Timing booze

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In an overview of the video
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The fermentation of the tobacco, but the
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PRINCIPLE TO GETTING STARTED

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Renaming the title

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INTRODUCTION

Non-fermented raw tobacco coming from procurement
items are subjected to appropriate processing in fermentation plants
and fermentation. The purpose of tobacco processing in a fermentation plant is
it is, on the one hand, the preparation of raw tobacco for normal flow
it contains enzymatic processes that ensure the identification and development of
the final product of all quality advantages, on the other - improvement
the quality of tobacco products in factories and especially its stability.
In recent years, many tobacco-growing farms instead of bales have become

packing tobacco into bales. This type of packaging allowed to increase by 40-45% the concentration of the mass of tobacco per unit volume due to the denser than in bales, pressing tobacco leaves and, accordingly, increase the loading the capacity of vehicles, storage and fermentation rooms.
For the same reason, some of the tobacco coming in bales from producers farms, began to process into bales in fermentation plants, which significantly increased their throughput.
Fermentation of tobacco is the last post-harvest process processing. As a result of fermentation, tobacco acquires physical properties and the quality at which it becomes suitable for the production of smoking products.
During fermentation, the chemical composition of tobacco leaves changes, the smell and taste of tobacco are leveled, combustibility and elasticity increase.

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Process flow diagram of fermentation production

Non-fermented raw tobacco coming from procurement items are subjected to appropriate processing in fermentation plants and fermentation.
Technological processes are carried out in fermentation plants in the following sequence:
all raw tobacco is checked according to the indicators provided for by GOST 8073-77 and technological instructions;
raw materials that meet the established requirements are formed in a homogeneous batches and stored in the warehouses of the plant until it is transferred for fermentation;
bales (bales) of tobacco that do not meet the moisture requirements, then-brewed grade and other indicators, subjected to processing and conditioning moisture control;
in order to increase the throughput of fermentation plants a significant part of bales in factories is processed into bales;
prepared batches of tobacco are loaded into fermentation chambers or into compartments of continuous fermentation units;
after fermentation, each bale of tobacco is subjected to general sorting ke, curing, aging, export preparation, etc .;
raw tobacco that has undergone post-fermentation processing, pressed and shipped to consumers.

Preparing tobacco for fermentation

The purpose of the processing of tobacco in a fermentation plant is, with one hand, the preparation of raw tobacco for the normal course of fer-mental processes that ensure the phenomenon and development in the final product of all quality advantages, on the other hand, improving the quality of tobacco

products in factories and especially its stability.
The tobacco processing process consists of a number of sequentially performed -
operations: bale disassembly, leaf splitting, dust removal, mixing
bale forming, bale forming and pressing. Dry or high humidity
tobacco at the appropriate stage of processing (in bales or after their disassembly
and splitting) is moistened or dried. All these operations are performed
on special machines and installations.
The specified processing technology is insufficiently conducive to further
to improve the quality of tobacco products and especially its stability: it
does not provide the required uniformity of the quality of raw materials, and not only in
batches, but also in separate bales and bales.
The problem of improving the quality of tobacco products and ensuring consistency
their smoking advantages can be fully resolved only when
implementation at fermentation plants of technology for the preparation of tobacco

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averaged quality indicators by the tong method.

Tonga tobacco processing

The main feature of the processing of raw tobacco by the tonga method,
distinguishing it from other types of processing is averaging (mixing
vanie) raw materials from different microdistricts of raw material zones and quality characteristics,
provided by the standard for a given commercial variety (maturity, color,
breaking, etc.), as well as different methods of drying, with the exception of raw materials full
solar and full artificial (fire) drying, which is processed
apart.
Tonga tobacco processing is widespread
in all countries producing oriental type tobacco, especially small-leaved
aromatic group. In the bales obtained after such processing in one
all the variety of
tobacco leaves, allowed by GOST 8073-77 and GOST 8072-77 in this product-
grade: leaves of different fragility, different degrees of maturity, different shades
by color, grown in various soils, etc. Leaves related and
other varieties are removed during processing.
Thus, each bale of tong processing contains all the different
the variety of tobaccos included in this commercial grade, but the bales are within
large consignments, measured in hundreds of tons, must be homogeneous, i.e.
similar to one another. The thoroughness of the averaging process and
mixing tobacco allows the tobacco factory master to limit inspection
batches with one to two percent of bales in order to accurately send to the blend
(bag) a large consignment of raw tobacco.
Tonga tobacco processing is a progressive

tium, and in this regard, it is increasingly being introduced in fermentation plants.
This makes a clear distinction between simple tobacco processing
with the formation of so-called standard bales and processing in the way
Tonga.
When processing tobacco using the tonga method, it is necessary to observe a number of technical
the logical requirements outlined below.
It is allowed to process unfermented tobacco only normal
humidity (about 18%), i.e. not subject to mechanical damage
niyam and does not stick together into lumps when squeezing a bunch of leaves in the hands. Dry or
highly moist tobacco must be pre-moistened or under-
dried in appropriate installations. For drying highly damp
installations of the "Proctor" type are usually used, and for humidification of dry
tobacco, it is recommended to use a continuously operating installation NDU-10,
developed at the Chisinau tobacco plant. Recycle way
bong tonga can be used for all commercial varieties of tobacco, with the exception of the 4th
grade. Tobacco
It is generally inappropriate to subject the 4th grade to sheet sorting, in view of
low quality and the presence in it of a large number of highly overripe and
burnt leaves, easily damaged during processing. Such tobacco

