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The presence of rodent hair in food : a risk of human health *

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Abstract

Rats and mice, have accompanied man for many centuries, they adapt to any environment. They are responsible for large losses in world food production and they are important mechanical vectors in transmitting illnesses to man. The presence of hair in food is a characteristic indicator of the infestation by rodents. The presence of hair is related to that of excrements. To recuperate the hairs in food analyses, micro-analytical techniques are used. Rodents have three types of hairs: sensorial hair, fur hair and guard hair. Sensorial hairs are large and thick, having a reduced medulla and nervous tissue in the follicle. Fur hair is fine and weak, small and soft, to maintain the animal's body temperature, with a medulla composed of a single layer of cells. Guard hair is long and thick and protects the others, it is more pigmented and the medulla has various layers of cells. Fur hair and Guard hair are those most frequently found in food. Between 1995 and 2005, 1,473 microscopic analyses were performed at the Adolfo Lutz Institute - Campinas Regional Laboratory, Food Microscopy area, to study extraneous materials in several types of food. Rodent's hair was found in 37 samples (2.5 %). According to legislation RDC n° 175/03, ANVISA/MS, the presence of rodent hair in food makes it improper for use, for they are considered as prejudicial to human

health. Their presence also makes it evident that there are failures in the application of good manufacturing practices.

Key words: rodent hair, food, legislation.

Rodents, rats and mice, have accompanied man for many centuries. Being omnivorous animals, they adapt to any environment, from farm fields, food storage locations, homes to the sewer system, among others. They are responsible for large losses in world food production, mainly in developed countries, and they are important mechanical vectors in transmitting illnesses to man (Carvalho Neto, 1988). According to Zimmerman and Friedman (2000), they are considered the greatest causers of human illnesses and deaths, when compared to other mammal groups. As mechanical vectors, they transmit salmonellosis, leptospirosis, murine typhoid and, more recently, mice (*Peromyscus maniculatus*) have been associated to a pulmonary syndrome produced by hantavirus.

The presence of hair in food is a characteristic indicator of the infestation by rodents (Vazquez, 1993). The presence of hair is related to that of excrements, since these animals have the habit of licking their hair to clean themselves, and by this action, they also swallow much of it, excreting them in their feces. To recuperate the

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hairs in food analyses, micro-analytical techniques are used (Boese & Cichowicz, 1995). As rodent's hair is considered as extraneous material, light filth, i.e., it is separated from product by floating in an oil-aqueous liquid mixture. As hair is lipophilic, it is dragged to the oily layer. By filtering this oily layer on filter paper ruled, the hair can be identified under a stereoscopic microscope.

The macroscopic characteristics are important for their classification: length, color, texture, forms and microscopic structures (cortex, medulla and cuticle), Deedrick & Koch (2004). By differentiating these structures and through classification keys, one can determine the genus and specie (Vazquez, 1993).

Rodents have three types of hairs: sensorial – feeler hairs, fur hair – covering their bodies and guard hair – for protection and defense (Deedrick & Koch, 2004). Sensorial hairs are large and thick, with long and fine parts, having a reduced medulla and nervous tissue in the follicle; Fur hair is fine and weak, small and soft, to maintain the animal's body temperature, with a medulla composed of a single layer of cells (Figure 1A and B); Guard hair is long and thick and protects

the others, it is more pigmented and the medulla has various layers of cells (Figure 1C). Fur hair and Guard hair are those most frequently found in food. The most common species of rodents in Brazil are: *Rattus norvegicus* (Rat), *Rattus rattus* (Black rat) and *Mus musculus* (Mice), Carvalho Neto (1988).

Between 1995 and 2005, 1,473 microscopic analyses were performed at the Adolfo Lutz Institute - Campinas Regional Laboratory, Food Microscopy area, to research extraneous materials in several types of food. Rodent's hair was found in 37 samples (2.5 %) as shown in Figure 2.

According to legislation RDC n° 175/03, ANVISA/MS, presently in force, the presence of rodent hair in food makes it improper for use, for they are considered as prejudicial to human health (Brasil, Leis, decretos, etc., 2003)². Their presence also makes it evident that there are failures in the application of good manufacturing practices, characterizing unsatisfactory hygienic conditions; besides this, they also eliminate the pleasure of eating such food products, as would normally be expected.

