quality of different sterilisation conditions, it is necessary to calculate the combined influence of time and temperature on rheological, chemical and sensory properties.

The changes in food composition during the heat treatment are expressed by so called ***C-value*** *(cook value)*. This value characterises the product cooking degree and enables to compare the changes caused by denaturation of nutrients in the given product at certain thermal intervention[8]. The method comes from the presupposition that the considered changes in nutrients caused by denaturation take place according to the kinetics of the first order reaction. It appears, that the dependance of nutrients denaturation rate on temperature can be expressed in the same way for microorganisms and enzymes - by the *D* and *z* values, i.e. the slope of the straight lines for denaturation of these components is in the linear dependance on denaturation of food with the thermal intervention. The higher is the z_c value, the more resistant is the given food component against the influence of thermal energy.

Leonard et al. proposed a cook value (C-value) which is calculated in analogue to the sterilisation value (F-value) as follows :

$$C = \int_0^t \frac{T(t) - 100}{10^{Zc}} \, dt$$

The definition is given including a formula comprising an expression *z-value* z_c (°C), being a value of straight line for denaturation of food nutrients and expressing a temperature interval necessary for running of this straight line through only one logarithmic cycle. In general is mostly used a z_c-value equal 33 °C as an approximation for chemical changes. In fact, very few experimental measurements of C- and z_c-values for different foods have been reported in the literature [2,3,4,6,7,8].

When the thermosterilisation process from the point of maximal retention of nutrients shall be optimized, it is necessary to find the minimum C-values for the given F-value.. The presupposition takes in consideration that when C-value is minimal for F = const., then also ratio C/F is minimal. But the margin of sterilization temperature is valid, because C-value should be minimal only at very high temperatures with subsequent achievement of F-value. The most suitable is to look for the optimal temperature and time for F- and C- values, that are afore known. F-value is determined according to the character of the product. Minimum C-value is determined on the basis of *z*-value for the selected components [7,9].

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GROWING OF AMARANTH AND ITS IMPORTANCE IN MAN NOURISHMENT

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Summary

Amaranthus belongs to pseudo-cereals and was grown by ancient Mayas (Moudrý, et. al.,1999) for whom it was a sacred plant. Amaranthus is an annual dicotyledonous plant. Plants have a bulky pile root with a firm often 2 m high stem (depending on genotype)and rich panicle of varied color. It belongs to plants with C 4 cycle, i.e.plants with high demands on temperature. Growth of plants is slow in the beginning of season and therefore very sensitive to weeds. Convenient front-crop are rape, leguminous plants, cereals (except rye). Soil preparation in spring season has to be good with respect to very small seeds. Seeds are sown at dose of 1.5-2.0 kg/ha in depth max. to 1.5 cm and row distance of 20-35 cm. Convenient period of sowing under our conditions is usually at soil temperature above 12 C in the middle of May. Weed control is possible to do by harrowing. In case of bad climatic conditions (crust or wet soil)

there is a danger of infection by parasitic fungi of the genus Fusarium, Pythium, Rhizoctonia and Aphanomyces which attack roots, stems and cause so called falling of plants. Beetles (foliage consumption), aphids(deformation of leaves and stems) and corn borer (damage on stems) are usual pests of amaranth. Harvesting time is influenced by tere date of sowing, variety and climatic conditions at harvest period. Average yield varies around 1 t/ha. Storage humidity is 12%. Harvest range losses between 8.0-44.0%. (Peterka et al., 2000).

Genus Amaranthus (L.) represents 60 species among which some (A. cruentus., A. hybridus., A. dubius, A.tricolor., A. caudatus etc.) can be grown and used as vegetables. Plants can reach height of 1.0-1.6 m and they are harvested 3-5 times per season. The color of leaves and stems varies between light green to dark green with various spots on leaves and colorful violet. Seeds are dark red to black and 0.8-1.5 mm in size. Vegetable varieties of amaranth are characterized by high content of proteins in plants (1.2-1.4 g of lyzin per 100 g). High content of minerals is also important, particularly: 800 mg of Mg per 100 g, 900 mg of K per 100 g, 650 mg of Ca per 100 g, 500 mg of P per 100 g, 120 mg of Fe per 100 g, 60 mg of Zn per 100 g.
Also the content of vitamin C is interesting: 700 mg per 100 g, B 2 (riboflavín) 2,1 mg per 100 g.
From the viewpoint of utilization it is necessary to mention amaranth flour with its high contents of essential amino-acids (lyzin, leucin) and absence of gluten. The flour seems to be a suitable component for mixtures with vheat or rice. Amaranth products are suitable for individuals suffering from"celiakie", food allergy, or for babies (up to 1 year of age) for production of formulas replacing breast-feeding. Am flour also helps aterosclerosis prevention as well as the prevention of heart problems, lower limbs problems, angina pectoris, heart attach, brain stroke or diabetes and obezity. Due to the high contents of fibre and starch it cures and prevents constipation, diarrhea or intestinal inflamations. Amaranth oil contains unsaturated fatty acids (linol) which reduce the levels of cholesterol. The oil can be used cold as an ingredient for food products as margarine or salad dressing. With regard to high nutritional value of the seeds (18% proteins, 5-6% fat, more than 7% fibrous matter and other mineral substances) there are many interesting possibilities how to utilize the crop outside food industry.

Key words: amaranthus, Fusaria, yield

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