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packed in bales without averaging. To a certain extent, this also applies to
tobacco of the 3rd grade (GOST 8073-77) due to its poor quality.
Tobacco in bales (bales) intended for processing should not be
strongly pressed, since the pressed leaves do not lend themselves to complete expansion
pinch.
Of the varied quality traits that distinguish tobacco leaves
one from the other within the same commercial grade, in practical work on
averaging tobacco usually takes into account two or three main indicators: color
leaves, their sizes, microzones of tobacco growing.
Ideal conditions for averaging tobacco quality can be achieved in
in the event that we focus on warehouses all raw tobacco purchased in
during the harvesting season, and then start processing. Because the
it is difficult, then in practice there is a way to average and process tobacco
Tonga is started shortly after the start of harvesting, but on condition that
accumulation of a batch of raw materials at the plant, characterizing a variety of signs
of the entire crop of that group of breaks, which in this period prevails in
blanks. The minimum size for such a batch should be about 20 tons.
But the larger the batch, the better it will be averaged.
However, the uniformity of the quality of raw tobacco of this commercial grade,
passed averaging at the beginning and end of the harvesting season, to achieve

almost impossible. But this has to be reckoned with all the more since
changes in the quality of raw materials as the content in the average
mixtures of leaves of higher breakage occur during production
the war season gradually, smoothly.
The selection of tobacco for processing by the tonga method is carried out at the plant of one
temporarily with its control check and acceptance from the procurement points
Comrade At the same time, they strive to ensure that throughout the entire production
of the season, the plant maintained a 5-10-day supply of unfermented
tobacco intended for processing by the tonga method. Each
the batch selected for processing should include tobacco of various
the regions of the raw material zone of the plant in ratios corresponding to the number of
tobacco of each microzone in blanks. These ratios should be observed on
throughout the season of harvesting and processing of tobacco of a given crop year.
If the entire raw material zone of the plant is the same type and the quality of tobacco within it is the same
nakova, then the averaging is carried out without observing the above proportion
nality by microzones.
The tobacco selected for processing is divided by color into the following
groups (approximately):
Group
Colour
1
light-colored tobacco in color
(yellow and orange with a touch)
2
dark tobacco in color
(dark orange, red, brown
and dark brown)

7
3
dark green tobacco
Each of the above groups should include tobacco of different
microzones in quantities corresponding to their specific gravity in workpieces in
raw material zone of the entire plant.
Each of the above group includes small-leaved and large-leaved
tobaccos of this botanical variety.
Tobacco belongs to one or another group by color according to the predominant quantity
the quality of the leaves of a particular group. For example, if a bale (bale) contains
60-70% of tobacco leaves are orange, then it should be in the first group and
etc. On each bale (bale) a number indicates the group to which it is assigned.

Preliminary division of tobacco bales (bales) into the above groups
py is an obligatory preparatory link in the technological process of processing
ki tobacco in the Tonga way, since without it, proper averaging is impossible
the composition of the processed tobacco.
All listed groups should contain only one tobacco
commercial grade.
Selecting tobacco for processing by the tonga method and grouping it according to
the above signs are carried out simultaneously. It is advisable to do this work
conduct at the time of central inspection and acceptance of tobacco received from
procurement points, entrusting it to an experienced specialist.
The tobacco selected for processing is stacked in groups. TO
a plank is attached to the stack of each group, on which are indicated
required data: commercial grade, group, number of bales (bales).
When accepting tobacco from tobacco-growing farms in a loose mass (in
boxes, etc.), grouping it according to quality criteria is advisable
to carry out on site (in farms) simultaneously with the acceptance of raw materials. In that
case to ensure a better averaging of tobacco by microzones, as well as by
the timing of procurement is desirable to deliver tobacco from tobacco farms to
procurement points or directly to fermentation plants for
the schedule previously agreed with the deliverers.
The first production operation of processing by the tonga method is
disassembly of bales (bales) and separation of bundles of tobacco into individual leaves on
splitting installations. Usually these are continuously operating pneumatic
nical installations consisting of a pre-splitting device
bales (bales) and dosed tobacco supply into the air duct of the pneumatic
pipeline. In it, the planking of bundles into individual leaves occurs.
In the process of breaking and moving tobacco along a pneumatic pipe
the leaves are dedusted at the same time.
Bales (bales) are transferred for processing, taking into account the prevailing
working day of the ratio of bales by groups. For example, in stacks there is
3000 bales (bales) of 1 grade tobacco, of which 1200 bales (40%) are of the first group, 1200
(40%) - the second group and 600 (20%) - the third group. In this case, every 100
bales (bales) transferred for processing must include: 40 bales (bales)
the first group, 40 second and 20 bales of the third group. If plucking

