O. Stupakov, N. Kondratiuk, S. Riabovol

WAYS OF REDUCING CARCINOGENS IN SMOKED FOOD

Smoking is a technological process of processing raw materials of animal origin, which creates a unique taste and aroma of a food product. According to available information, between 40 and 60% of all meat processed in Ukraine is smoked. Such products have a long shelf life, as numerous smoke components have an antimicrobial effect and prevent oxidation. However, it is well known that some of the smoke substances can be harmful to health due to their potential mutagenic/carcinogenic properties.

Polycyclic aromatic hydrocarbons (PAHs) and heterocyclic amines (HCAs) are oncogenic substances. These compounds are formed during the processing of meat (beef, pork, poultry) and fish at temperatures above 150^0C. HCAs are formed as a result of excessive heating of sugars and amino acids contained in raw meat and marinating mixtures. The source of surfactants is overheated fats. HCAs and surfactants accumulate on the surface of smoked products and constitute a hazard when consumed.

So, despite the great taste and aroma of smoked products, it should be remembered that they can be sources of mutagenic substances that can alter the consumer's DNA, exposing them to cancer. It should be noted that when ingested, HCA and surfactants are metabolised by enzymes, which makes them dangerous for the large intestine, mammary glands, liver, and prostate [1].

During the analytical research conducted by us, it became known that many ethnic traditions consist in the processing of meat and fish raw materials by means of smoking, roasting on an open fire (grilling). However, it is reliably known that the formation of HCA and surfactants can be prevented by proper preparation of products before heat treatment at high temperatures, namely, preliminary marinating of meat [2].

For instance, vitamin E, which is contained in oils (sunflower, corn, sesame, rapeseed, pumpkin), can prevent the formation of carcinogens. In addition, the antioxidant compounds in rosemary, turmeric [3], garlic, berries and fruit [2] can inhibit both the formation of HCAs and surfactants on the surface of foods and prevent their metabolism in the human body. It should be noted that there are effective technological methods to reduce carcinogenic compounds on the surface of meat and fish products. For example, reducing the processing time of products can be achieved through pre-marinating. Muscle fibres soften under the influence of organic acids contained in marinades during the marinating process, and thus products reach the state of cooking readiness faster or at lower temperatures.

Thus, taking into account that pre-marinating reduces the duration of heat treatment, and the marinade components, due to their high antioxidant effect, can reduce the amount of HCAs and surfactants both on the surface and in the human body, it can be said that with moderate consumption of properly prepared smoked products, it is possible to avoid the mutagenic effects of carcinogens and protect the consumer's body from cancer.

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