

## **Development of Antimicrobial Properties Nutraceuticals: Gummy Candies with Addition of Bovine Colostrum, Essential Oils and Probiotics**

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**Abstract :** In this study, antimicrobial nutraceuticals; gummy candies (GC) from bovine colostrum (BC), essential oils (EOs), probiotic lactic acid bacteria (PLAB), and their combinations, were developed. For antimicrobial GC preparation, heteropolysaccharide (agar) was used. The antimicrobial properties of EOs (*Eugenia caryophyllata*, *Thymus vulgaris*, *Citrus reticulata* L., *Citrus paradisi* L.), BC, *L. paracasei* LUHS244, *L. plantarum* LUHS135, and their combinations against pathogenic bacteria strains (*Streptococcus mutans*, *Enterococcus faecalis*, *Staphylococcus aureus*, *Salmonella enterica*, *Escherichia coli*, *Proteus mirabilis*, and *Pseudomonas aeruginosa*) were evaluated. The highest antimicrobial properties by EO's (*Eugenia caryophyllata* and *Thymus vulgaris*) were established. The optimal ingredients composition for antimicrobial GC preparation was established, which incorporate the BC fermented with *L. paracasei* LUHS244 in combination with *Thymus vulgaris* or *Eugenia caryophyllata*. These ingredients showed high inhibition properties of all tested pathogenic strains (except *Pseudomonas aeruginosa*). Antimicrobial GC formula consisting of thyme EO (up to 0.2%) and fermented BC (up to 3%), and for taste masking, mandarin or grapefruit EOs (up to 0.2%) was used. Developed GC high overall acceptability and antimicrobial properties, thus, antimicrobial GC could be a preferred form of nutraceuticals. This study was fulfilled with the support of the LSMU-KTU joint project.

**Keywords :** antimicrobial activity, bovine colostrum, essential oil, gummy candy, probiotic

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