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eight
there are several installations, then bales (bales) of tobacco of one
temporarily from all groups, if there is one installation, alternately in
an amount proportional to their content in the entire batch.
The ratio of bales (bales) in groups depends on the daily intake
to the tobacco plant and its consumption. Therefore, it is difficult to achieve the development of

in one day, the composition of the bales produced was always completely identical.
on the development of the previous or next day. However, one should take
mother measures to minimize these deviations. On fermentation
factories that have accumulated experience in the processing of tobacco using the tonga method, differences in
composition of bales made on different days are largely smoothed out.
For splitting, as many settings are used as necessary for
simultaneous feeding for averaging of all components of the mixture (but not less
two). In the practice of a number of factories, it is accepted that one splitter
the installation serves two sorting conveyors, to which
chopped leaves. The length of each sorting conveyor is about 6-9 m.
In the process of sorting, selected leaves of other commercial varieties
stacked separately in boxes and at the end of the processing of the entire batch
are transferred for packing in bales. Adjacent to the sorting conveyors
linear mixer, on which additional averaging takes place. Sme-
the carrier also serves as a storage and dispenser of tobacco. Mixing
carried out by a conveyor of a mixing carriage with a continuous reversing
with a strong movement, which ensures the layer-by-layer mixing of tobacco in
within the loaded batch. From the bottom belt of the mixer along an inclined
the tobacco is fed to the conveyor on a vibrating sieve, where it is additionally cleaned from
dust and sand with the release of pharmaceuticals in a separate fraction.
Normally moist tobacco, which does not require drying or moistening, from
vibrating screens are fed to multi-layer bale presses.
Tobacco of high humidity from a vibrating sieve on an inclined conveyor
goes to the mesh conveyor of the "Proctor" type installation for drying.
After passing through the zones of the pre-drying plant (drying, cooling, humidifying
nenie), tobacco leaves through a conveyor system and a dispenser (small
accumulator) are fed into the press to form bales. The dispensers are
connecting element between the continuously operating installation "Proc-
torus "and periodically operating press TPM-15 for the formation of multi-
layered bales. The process is organized in such a way that for the time required
for pushing out the formed bale and preparing the mold for receiving
the next portion of tobacco, the supply of the latter to the press stops. At this time
The tobacco coming from the "Proctor" type installation accumulates in containers
dispensers.

Chamber fermentation of tobacco

The fermentation plant consists of three production sites
(branches): preparatory (pre-fermentation processing), enzyme-

nine
tional and post-fermentation processing. Fermentation department

the plant is the main one that determines its capacity. Depending on the capacity, the number of fermentation chambers at the plant is different (from 5 to 10).

Technological modes of tobacco fermentation

Fermentation of cigarette (oriental) tobaccos depending on their quality is carried out at a temperature of 50-60 ^{0} C, and cigar tobaccos - at more high temperature (up to 70 ^{0} C).

At a temperature of 50 ^{0} C, it is advisable to carry out fermentation all tobaccos of the 1st grade according to GOST 8073-77. All other varieties of tobacco are preferred ferment more at a temperature of 60 ^{0} C, and tobacco of the 4th commercial grade and partially of the 3rd grade even at a higher temperature, up to 80 ^{0} C.

The fermentation process is conventionally divided into three periods (phases). **First period** - gradual heating of tobacco to the maximum temperature for 2-5 days, depending on the characteristics of the tobacco. Air temperature in the chamber increase in such a way that the gap between the air temperature and of tobacco did not go beyond the limit at which an increase in relative humidity at the surface of tobacco bales (bales) to the "point dew "and cause darkening of tobacco. This limit is calculated by psychromet richeskih tables or 1D-diagram. When tobacco is heated, the difference between the air temperature of the chamber and tobacco should not exceed 9-10 ^{0} C, and for light tobaccos - 3-4 ^{0} C.

Moisture condensation is especially dangerous for light tobaccos.

The relative humidity in the chamber in the first period is maintained depending on the moisture content of the tobacco: for tobaccos with normal moisture content air humidity is maintained within 50-60%, for dry - 70-75%, and for tobacco with high humidity, the relative humidity of the air is reduced up to 35-40%. The relative humidity is also regulated depending on the color, maturity of tobacco, etc.

The moment tobacco reaches a temperature close to the limit (50 or 60 ^{0} C), serves as an indicator of the end of the first period of fermentation. Far- The rapid rise in air temperature in the chamber then stops.

In order to accelerate the heating of tobacco to 50 or 60 ^{0} C, the temperature air in the chambers is increased to 50-55 ^{0} C at 50-degree mode and up to 60-65 ^{0} C at 60 degrees. Raising the air temperature in the chambers above 55 ^{0} C (at 50-degree mode) and 65 ^{0} C (at 60 degree mode) technological instructions are not allowed.

