sciforum-098945: A new method of hulling oil seeds in Ukraine

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Introduction

The stages of seed dehulling, such as sunflower or safflower, do not meet the requirements for a high degree of target product preservation (kernel) and high purification selectivity. Hulling the seeds using the single oriented strike method is characterized by a degree of hulling of no higher than 80-85%; therefore, it leaves a noticeable amount of hulls in the cake and meal. This, in turn, results in a low degree of utilization of their nutritional potential, which is up to 65-70%. The purpose of this study is to find a new method of seeds dehulling when the seeds are cooled to sub-zero temperatures.

Methods

Physical–chemical, technological, and structural–mechanical parameters of seeds were studied as per ISO standards.

Results

A method of dehulling sunflower seeds at negative temperatures of -30...-42 °C was developed. This method allows us to obtain a dehulling rate of up to 99-100% in cases where the moisture content of the seeds is not more than 3.0%. For the sunflower hybrid Ukrainian F1, the maximum dehulling rate was achieved when the seeds were dried to a final moisture content of 3.0-0.5%. The dehulling rate for safflower seeds, when the seeds were frozen, increased by 3.6-4.0 times, from 19.7-23.0% (at 20°C) to 83.0-85.0% (at -40...-42 °C). This new hulling method allows us to obtain a reduced yield of oilseed dust by 2-6 times.

Conclusions

The new method of oil seed dehulling in a frozen state not only allows us to overcome the main drawback of the existing technology, but also to obtain a hull-free kernel in one pass through the seed crusher (hulling degree 99-100 %) with a minimum content of oilseed dust of 2.4-3.8% and a safety factor of the whole kernel of 0.96-1.00 units.