

MICROWAVE DRYING OF SORIZ GROUP UNDER OSCILLATORY REGIME

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Summary: The paper presents the systematization of investigation made to consider the drying of soriz croup, applying the method with S.H.F., reflects the next advantages: saves the costs of electric power, reduces the drying duration, the small inertness of deviances the keeping of product quality. Under experimental dates, it was built the drying curve and the curves of speed drying.

Introduction

There is the big quantity of drying technology: the natural, convention, through airy, fluidity stratum etc. In purpose to save the costs of electric power, the keeping and bettering of product drying, is proposed the electrophysical method to intensify at drying process with helping waves of super high frequency.

The drying specifics features in S.H.F. plan under of product heating in mass and volume and the setting up of temperatures gradient, to make for product center.

The advantage of drying with waves S.H.F. consists of possibility of adjustment and maintain one determined temperature of product, to intensify appreciably at dehydration process, it reduces appreciably the costs, S.H.F. has the efficiency from 50–70% and costs are 1.2 kW for 1kg of evaporated humidity [3].

After the international convention in industrial and scientific purpose it was used the frequency ladders: 915, 2450, 5800, 22125. More often are used the frequency 2450 MHz, which we used in the investigation, where the distribution of electric power is provided more uniform, but the power of magnetron is 2.5–100 kW.

For fulfilling the investigation, the product quality was appropriated (the boiling soriz croup) for drying the object with waves S.H.F., for application of the most propitious frequency with evidence of the quality of product [2].

Thus the porridge of soriz is classified under structural –sip quality, which answer for spreading resistance and dependence of pores emplacement in the product after size. After investigation of scientists, the porridge of soriz is classified in matters at I–II class what to support one effective regime of drying 5–40s with repose.

That is why for drying of boiling soriz croup with waves SHF, to propose the next scheme of effect the experiments.

Table 1. The scheme of the drying oscillating systems.

5/25	10/25	15/25	20/25	25/25
5/20	10/20	15/20	20/20	25/20
5/15	10/15	15/15	20/15	25/15
5/10	10/10	15/10	20/10	25/10
5/5	10/5	15/5	20/5	25/5

Materials and methods

We fulfilled with success the strategy for choosing the best equipment for the drying process.

The investigations were done in a modernized lab installation – a super high frequency CII-01.

The installation for drying, was build on the microwave oven of nominal power (1,5kW) basis, and is composed of:

Such a construction of the installation allows a permanent registration of the sample mass over different periods of time.

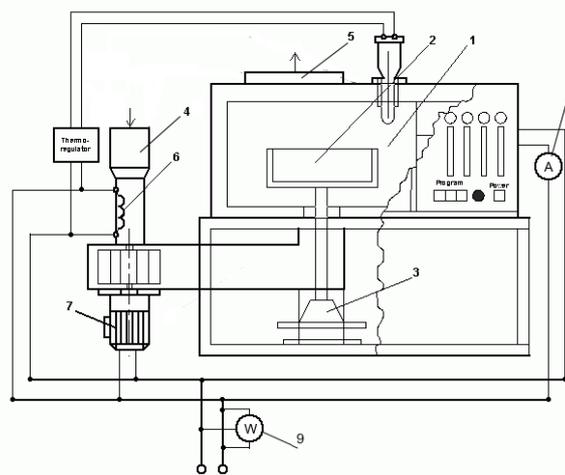


Fig.1. Scheme of the laboratory dry installation.

1. in this part is placed a condenser, 2. with a vessel form, 3. the analysed product is placed in the condenser. In the drying room are connected couplings. 4, 5 for the entering and evacuation of the drying agent. The drying agent is warmed up by the electric radiator. 6 Through the ventilator 7 the drying agent is repressed in the drying room. The indication 8 shows the consumption of the electric power for the creation of the electromagnetic field impulses. The electricity consumed by the drying installation is registred in the electric meter 9.

The drying of boiling soriz croup through SHF method was done in different power at magnetron at: 25%, 50%, 75% and 100%. Examining the drying grits it was established that the systems are very hard, because the croup it destroyed termically. Thus it was appealed to scheme in table1 for drying the boiling croup, to obtain the good result.

The experimental, effects only in regimes above diagonal.

Results and discussions.

Knowing the dielectrically quality of boiling soriz croup and fundamental indexes, after the experiment it was obtained the drying curves and speed of drying curves in different regimes.

The curves forms correspond to the curves described in the literature for the capillary-porous corps [1, 2].