The ventilation system of the fermentation chambers in the first period fermentation is set mostly for ventilation. Air is supplied into the chamber along the upper air ducts.

If in the lower tiers of the shelves the tobacco heats up more slowly than with the upper, then the system is switched to supply air to the lower

ten
air ducts. Such periodic switchings achieve uniform
new heating of air and tobacco in the chamber.
After about a day, the temperature of the tobacco levels off with the temperature
ambient air in cases where the chamber during the first
high relative humidity during fermentation
air (70-75%). This is observed during the fermentation of dry tobaccos. In all
in other cases, the temperature of the tobacco at the end of the first fermentation period
below the air temperature in the chamber by 1-3 ^{0} C. This is caused by the cooling of tobacco
in the process of evaporation of moisture while maintaining the relative humidity
air below 50-55%.
The rate of temperature rise during the first period of fermentation is mainly
depends on the nature of the tobacco. For overripe, dry tobaccos, especially
lower breaks, a rapid rise in temperature is allowed within 1-2 days.
When processing dense (material) tobaccos of normal maturity, especially
especially if they are damp, the temperature should be raised much more slowly.
nnee. Light-colored artificial-cured tobaccos also require more
slow and gentle warming up while maintaining a lower
relative air humidity than when heating similar tobaccos
sun dried, having a reddish color.
For bales and bales that are heavier compressed, a slower
rise in temperature, and for loose ones - vice versa. Fastest rise
temperature is necessary for the fermentation of moist tobaccos with signs
mold growth.
In the second period - the fermentation process reaches the highest intensity
vivacity, although by the end of the first period, when the temperature in the tobacco
reaches 45 ^{0} C, it proceeds quite actively. End of the first period and
the beginning of the second is characterized by significant formation of excess
moisture, which, increasing the moisture saturation of the tobacco, can lead to
darkening of the color of the leaves.
In the second period, the commodity properties of raw tobacco are formed
(color, aroma, taste, elasticity) and the most vigorous processes in it
internal changes, characterized, in particular, by the loss of tobacco
ability to absorb oxygen and reduce its water-retaining
ability (tobacco self-hydration occurs).
The second period is the most critical part of fermentation, and
its normal conduct determines the quality of the resulting product.
The air temperature in the chamber is maintained in the second period by
constant limiting level, and the relative humidity in the chamber is
at a level at which the moisture content of the tobacco would remain normal (in
within about 18%). As a rule, for massive dense tobaccos, tobaccos with
high humidity, as well as light relative humidity

maintained at a lower level than overripe, dry and sluggish
fermentable tobaccos for which moisture may increase
air in the second phase of fermentation up to 75%.

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eleven

Since most of the raw tobacco comes for fermentation with
humidity more than 18%, fermentation modes used in the second period
de, provide for the rapid removal of moisture emitted by tobacco, so that
in bales (bales), the air humidity did not exceed 75% all the time (this is the most
neck fermentation condition). For this, the relative humidity of the air is almost
throughout the second period, they are maintained at a low level (in
within 45-60%).

In bales and bales, more strongly pressed (when processing with stos
method and with smoothing the leaves) moisture evaporation occurs mainly
way from the surface layers of leaves in bales and bales, and with a simplified
processing the leaves, moisture evaporates quite vigorously from the inner layers
bale.

Heat is spent on the evaporation of this moisture, and therefore, with "dry" re-
bench press, i.e. at a relative humidity in the chamber below 60%, the temperature
the temperature in bales and bales is always 2-3 ◦ C below the ambient temperature
Ha. Therefore, in order to bring the temperature in tobacco to the maximum permissible
given mode, in the first phase of fermentation, the air in the chamber is heated to
temperature, 3-5 0 C above the limit.

Subsequently, the air temperature in the chamber is controlled in such a way
so that inside bales and bales it is close to the limit for this mode
fermentation.

As the fermentation process weakened by the end of the second phase,
moisture drainage from tobacco is reduced so that the tobacco does not dry out, the relative
the air humidity in the chamber is accordingly increased to 60-75%, which is usually
coincides with the end of the process.

The temperature of the test bales is usually used to determine how satisfactory
the relative humidity in the chamber is satisfactory. If the humidity is
spirit is insufficient, negative differentiation in bales increases (increase
lag of tobacco temperature from air temperature), therefore,
there is an excessive loss of water and air humidity is necessary
increase. On the contrary, if the temperature in the bales increases, it becomes equal to
temperature of the camera and even begins to slightly exceed it (appears
positive differential), the humidity in the chamber is high and its
must be reduced by increasing ventilation.

