

# FORMULATION OF LOZENGES CONTAINING LEMON BALM (*Melissa Officinalis* (L.) EXTRACT AND THEIR QUALITY ASSESSMENT

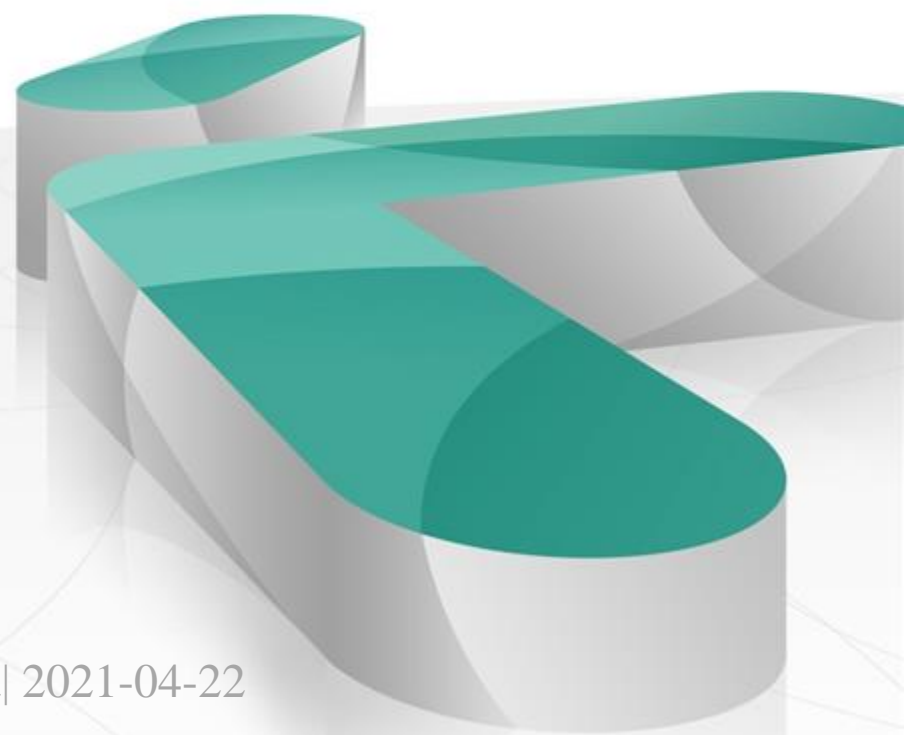
Saimonas Marcinkus

Kaunas University of Applied Science,  
Faculty of Medicine  
FK8/2A group student

Supervisor: lek. Kristina Perminaitė



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# Introduction

- **Relevance of the topic.** Lemon balm (*Melissa officinalis* (L.)) is a plant which is valued for its wide range of biological activities, including antinociceptive, stress relieving, antioxidant, and many others [1]. It is important to always experiment with innovative and customer-friendly pharmaceutical forms to model and evaluate, such as lozenges which can be chewable or hard [2]. In this work, we have formulated lozenges containing dry lemon balm extract, and evaluated their quality.
- **Aim of the study:** To model lozenges with dry lemon balm (*Melissa Officinalis* (L.)) extract and to evaluate their quality.

- **The objectives of the study:**

1. To choose the excipients and bases for various types of lozenges containing dry lemon balm extract.
2. To prepare and model lozenges with chocolate, gelatin and honey base, and describe the production process.
3. To evaluate the quality of prepared lozenges.

- **Research object:** Lozenges with dry lemon balm extract.

# Medicinal properties of melissa (*Melissa officinalis* L.)

- Medicinal melissa herbal raw material (*Melissae folium*), which is described in the European Pharmacopoeia (European Pharmacopoeia, 2021), and its preparations have a mild sedative, antiviral effect, improve gastrointestinal function and relieve intestinal cramps (Lee et al., 2008; Vejdani et al. , 2006).



Figure 1. Pharmacy Melissa (*Melissa officinalis* L.).

# Empirical research methodology

- Lozenges were prepared by melting the excipients in the water bath, and incorporating dry lemon balm extract in the mixture, then pouring in the molds and leave to harden.
- The quality was assessed by evaluating the weight uniformity of prepared lozenges, and their disintegration time, as well as organoleptic properties.

# Excipients used in the manufacture of scaffolding

Excipient material	Performing function
Cocoa butter	Filler
Sugar	Sweetener
Cocoa and sugar mixture	Taste enhancer and due to organoleptic properties
Peppermint essential oil	for taste improvement
Gelatin	Solvent
Water	Helps with disintegration
Glycerol Glucose Honey	Sweetener Energy source Sweetener

Table 1. Auxiliary material groups.

# Lozenges series compositions

Mass of one lozenge (g)	Melissa extract content(g/%)	Excipient content (g/%)
N1-5,77	0,283 g (4,96%)	Cacao butter - 2,5958 g [45,54%] Cocoa and sugar mixture – 2,8215 g [49,5%] Peppermint essential oil – 0,001-0,002g
N2-2,50	0,209 g (8,34%)	Gelatin- 0,4167 g (16,67%) Water – 0,75 g (30%) Glycerol – 0,2085 g (8,34%) Syrup- 0,917 (36,68%) consists : (Water – 0,4585 g (18,34%) ; Glucose – 0,4585 g (18,34%)) Peppermint essential oil – 0,001-0,002g
N3-2,70	0,225 g (8,33%)	Sugar – 1,35 g (50%) Water- 0,675 g (25%) Honey – 0,45 g (16,67%)

Table 2. Lozenges series compositions.

