



EXTENDED ABSTRACTS

Assessment of Antimicrobial Effect of the *Artemisia herba-alba* Aqueous Extract as a Preservative in Algerian Traditional Fresh Cheese

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ABSTRACT

In food industry, the major challenge is to oppose food alterations. Industrial have always resorted to the use of synthetic additives developed by the chemical industry. These synthetic compounds are widely used to protect food, reducing lipid oxidation and microbial growths during food storage. However, some of them have shown several disadvantages and limits of use like butylated hydroxyanisole (BHA) or butylated hydroxytoluene (BHT), which are suspected to have pathological and toxic effects as chronic toxicity (carcinogenic and allergenic effects). Hence, the new antimicrobial agents should be from natural wholesome sources. Thus, essential oils, proteins and peptides represent the new generation of antimicrobial agents. The efficiency of medicinal plants has driven researchers to conduct thorough studies of defense systems to identify active molecules. These latter synthesized by the plant, as being secondary metabolites are classified into different families according to their chemical structure. The active molecules might be phenolic and proteinaceous compounds, and peptides with antimicrobial activities. Several extracts and essential oils of *A. herba-alba* have shown biological activities, such as anti-malarial, anti-viral, anti-tumor, antihemorrhagic, anti-coagulant, antioxidant, antidiabetic activities and strong antibacterial activities against several human pathogens [22-24]. *A. herba-alba* essential oil contain mainly aromatic substances such as terpenoid, flavonoid, coumarin, acetylenes, caffeoylquinic acids and sterols. In addition to the previously described components, *A. herba-alba* contains antimicrobial peptides. The first identification of which was made by. These PAMs inhibited the growth of *Listeria monocytogenes*, *Staphylococcus aureus*, *Bacillus cereus* and the new approved species *Bacillus cytotoxicus*. The aim of the present work was to highlight antibacterial activity of *A. herba-alba* aqueous extract after partial purification of active molecules by ammonium sulfate precipitation and the study of application of the extract obtained as food preservative by assessment of its antimicrobial effect on the storage time of "Takammérite" traditional fresh cheese. Plant material and bacterial cultures, Preparation of crude extract and ammonium sulfate precipitates, Cheese preparation and application of active extract, Microbiological analyses, Statistical analysis A crude extract was prepared by soaking of the dry leaves of *A. herba-alba* in phosphate buffer and in order to obtain concentrated fraction in active molecules, a series of ammonium sulfate precipitation was carried out. The precipitates obtained were dissolved in phosphate buffer and them

antibacterial activity was examined by demonstrating the zones of inhibition on agar medium inoculated with a target strain. Seven strains were tested: *B. subtilis*; *L. innocua*; *L. monocytogenes*; *E. faecalis*; *S. aureus*, *M. luteus* and *E. coli*. Studies showing, in vitro, the antimicrobial activity of peptides are uncountable. However, there is not much works treating activity of antibacterial peptides in the food medium whose complex composition may affect the efficiency of these peptides. Added to skimmed milk and to the carrot juice, the peptides resulting from α s2-casein hydrolysis have showed substantial loss of activity. The latter seems to be influenced by the presence of metals cations. So, studies on the factors influencing the activity of these peptides and appropriate methods for efficient applications are necessary. The growth of yeasts and molds can lead to organoleptic deterioration of the fresh cheese due to their high lipolytic and proteolytic activity. The increase in their growth is favored by the pH decrease of the medium. Yeast and mold are observed from the first day with a count of $3.74 \pm 0.09 \log_{10}$ CFU/g. After 15 days of storage, the rate reaches $4.40 \pm 0.15 \log_{10}$ CFU/g in cheese without extract. However, the treated cheese, showed significant slowest increase in the number of yeasts and molds ($4.06 \pm 0.13 \log_{10}$ CFU/g) ($p=0.0150$) (Figure 2c). It is necessary to note that the processed fresh cheese is prepared by raw milk that has not undergone any heat treatment to reduce its initial microbial load. In the current context of food safety and protection using natural molecules, the application of ASP60 on traditional fresh cheese "Takammérite", as preservative, causes a significant slowdown in microbial growth during storage by refrigeration. Nevertheless, it is necessary to specify that the tested extract underwent only a first purification step by ammonium sulfate precipitation where the extract still contains impurities and compounds without any antimicrobial activity that might affect the action of active peptides. Indeed, the purity of these molecules is necessary for their activity.

Keywords: *Artemisia herba-alba*; Antimicrobial activity; Purification; Fresh cheese; Bio preservation

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