Antimicrobials in foods today and the role of chitosan - current hopes and new perspectives

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At present, the food industry faces different challenges with relation to food safety, public hygiene, and new regulatory norms on the international level [1-3]. Many of these matters concern the nature of foods and beverages in terms of chemical contamination, chemical and physical features (with relation to artisanal products and new or “ameliorated” industrial versions), microbiological contamination, detection of foreign matters, intentional food adulteration, traceability, sustainability, etc. [4-6]. However, one of these arguments at least is not immediately recognized by food consumers because of the clear connection with non-food industries: the contamination and the allowed or unallowed use by antimicrobial substances for food production purposes.

Actually, the use of antibiotics and similar compounds in this ambit is well known and a vast literature is now available when speaking of the correlated risk in terms of human health [7]. Two basic consequences are observed when speaking of antimicrobials in foods: the psychological impact of these compounds on the behaviour of food consumers on the one side, and the real effects on human health. Practically, the problem is the selection of resistant mutant life forms in foods because of the intensive use of antibiotic, even at low dosages: risks could be minimized depending of the usage, but the theoretical danger is always possible. For these reasons, risk assessment is surely needed in these food-related ambits. Many different products – raw milk cheeses, cured sausages, market vegetables, etc.) can show similar resistant microorganisms (enterococci, staphylococci, lactococci, coliforms) [7,8]. Because of the possible transfer of mutant and resistant life forms from animals or vegetables to the human being, common technological measures against microbial spreading and pathogen attacks may be not sufficient [9]. For these reasons, risk assessment studies could suggest the elimination of antibiotics in animals; however, several researchers have recently considered that the effect of similar actions could be detrimental for animals and the human health without advantages when speaking of safe foods. On the other side, the careful and reliable monitoring of antimicrobial usages in the food production should give better results [7,8]. Anyway, alternative systems for the eradication of most dangerous infections are needed [10].

One of the most recent innovations in this ambit is the use of chitosan in certain food productions, including also the management of food production areas (work surfaces for sanitation purposes) and food packaging technologies and applications (surface sanitization against biofilms; realization of antimicrobial packaging materials; food preservative; etc.). On the other side, the use of chitosan may be still questionable in these ambits: at present, there are only a few data concerning toxicological aspects and safety evaluations of this versatile antimicrobial in foods [17]. Consequently, more research is needed.

References


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