

# THE TOBACCO QUALITY IMPROOVEMENT BY FERMENTATION PROCESS

## ÎMBUNĂTĂȚIREA CALITĂȚII TUTUNULUI PRIN PROCESUL DE FERMENTAȚIE

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**Abstract.** *For obtaining a tobacco with improved physical-chemical and smokable qualities, it is processed through fermentation. After this process, the raw material for cigarettes, finalizes its typical qualities for a smokable product. This work includes the stages of fermentation of the tobacco using different diagrams, conducting the temperature of the air, of the tobacco and the relative dampness. The result of this process is the tobacco good for smoking.*

**Rezumat.** *În scopul obținerii unui tutun cu calități fizico-chimice și fumative îmbunătățite, acesta s-a supus procesului de fermentare. În urma acestui proces materia primă pentru țigarete își definitivează însușirile specifice pentru un produs fumabil. Această lucrare include etapele fermentării tutunului utilizând diferite diagrame, conducând temperatura aerului, a tutunului și umidității relative. Rezultatul acestui proces este tutunul bun pentru fumat.*

### Importance and necessity

By fermentation is also obtained the quality keeping of the tobacco, of a constant quality and chemical composition. The fermentation process is an oxidation process catalyzed by enzymes. In order to realize a correct process of fermentation we have to take in count the characteristics of the tobacco that follow to process. So, the bright color tobaccos, Oriental and Virginia need a light fermentation where reduced transformation take place, but they are imperious for improving the smokable quality. [1].

The brown and rifle green tobaccos need a more intense fermentation, with profound transformation in the tobacco leaf. The technological process of fermentation can be made by the natural way and the industrial way. [2].

The natural fermentation method is adopted when the climatic conditions assure the needed temperature and dampness parameters to this process. This method is known also under the name of a seasonal method because only in a certain season, in our country being in spring, the climate assures the optimal parameters for fermentation. [3].

In this way, the natural condition environment, the heat necessary in fermentation results from the exothermic reactions that take place in the tobacco leaf. In this purpose, the tobacco is laid on tables or bales placed in packs, they auto heat and the temperature crows. [4].

In order to assure differential temperatures according to the variety and the quality class, the dimension of the packs is increased or reduced. The natural fermentation is especially applied in countries with warm climate and they require a large volume of work. [5].

The industrial or artificial way consists in tobacco fermentation in an area named fermentation room, in which the parameters of temperature and relative dampness are conducted by specific installations. [6].

The method can be applied in every season of the year and is called the extra sensorial method. The tobacco heating at the necessary temperature can be assured by air streams and rarely, by electric way.

For the Virginia tobacco at an indirect fire, the treatment in Redrying installations is practiced, followed by aging.

Generally, the technological process of fermentation consists in 3 main stages:

- stage I or heating, consists in increasing the temperature and dampness from air to the specific parameters level of each tobacco breed and quality class;
- stage II or stabilization, consists in maintaining these parameters on a determined period of time, until the physic-chemical processes are finalized in tobacco;
- stage III or cooling, consists in reducing the tobacco temperature level to the room temperature.

The total fermentation duration vary according to the tobacco breed and class between 8-13 days. After the fermentation, the tobacco is stored to aging in specific areas for this purpose. The fermentation process is conducted on the base of fermentation diagrams as follows:

Table 1

**Fermentation diagrams**

Breed	Stage	Parameters	Duration
Virginia F. I	Heating	Rd: 55-60%	2 days
	Stabilization Cl. S+I+II Cl. III+IV	Tt: 44-46 Rd: 60-65% Tt: 50-52 Rd: 70-75%	5 days
	Cooling	Rd: 70-75%	2 days
	Heating	Rd: 55-60%	2-3 days
Burley	Stabilization Cl. I	Tt: 50-52 Rd: 60-65%	5-6 days
	Cl. II	Tt: 53-55 Rd: 75-80%	
	Cl. III+IV	Td: 57-58 Rd: 60-65%	
	Cooling	Rd: 70-75%	2-3 days

### **The physico-chemical transformations from the tobacco leaf during the fermentation**

During the fermentation, the tobacco suffers important changes: physical, chemical and biochemical.

The physical changes concern the color, resistance, elasticity and the hygroscopicity. So, the color becomes lightly darker and is homogenized, the resistance and elasticity of the foliar tissue is decreased and so the hygroscopicity.

The weight losses of the fermented tobacco are due the water elimination and the consumption of dry matter, these losses could be to 9%.

The chemical changes are due the enzymes, which determine the physiological and biochemical processes in the tobacco leaves.

Carbon hydrates, a positive element in quality determination, present a decrease of the qualitative level, as a consequence of the dry matter consumption. By their degradation, caloric energy, water and carbon dioxide is released. A part of sugars, through non-enzymatic reactions with Maillard type amino-acids finally lead to maloidynes formation, compounds they compete at the homogenization of the tobacco leaf color.

So, from a yellow tobacco with 15% soluble carbon hydrates, by fermentation can decrease with 3% from dry matter. [8].

The starch is completely hydrolyzed during the fermentation. The pectin substances can be transformed in carbon hydrates, being turned even into monosaccharoses, a process that leads to elasticity and resistance decreasing of the tobacco leaves.

The nitrous substances are degraded with the release of ammonium. The proteolytic degradation of the albumins can reach to poly-peptides, dy-peptides and even to amino-acids. The content in total nitrogen decreases during the fermentation between 0.8 and 2.6%. [10].

Nicotine is quantitatively decreasing by fermentation due the oxidation, the microbiological degradation and can result due the conversion in nornicotine, nicotinic acid and oxy-nicotine.

The organic acids, especially the malic acid and citric acid, break into simpler acids, but in the same time the oxalic acid content is increasing.

Poliphenols tend to decrease as a consequence of oxidations and their combination with amino-acids, leading to a darker color of the tobacco leaves.

The pitches and etheric oils maintain their levels and present a high level in bright tobaccos, submitted by the Redrying treatment.

The ash is in a larger amount in the fermented tobaccos comparative with the unfermented tobaccos.

## CONCLUSIONS

Consequently the fermentation process applied and correctly led from the scientific point of view leads to a series of chemical and biochemical transformations, in the purpose to fix the qualitative characteristics, especially color and taste.

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