A practical technique with the help of which the moisture content is determined
baled tobacco, is the observation of the state of the leaf stalks

tobacco, which should be soft but firm. When the tobacco dries out
petioles become brittle (which is usually observed with relative
humidity below 50-55%).
The moisture state of the tobacco is also determined by squeezing in the hand.
bunch of leaves taken from bales. If, after compression, the leaves straighten themselves,
those. have a known elasticity, then their moisture content is normal.
If, after compression, the leaves do not straighten or crumble, then wet
their number is excessive or insufficient for the normal course of the process

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fermentation.
The fermentation of tobacco is determined by the oxygen indicator
(its value should be no more than 0.1 ml), as well as for external and tasting
signs (elasticity, smell, color, aroma, smoke taste, etc.). After
establishing the fermentation of tobacco according to the indicated characteristics, the process
fermentation enters the third, final period, the task of which is
prepare tobacco for unloading from the chamber. The second phase of fermentation lasts 4-6
days The duration of this phase depends on temperature and relative
moisture and tobacco properties. In dry mode, the duration of the second phase can
lengthen by 2-3 days.
In the third period - reduce the temperature of the tobacco and keep it in it
normal moisture, providing elasticity. The tobacco is cooled by
possibilities to the temperature of the room into which it will be unloaded from the farm
a mental chamber; it is not allowed to unload tobacco into a cold room.
The gap between the temperature of the tobacco and the air of the room in which it
unloaded, should not exceed 7-10 ^{0} C.
The transition to the third period of fermentation (tobacco cooling) tolerance
it also occurs with an oxygen indicator above 0.1 ml. For example, at 50-degree
mode, you can start the transition to the third period with oxygen
0.15 ml, and at 60-degree mode - 0.2 ml. But in these cases, the temperature
in tobacco is reduced only to 40 ^{0} C. To further decrease the temperature
tobacco is transferred only after the oxygen indicator reaches the value
0.1 ml This technique was established on the basis of practical observations, showing
that in the process of reducing the temperature of tobacco to 40 ^{0} C oxygen
the indicator, as a rule, also decreases to the established rate.
Thanks to this technique, the duration of the demand is somewhat reduced.
this period, which usually takes from two to four days, and decreases
There is a risk of darkening of light tobaccos.
When cooling tobacco, make sure that its moisture content is equal to 14-
16%, since rapid cooling creates a risk of drying out the leaves,
which will lead to increased pharmacology. Therefore, with a decrease

temperature, the relative humidity should be maintained at
high level (70-80%).
The third fermentation period ends when the temperature drops.
tobacco to 25-30 ^{0} C, at which it is unloaded from the fermentation chamber.
When overexposed in fermentation chambers at high temperatures
the tobacco may darken, which is especially dangerous for light-colored tobacco.
Ki. The total duration of the fermentation cycle under the described regimes
max is 6-10 days.
Combined fermentation **modes** are widely used in fer-
plants in order to speed up the fermentation process or to prevent
rotation of the danger of darkening of tobacco with high humidity.
The main difference between combined fermentation modes and conventional ones
lies in the fact that in bales and bales a positive

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temperature difference by reducing the temperature by two or three times
air in the chamber with its subsequent increase, which contributes to better
drying tobaccos of high humidity.
Another variant of the combined mode provides for a quick
one-time heating of tobacco to the limiting temperature (60 ^{0} C) followed by
gradual self-cooling until the end of the process (bypassing the second
phase). In this case, the air temperature in the chamber for one to two days
rises to 60-65 ^{0} C.
A variant of the combined mode of fermentation with a multiple reduction
the air temperature in the chamber is carried out as follows:
cutting tobacco to 50 or 60 ^{0} C is carried out as quickly as possible (1-2 days). Tempe
The air temperature in the chamber increases during this period to 55 and 65 ^{0} C, respectively .
After heating the tobacco to the set temperature, the temperature
air in the chamber is quickly reduced to 35-40 ^{0} C and maintained at this level
until the temperature of the tobacco also drops by 5-10 ^{0} C and becomes
close to the air temperature. If by this time the moisture content of the tobacco is not
will decrease to 14-16%, and the oxygen indicator - to a value of 0.1 ml, tobacco again
heated to the temperature of the specified mode, and then repeat the gradual
cooling.
The relative humidity of the air when heating and cooling tobacco
maintain at a level that prevents overdrying of the surface layers of bales
and bales (60-70%).
When carrying out combined fermentation modes as with
repeated heating and cooling, and with a single heating
and gradual self-cooling until the end of the process must be observed
the following conditions:

determine the initial oxygen uptake activity before fermentation
tobacco;
after a decrease in oxygen absorption activity to 0.12-0.15 ml at 50 $_0$ C
and up to 0.15-0.20 ml at 60 $_0$ C to carry out systematic daily observations
for its change;
cooling of tobacco below 40 $_0$ C is allowed only after the onset
moment of fermentation, i.e. with an oxygen indicator of 0.1 ml;
for the variant with self-cooling tobacco, until the end of the ventilation process
the system in the fermentation chambers should not be switched off until complete
fermentation of tobacco (oxygen indicator 0.1 ml).
The listed requirements, in particular the determination of the initial value
the oxygen index are due to the fact that with combined
modes, a clear line between the individual phases of fermentation is violated.
In some fermentation plants, combined modes
substantially modified and improved.
In the practice of Moldovan fermentation plants using
the chamber fermentation method (Floreshtsky and others), there were other options
you of the improved combined modes for tobaccos normal and

