1. Introduction

Nowadays, consumers demand the elimination of artificial additives in foods and its replacement with "natural" substances. This situation has created many challenges, especially in terms of ensuring that perishable foods are safe while having an extended shelf life. Thus, research in the food area has focused on the application of preservatives derived from plants to utilize them instead of synthetic additives (Moro et al., 2014; Han et al., 2014).

Thyme is an herb that belongs to the *Lebiatae* family that has been used for a long time as flavoring agent in various foods. Thyme essential oil has antimicrobial properties that are mainly due to its content of carvacrol (up to 85%) and thymol (up to 83%), whose activities consist in interfering and destabilizing the operation of bacterial enzymatic systems, bacterial genetic material, and phospholipid bilayer of the bacterial cell membrane (Govaris et al., 2011; Han et al., 2014; Marzec et al., 2010).

The United States Department of Agriculture (USDA) has classified thyme essential oil as a Generally Recognized as Safe (GRAS). However, one of the limitations of using this essential oil in foods is the intense aroma that it leaves in them, which can cause negative organoleptic effects. Essential oils are mostly accepted in foods that are traditionally associated with spices and aromatic plants, among which are selected cheeses. Additionally, its use is recommended in food products with high porosity, where control of microbial growth is difficult using non-volatile antimicrobials (Moro et al., 2014; Han et al., 2014; Asensio et al., 2014).

Fresh cheese is a typical Mexican dairy product, its processing technique may vary depending on the region. The official Mexican standard (NOM-121-SSA1-1994) establishes that this type of cheese is characterized mainly by its high moisture content, mild flavor and short shelf life, which is why it requires refrigeration for its conservation. In Mexico, fresh cheese production is associated with a microbiological risk (Ramírez-López & Vélez-Ruiz, 2012; Soto-Beltran et al., 2015).

Escherichia coli and *Listeria monocytogenes* are one of the most important foodborne pathogenic microorganisms, and several authors have proved their presence in dairy products. Several foodborne outbreaks produced by *E. coli* and *L. monocytogenes* from cheese consumption have been associated with poor pasteurization of milk or with a contamination after production of the cheeses, that is during their handling, transport, and storage (Govaris et al., 2011; Han et al., 2014).

In the case of the fresh cheese, microorganisms besides representing a risk to the health of the consumers, their presence also is a hazard to the quality of the cheese, since they can alter its physical, chemical, organoleptic, and nutritional properties (Ramírez-López & Vélez-Ruiz, 2012).

The antimicrobial activity of thyme essential oil against pathogenic microorganisms has been extensively studied in many *in vitro* studies; however, not many *in vivo* studies were found, especially related to its application on fresh cheese (Govaris et al., 2011).

The aim of this study was to test the antimicrobial properties of thyme essential oil against *E. coli* and *L. monocytogenes* in fresh cheese, in order to determine if thyme essential oil can be used as a natural preservative in this type of cheese. Furthermore, it was studied the effect of storage temperature on tested thyme essential oil antimicrobial activity.