

| Parameter name | Whithout nozzles | Nozzles |
|---|---|---|
| You go out of mode | Cycle | Cycle |
| Product consumption ,t | 5 | 5 |
| Process duration ,min | 250 | 165 |
| Dimensions | Height :5000 *mm*<br>Diametr :2000 *mm* | Height :5000 *mm*<br>Diametr :2000 *mm* |
| Open water consumption | 0,07 *kg/s* | 0,06 *kg/s* |
| Working temperature | 220-240°*S* | 200-220°*S* |
| Pressure | 0,7-1,3 *kPa* | 1-5 *kPa* |

The deodorizing product is various parameters of cottonseed oil at the inlet and outlet of the exiting and new deodorizer are given in Table 4

Exiting deodorizer and product indicators at the inlet and outlet of the proposed device Deodorized neck quality indicators

| № | INDICATORS | Cotton oil | |
|---|---|---|---|
| | | High type | 1st type |
| 1. | Clarity | Transparent | Transparent |
| 2. | Smell and taste | odorless, the taste is typical of unscented butter | |
| 3. | Colors:<br>- in red, not much | 7 | 10 |
| 4. | The numbers of the acid ,mg KON, not much | 0.2 | 0.2 |
| 5. | Non-oil substances (sediment by weight), %, not much | Not available | |
| 6. | Moisture and volatile matter mass, %, not much | 0.1 | 0.1 |
| 7. | soap(quality analysis) | Not available | |
| 8. | Sony iodine , gr 100 | 101-116 | 101-116 |
| 9. | Non-soapy substances , %, not much | 1,0 | 1,0 |
| 10. | Extraction oil boiling point, °C, not less | 234 | 232 - |

**Conclusion.** In short , experiments have shown the effectiveness of a floating wooden nozzle device compered to exiting deodorizers. As a result of processing cottonseed oil in a new periodic device, various volatile components in the finished oil were reduced in a short time, which led to an improvement in the quality od the oil is coming. Based on the experiments conducted proposed facility, proposals for industrial construction were developed

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