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fourteen
high humidity. Basically, these modes are as follows.
The first period - the heating of tobacco to 55-58 $_0$ C is carried out by
the fastest (within one to two days) temperature rise
air in the chamber up to 60-65 $_0$ C.This is achieved when all
devices for heating chambers (internal heaters and air conditioners).
When the tobacco reaches the temperature indicated above, heating the chambers
ends, the first period of the process ends.
The second period takes place under conditions of enhanced ventilation of the chamber,
rapid decrease in air temperature in it and the formation of a positive
temperature differentiation. Period of enhanced ventilation of the chamber
lasts 6-12 hours from the moment its heating is turned off.
During this time, the air temperature in the chamber decreases to 50-48 $_0$ C, and the temperature
ratura of tobacco in bales - up to 54-55 $_0$ C. Positive differentiation within 4-7 $_0$
C, which is created at this time, remains until the end of the fermentation process:
it promotes the outflow of moisture from the central part of the bale to the periphery,
as a result, the periphery of the bale remains permanently soft (normally
wet).
The duration of the second phase, or rather the duration of the enzyme,
tions in the conditions of self-cooling tobacco is 5-6 days.
The third period does not have a pronounced border and is smooth
continuation of the second. Preparing tobacco for unloading requires about one

days.
The relative humidity of the air in the chamber is maintained throughout
the whole process at such a level that the petioles of tobacco leaves are
soft and firm.
It is characteristic that with a rapid rise in temperature, the relative humidity
the air in the chamber decreases sharply, but as soon as the heating of the chamber stops
positive differentiation is formed and formed, relative humidity
air rises easily.
The relative humidity in the chamber in the first phase is maintained
at the level of 50-60%. When loading tobacco into the chamber in bales with dried
the surface turns on steam humidification.
In the second period of fermentation, the relative humidity of the air in
chamber is maintained at a level of about 70%, and during the preparation of tobacco for
unloading from the chamber - in the third period - depending on the state of the tobacco
air humidity can be increased up to 80%.
The duration of the entire fermentation cycle under the described mode
about 8 days.
For tobaccos with high humidity, two options are used for improved
combined modes of fermentation.
The first option - the first period is carried out according to the regime scheme,
higher for tobacco of normal moisture content.
After reaching the temperature of the order of 55-58 ^{0} C in tobacco , it is maintained
are kept at this level for one to two days, using periodically

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complete short-term ventilation of the chamber.
As soon as drying of the tobacco in the peripheral layers is noticed
bales, the heating systems of the chamber are turned off, and in the future the process of
tation proceeds in the conditions of self-cooling of tobacco at relative humidity
air in the chamber 65-70%.
In this case, periodic ventilation of the chamber is applied, but taking into account
in order to prevent dryness of tobacco in the surface layers of the bales.
The second period lasts 5-6 days, of which 1-2 days at high temperatures.
pe in bales of tobacco (55-58 ^{0} C) and at low relative humidity in
chamber (45-60%), and the remaining 4-5 days, fermentation continues under conditions
self-cooling of tobacco at a constantly maintained positive temperature
raturny differentiation.
The preparation of the chamber for unloading is carried out within one day at
maintaining the relative humidity in the chamber at least 75%. Continue
the duration of the entire fermentation cycle for this mode option is 8-
9 days.

The second option - the first period of fermentation proceeds in the same way as in the previously described combined mode of fermentation of normal tobacco humidity. When the temperature in the bales reaches 55-58 ^{0} C, the heating of the chamber turns off, fermentation proceeds in the conditions of self-cooling of tobacco with periodic long-term ventilation of the chamber, which contributes to the formation of a positive temperature differentiation.
The relative humidity of the air during this period is maintained at the level of 70-75%.
Due to the fact that high humidity tobaccos go through a fermentation process tations more intensively, while losing a significant amount of water, they and cool faster. Under self-cooling conditions, the tobacco temperature is the third day may drop to 35 ^{0} C and below, although the fermentation process during this time is far from over. Therefore, they turn on again at full capacity.
the heating system for 0.5-1 days and the tobacco is reheated to 40-45 ^{0} C.
At the same time, the relative humidity of the air drops sharply to 50%.
As soon as the temperature in the bales reaches 40-45 ^{0} C, the heating of the camera is completely turned off, which contributes to the repeated the formation of a positive temperature differentiation and an increase relative air humidity up to 70-75%.
The duration of the entire fermentation cycle for this mode option is 9-10 days.
For fermentation of low-grade and non-grade tobaccos (moldy) and other non-standard tobaccos use the following regime option.
The temperature in the chamber within 18 hours rises to the maximum possible value in order to raise the temperature of the baled tobacco faster up to 63-65 ^{0} C.
During the period of temperature rise, frequent ventilation of the chamber is carried out.
At the same time, the relative humidity in the chamber is reduced to 45-55%.