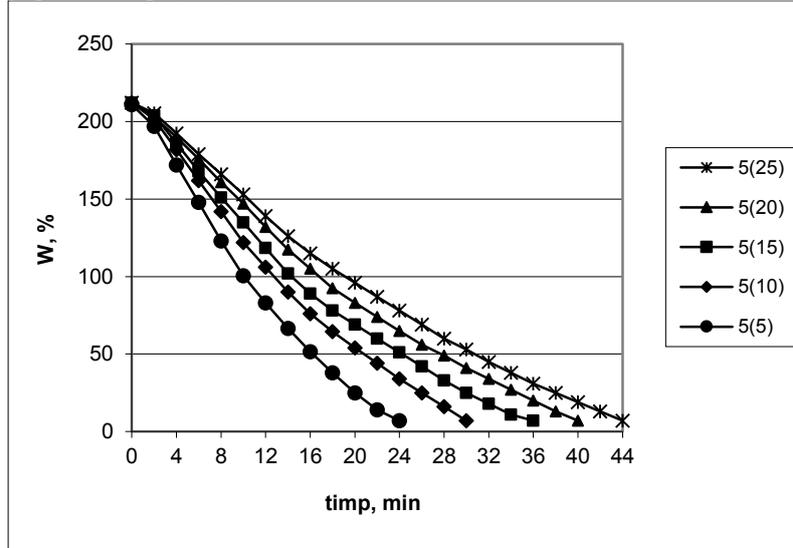


Fig.2. Drying curve in the (5/5-5/25 system).

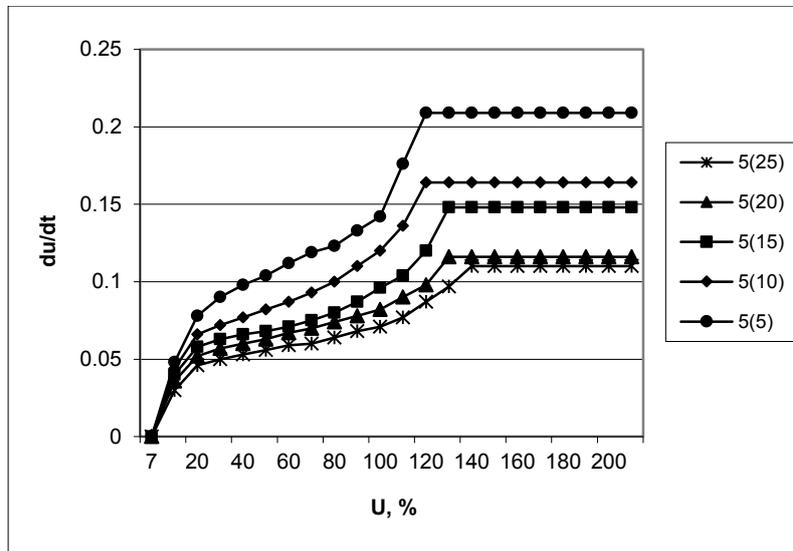


Fig.3. Speed of drying curve in the (5/5-5/25 system).

Analyzing the drying curves it was observed that the drying duration is falling once with the temperature raising in the product, as in 5/5 regimes the temperature of the product is greater than in 5/10; 5/15 regimes. Because the action cycle is repeating itself just over 5 sec., while the, 5/10 regime action cycle repeats itself over long time at repose 10, 15 sec. in that time the product loses from the temperature. Under obtained results of the investigation of drying product, (the sensory indexes, the chemical composition) the most propitious drying regimes is – S.H.F. of soriz croup in hydrothermal processing

The speed of drying curves was built through graphics derivation method of drying curve. In table 2 it is observed that drying processing with S.H.F. is divided in 2 periods.

The first period has a constant speed of drying, in medium 30% from total duration of drying.

With the rise of the action duration and the fall of repose duration the speed of drying is raising consecutively.

Conclusion

For the investigation was used the soriz croup “Alimentara 1”, which was preventively processed hydrothermically (ferriferous in water under pressure and then boiling) then it was dried with S.H.F. It was done in more than 15 experiments of drying of different oscillation regimes at magnetron. The initial mass for each sample of drying croup is 70g. Following of drying S.H.F. the humidity content and boiling soriz croup is falling from 67% to 7%. The drying duration for most propitious regime of S.H.F. drying 30 min. and in composition of drying of croup trough the convention method, the drying processing is intensified 2 times.

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