AGRICULTURAL PRODUCTION AND TECHNOLOGICAL QUALITY OF FLAX (IN RUSSIAN: AGROPROIZVODSTVO I TEKHOLOGICHESKOYE KACHESTVO L’NA), by E. L. Pashin. Kostroma, 2004, 208 pages.

An interesting monograph on the formation of technological quality of flax was published under the imprint of All-Russian Research Institute for Processing of Bast Plants. In the first three chapters the author has presented general information on flax, processing of flax stalks in order to obtain fiber as well as relationships between different parameters influencing fiber yield and formation of fiber quality. Since yarn quality is determined by its tensile strength, parameters of inhomogeneity and linear density, the author has included in the second chapter relevant formulas, namely Komarov’s formula for the evaluation of inhomogeneity of flax yarn on the ground of breaking tenacity, Martindale’s formula describing the dependence of yarn variation on linear density and Perepelkin’s formula that combines several parameters responsible for yarn breaking. The third chapter that closes the introductory part of the book describes peculiarities of flax structure including botanical characterization of the plant, morphological description, anatomical structure, phases and subphases of flax plant development, structure of fibrous tissue and the effect of external conditions (moisture, light, nutrients, type of soil) on the development of flax plants. At the end of the above chapter, a model of the structure of bast fiber plants, developed recently by Grebyonkin on the grounds of NMR spectroscopic studies, was presented. Grebyonkin’s three-component model of hypermolecular
structure of cellulose present in bast fibers is based on the molecular mobility of macrochains in amorphous and crystalline regions and can help with explaining the effect of lignin on results of different methods of flax fiber processing.

Chapter 4 is devoted to selection, seed production and technology of flax cultivation and includes discussion on problems associated with the development of cultivars capable of giving fiber of better quality as well as presents reasons for the deterioration of fiber flax quality at different stages of its production. The effect of retting method on fiber linear density and breaking tenacity as well as the quality of fiber from dew-retted and water-retted flax were evaluated. Soil treatment, fertilizers for flax cultivation including the effect of nitrogen deficiency and excess and the role of phosphorus and potassium were presented as well. Then the author has described the treatment of seeds before sowing, the protection of crops against insects and weeds, problems associated with harvesting including harvest time, technology of flax harvesting and harvesting machinery. The presentation of machinery is accompanied by schemes, figures and pictures of machines.

The last three chapters (6-8) deal with drying of harvested material and seed cleaning, preparation of retted flax, mechanism of decomposition of pectin substances and changes occurring in technological properties of flax stalks at different stages of flax cultivation and processing.

Most of examples given in the book, both as concerns flax cultivars and machinery, are limited to those of Russian origin. Paradoxically, this limitation can become an advantage, if the book is translated into English, because readers of the translated version will receive an access to information about Russian achievements which is not easily available due to the language barrier.

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THERMOMECHANICS OF DRYING PROCESSES, by S. J. Kowalski. Springer Verlag: Berlin, Heidelberg, New York, 2003, 365 pages.

The book contains the following information:

- information about properties of dried materials, description of drying process and balance formula,
- thermodynamical principles of elastic and viscose materials drying,
- information about damages of materials during drying,
- introduction to numerical analysis in drying processes,
- description of stresses caused by drying of cylindrical and spherical objects as well as those of anisotropic structure.

The book presents a systematic theory of drying the capillary and porous solids against the thermodynamics background. It combines the knowledge of chemical and process engineering and mechanics of continua. It contains an uniform approach to heat and mass exchange processes and describes the connections of these processes with mechanical phenomena of dried material.

The theory presented is a baseline for a numerical analysis of mechanical behavior of materials during drying, especially to describe the stress generated by drying and its evolution across the time. It also allows for computer simulation of drying processes to optimize them in respect of both time of drying and strength of dried material.

Such a simulation allows for designing a drying process steering program in such way to obtain a product with no excessive deformations and cracks in possible shortest time.

To verify the optimized drying processes designed by computer simulation methods the method of acoustic emission was proposed and illustrated with examples. This method allows for on-line diagnosis of the drying process history, namely it allows for evaluation of increase of stress and progressing destruction of dried material.

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