Since the establishment of the above temperature in tobacco, heating the chamber is turned off and the fermentation process takes place in self-cooling conditions. denying tobacco at a relative humidity of 70-75%.
The duration of the full fermentation cycle in this mode is lasts about 9 days.
This mode differs from the previously considered mainly slightly higher temperature, but it was noted that tobacco increased low-grade and off-grade moisture content significantly improve its quality indicators.
According to data from fermentation plants, the combined modes of fermore cost effective than conventional 50-degree modes

fermentation discussed above. This is due to the fact that at 50-degree
fermentation mode, the chamber is heated for six to seven
days, and with the combined - only about two days. The rest of the time is all
the fermentation cycle proceeds with almost no steam consumption for heating. According to calculations
combined modes give savings in fuel, electricity,
reduce mechanical losses of raw materials, pharmaceutical formation and reduce
fermentation cycle by 5-10%.
The fact that under combined regimes tobacco some
being exposed to higher temperatures than intended
technological instructions for this mode (up to 58 $_0$ C at 50-degree
nominal mode), does not have a noticeable negative effect on the quality
tobacco. In combined regimens, tobacco is under the influence of
high temperature for about one and a half to two days, i.e. 2-3 times less than in
the second phase in the usual 50-degree fermentation mode.
Fermentation of tobacco at elevated temperatures is used for
tank raw materials of low commercial grades (3rd and 4th grades in accordance with GOST 8073-77), from-
characterized by a dark green color of the entire leaf blade, characteristic
for unripe tobacco. This fermentation mode significantly improves the taste
new qualities under the influence of high temperatures (about 70 $_0$ C and higher).
Along with improving the quality during fermentation with high
temperatures intensify the process and, therefore, reduce
the duration of the processing cycle of raw tobacco.
Features of the technological mode of fermentation with increased
temperature are as follows: for fermentation at a high temperature
it is recommended to select only tobacco raw materials of the 4th grade and the worst
part of the raw material of the 3rd grade (dark green).
In the first stage of the fermentation process, raw tobacco is heated to
70 $_0$ C per hour by rapid (not more than within a day) temperature rise
in the fermentation chamber up to 70-75 $_0$ C. The tobacco is heated to this temperature
12-18 hours later. Relative humidity in the chamber in the first period
maintained at 60-65% or below depending on humidity
raw tobacco.
In the second period, the tobacco is kept at a constant temperature,

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achieved in the first period. The air temperature in the chamber during this period
also kept constant, and the relative humidity
air - within 60-65%. The duration of this period is about
one day.

The third period - cooling tobacco to 30-35 ^{0} C - takes on average about
one and a half days, and the total duration of the entire fermentation cycle is 3-3.5
days, i.e. 2 times or less than the duration of the fermentation cycle
tobacco of the appropriate grade at the usual 60-degree mode.
Control over the course and end of the fermentation process is carried out as in
oxygen indicator, and by changing the appearance of raw tobacco,
and also according to the tasting assessment of its smoking properties.
During fermentation, tobacco undergoes profound changes in
as a result of which dark greens acquire an olive or brown tone.
If before fermentation the greens were dark, coarse, then after fermentation
tobacco leaves acquire a brown or dark brown color without turbidity.
Control over the course and end of the tobacco fermentation process when
high temperature can be carried out both in terms of oxygen indicator and
the concentration of carbon dioxide emitted by tobacco. When fermented in
under high temperature conditions, the release of carbon dioxide increases to a maximum
at the end of the second phase of the process (after about 36-40 hours), and then decreases,
begins to fade gradually, which indicates the need to go to
the third phase is the cooling of the tobacco.
The maximum temperature at which you can conduct thermal
processing of low-grade tobacco, may be higher than 70 ^{0} C, if
the capacity of the plant's heating system allows it to be achieved.

Making pipe tobaccos

Pipe tobacco as a smoking product has a certain range
consumers whose needs need to be satisfied. However, the number
pipe smokers are relatively small, and therefore the production of tobacco
products of this type are not of a mass nature. On several tobacco
factories have small sections for the production of pipe tobacco,
which ensure the release of this type of product in the required volume.
The manufacturing technology of pipe tobacco has a certain special
fiku, which is that a mixture of leaf or cut tobacco
processed with substances that improve the aroma and taste of smoke. Treatment
such substances of leaf tobacco is called "capping", and processing
cutting cut tobacco - "aromatization".
Sauce can be done in two ways: by spraying
sauce solution of the mass of leaf tobacco or soaking it by
dipping in the sauce solution. In domestic tobacco factories, usually
the first method is applied. In this case, spread out with a thin layer of leaf

howling tobacco is sprayed with a sauce solution and mixed thoroughly. Sack
lies within 24 hours for even distribution and absorption