# Lozenge production

- The lozenges are first filled with 96 g of the total mixture mixture. Each lozenge contains 5 g of dry lemon balm extract. How the fillers were used: cocoa butter, cocoa and sugar mixture, peppermint essential oil.
- Procedure: Weigh, to the nearest 0,01 gram, 5 g of the dry extract of medicinal lemon balm and 96 g of each excipient. Excipients and peppermint essential oil were added to the grinder and lightly dispersed to clog the pores of the pestle. The extract is then added in portions and mixed until a homogeneous mass is obtained. Other series of lozenges were also weighed afterwards.



# Uniformity of mass

- We countered with 10 scaffolding in each series and brought out the arithmetic average. The results are shown in the figure.

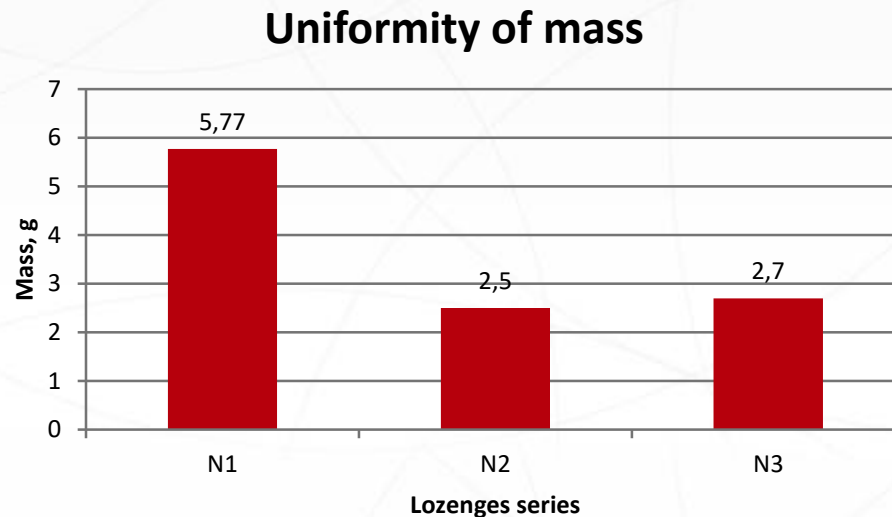


Figure 2. Results of the lozenges mass uniformity test.

# Assessment of the appearance of lozenges

- All the lozenges got neat, properly filled, smooth, not cracked and sweet.

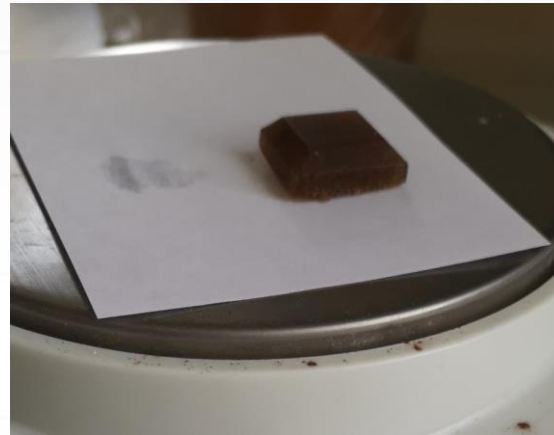


Figure 3. Chocolate lozenges.    Figure 4. Gelatin lozenges.    Figure 5. Honey lozenges.

# Disintegration test



Figure 6,7. The device performs a disintegration test at MRC Scientific Instruments.

# Disintegration test (1)

- The disintegration time of lozenges was determined in accordance with Article 2.9.1 of the European Pharmacopoeia. "Disintegration time of tablets and capsules". The liquid medium consists of purified water maintained at a constant temperature of  $37 \pm 1$  ° C. Five lozenges are selected from each series and they are placed putting each lozenge in separate chamber of the machine. The lozenges are kept in the machine for 30 minutes and then their condition is determined. Lozenges meet the requirements if they all break down within the set time. Each time, perform three replicates of the study with randomly selected lozenges.
- All lozenges disintegrated completely in 6 minutes 5 seconds. This means that the lozenges produced meet the requirements for non-modified loosening for lozenges.

N1	N2	N3
5 min. 35 sec.	1 min. 15 sec.	6 min 5 sec.

Table 3. Results.

# Conclusions

- The excipients and bases chosen for lozenges containing dry lemon balm extract were chocolate, gelatin and honey, which are acceptable for lozenges and possess good taste for the consumer.
- Three types of lozenges with dry lemon balm extract, while melting the excipients in water bath and the dry lemon balm extract was added in the mix, and then poured into silicon molds to harden.
- The prepared lozenges were good tasting, and organoleptic properties were evaluated positively, their mass was uniform and the disintegration test *in vitro* has shown that excipients chosen have impacted the disintegration time.

# References

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