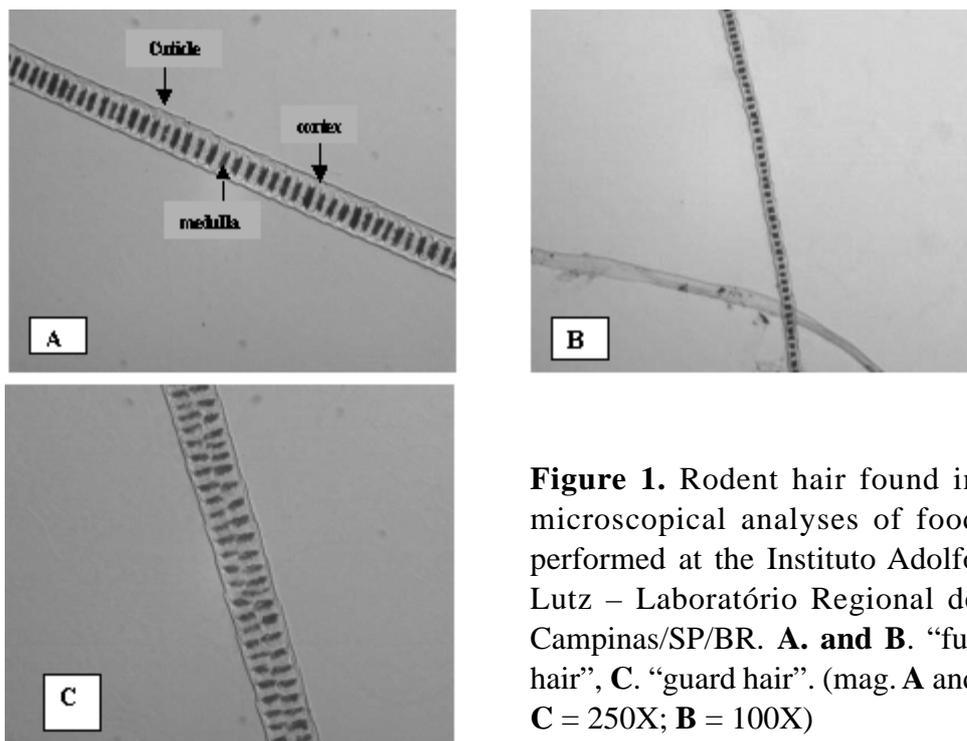


Figure 1. Rodent hair found in microscopical analyses of food performed at the Instituto Adolfo Lutz – Laboratório Regional de Campinas/SP/BR. **A. and B.** “fur hair”, **C.** “guard hair”. (mag. **A** and **C** = 250X; **B** = 100X)

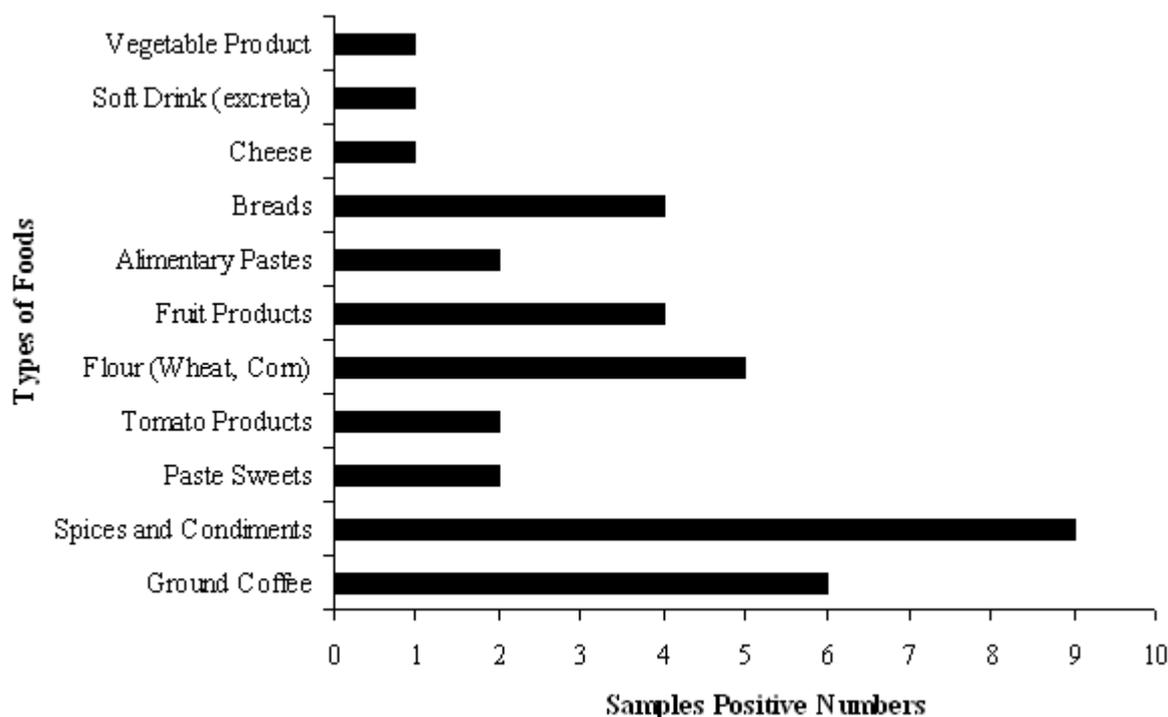


Figure 2. Positive Samples for rodent's hair in several types of foods analysed in the Food Microscopy area at the Adolfo Lutz Institute – Campinas/SP/BR, since 1995 to 2005.

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