sauce and then cut. Decoctions from
prunes, dried fruits, natural honey, fruit sugar, etc. Absorbed
the more successful the sauce is, the greater the ability to absorb and retain
tobacco possesses to live in corresponding solutions. Therefore, with the composition
When making bags, the selection of components with loose, lip-
chatted tissue sheet. The main goal, which is achieved by sauce, is
is involved in softening and enhancing the natural taste of pipe smoke
tobacco. Aromatization provides an improvement in the aroma of tobacco smoke, imparting
to him specific features and a certain bouquet of smells.
For this, the cut tobacco is sprayed with a solution of food essences, in
the composition of which may include a variety of aromatic substances, such
as extracts of anise, mint, clove, cinnamon, bergamot oil, licorice,
saffron, etc. After flavoring, the cut tobacco is aged for
days for even distribution of flavors in it.
Depending on the quality of the raw materials used, the manufacturing method and
pipe tobacco packaging is divided into premium, 1st and 2nd grade. In every variety
different brands of pipe tobacco can be produced, differing in the recipe
swarm of mixture, composition of sauces and flavors.
For the premium grade of pipe tobacco, saucing is a must
and aromatization, and for the 1st and 2nd, only aromatization.
The smoking qualities of pipe tobacco are determined by the variety and consistency.
the fact that the "Extra" Class pipe tobacco must have a pleasant,
pronounced aroma and full taste. For tobacco of the 1st and 2nd grades in
aroma and taste are subject to slight defects. For pipe tobacco
appearance and smell are essential. The color of the mixture should
be even from yellow to brown shades, and the smell is pronounced,
characteristic of this brand of tobacco.
Humidity of pipe tobacco when it leaves factories, depending on
varieties should be 15.5-18.5%. Higher in comparison with cigarettes and
with cigarettes, the moisture content of the finished product is a consequence of the sauce
mixtures. High humidity, as well as the conditions of combustion of tobacco in the pipe
determine the width of the pipe tobacco fibers, which is, depending on
bridges from the grade are 1.5-3.0 mm. This makes it possible to facilitate the conditions of combustion of tobacco in
tube, creating a relatively loose mass in it, providing a normal
tightening stress and good oxygen supply to the combustion zone.
Pipe tobacco is available in packs of 50 and 100g. Depending on the
varieties it is packed in colorfully decorated boxes made of tin and cardboard,
packs of label paper or polyethylene pouches. To
preserve the aroma odor, aluminum gaskets are used
foil, waxed paper and parchment.
In addition to smoking and pipe tobaccos, the tobacco industry in

insignificant quantities are produced and such types of tobacco products as

cigars, smoking and snuff tobacco.

Automation of control of the tobacco fermentation process

A new method has been developed at the Krasnodar Research Institute of the Food Industry control of the tobacco fermentation process. The essence of this method is monitoring the changing concentration of dioxide during fermentation carbon in the products of gas exchange between tobacco and ambient air. Studies have shown that this parameter objectively reflects the kinetics chemical reactions occurring in tobacco leaves during fermentation, and the appropriateness of its use to assess the progress and end of the process hygrothermal treatment of tobacco. Application of a new control method completely frees service personnel from the need to enter hot cell for sampling tobacco, as required by the control method process by the value of the oxygen index, and the analysis itself lasts only A couple of minutes.

Initially, for the analysis of a mixture of gases for the content of carbon dioxide, gas analyzers GKhP-ZM and GKhP-100 were used. However, these devices are not in fully met the production requirements. Therefore, in KNIIPP there was a special device-indicator of the IPFT-1 tobacco fermentation process was created, more convenient in operation and allows for analysis with a large accuracy.

On the basis of the automatic gas analyzer TP-2220, a van is a system for automatic control of the tobacco fermentation process. This the system ensures the implementation of all operations for the sampling of gases, their preparation for the analysis and measurement of carbon dioxide content in them without human participation. Only periodic observation of the operator is required, serving fermentation plants, behind the devices (5).

Microprocessor control system for tobacco fermentation

The use of microprocessors can significantly reduce the size, the cost of technical controls, to increase their versatility, ness, reliability. However, the use of universal "free" software of microprocessor devices that are the need to create effective software. In connection with therefore, microprocessor-based programming controllers (PC) - devices with built-in software, which makes it possible to apply them without additional programming. V 1986 at the Chisinau tobacco plant in industrial operation adopted a control system for the fermentation process in the PLF production line based on the domestic microprocessor controller REMIKONT R-100.

REMIKONT R-100 contains a microprocessor computer based on
based on the KR-580 processor, system bus, communication devices with the operator and

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twenty
object, analog-to-digital (ADC) and digital-to-analog converters
(DAC), discrete-digital, digital-discrete and digital-pulse modules
transformations, etc.
The control system implements the existing program modes of the fer-
mentations, as well as new optimized adaptive modes based on
taking into account the parameters of the material, allowing to intensify the stages
heating and cooling and reduce the time of their implementation. Algorithm input
control in the controller is carried out on a specialized technology
English language by service personnel. This language does not require the technologist
knowledge of programming and computing (6).

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