

# **Analysis of herbal medicinal products in the Republic of Bulgaria classified in ATC - Respiratory system**

Ivan Lalovski\*, Ivan Svinyarov, Anely Nedelcheva

*Faculty of Chemistry and Pharmacy, Sofia University "St. Kliment Ohridski", 1 James Bourchier Blvd.,  
1164 Sofia, Bulgaria*

## **Introduction**

Respiratory diseases, acute or chronic, contagious and non-contagious, affect millions of people and are of global social significance. The flu is an infectious disease which can lead to seasonal epidemics. It is caused by the Influenza viruses (types A, B, C and D) which are transmitted via droplets or contact (WHO, 2018). This hinders prevention and facilitates spreading of the pathogens, especially in crowded areas.

The disease includes the following symptoms – fever, cough (usually dry), rhinorrhea, muscular and articular pain, general weakness. The severity and duration of the illness can vary. Usually the patients recover from it within a week without a need of hospitalization, but some symptoms (cough for example) can last 2 and more weeks. Patients undergoing the sickness with mild severity should receive symptomatic treatment. People who are known to be at risk of more severely advancing disease or developing complications should be treated with antiviral medicines in combination with the symptomatic treatment.

OTC medicines (BDA, 2020a) are the most accessible and suitable for treatment of the respiratory disorders (cough and rhinorrhea). The present study focuses on the variety of herbal medicinal products (HMP) classified in ATC code R in the current "List of medicinal products without

prescription in the Republic of Bulgaria" (BDA, 2020b).

## **Materials and methods**

### *Estimation of HMP proportion*

The "List of medicinal products without prescription in the Republic of Bulgaria" and the summaries of product characteristics (SmPC) (BDA, 2020a) of the OTC medicines have been studied to determine what part of the products classified in ATC code R are registered as HMP.

### *Assessment of ATC code distribution*

The above-mentioned list and the SmPC have been researched to verify the ATC codes and determine the distribution across the different levels of the ATC code R.

### *Assessment of pharmaceutical form distribution*

The above-mentioned sources have been used to estimate the variety of pharmaceutical forms utilized by the HMP.

### *Occurrence of plant sources in Bulgaria*

The aforementioned list and one of the editions on distribution of the Bulgarian flora (Assyov et al., 2012) have been studied to determine the significance of native plants (in the form of herbal substances and/or herbal preparations) used as sources for the production of HMP.

\* ohil@chem.uni-sofia.bg

## Results and discussion

### HMP percentage

According to the current “List of medicinal products without prescription in the Republic of Bulgaria” (BDA, 2020a) 221 OTC medicines are classified in ATC code R. 18% of them are registered as HMP (40 in total).

### ATC code distribution

The HMP are distributed unevenly in several levels of the ATC code. Expectorants (R05CA, R05CA10 and R05CA12) are predominant (22.5%), while Expectorants, excluding combinations with antitussives (R05C) and Other cold combinations (R05X) are less frequent (7.5%). Cough and cold preparations (R05) and Mucolytics (R05CB) are also not common (5.0%). Cough suppressants, excluding combinations with expectorants (R05D), Other antitussives and expectorants (R05FB) and Nasal preparations (R01AX) are the least frequent (2.5%). The reason behind these results could be the herbal species used and their contents – for example *Hedera helix* contains triterpenoid saponins which act as expectorants.

### Pharmaceutical form spread

The HMP are spread across ten pharmaceutical forms. Syrups (40%), lozenges (12.5%), oral drops (12.5%), tablets (10.0%) and capsules (10.0%) being a majority. Oral solutions (5.0%), oral liquids, ointments, nasal drops and effervescent tablets (2.5%) make up a smaller part of the ten pharmaceutical forms. The unequal distribution between the different pharmaceutical forms can be explained by factors such as their convenience of intake and age of the patients.

### Occurrence of plant sources in Bulgaria

Herbal substances and preparations from 29 medicinal plants are found to be active substances of the 40 HMP. More than half of them (55%) are part of the Bulgarian flora. The species *Hedera helix*, *Thymus vulgaris*, *Althaea officinalis*, *Gentiana lutea* and *Primula veris* are used in more than one HMP. In comparison, there are 26 mentioned species for symptomatic treatment of respiratory disorders in one of the summarizing editions on traditional medicine (Petkov, 1982) out of which only just 34% overlap with the ones found in the current study.

## Conclusion

The biodiversity in the country, the ethnobotanical and ethnopharmacological knowledge are a potential for creating new HMP by scientific reconstruction of their traditional use.

## Acknowledgements

Authors gratefully acknowledge the financial support of the Sofia University “Financing from the state budget - competition 2020”/№ 80-10-140.

## References

- Assyov, B., Petrova, A., Dimitrov, D., Vassilev, R., 2012. Conspectus of the Bulgarian vascular flora Distribution maps and floristic elements Fourth revised and enlarged edition, Bulgarian Biodiversity Foundation, Sofia.
- Bulgarian drug agency (BDA), Summaries of product characteristics. Available at: <https://www.bda.bg/bg/регистри/кратки-характеристики-на-продуктите> (accessed 28.05.2020).
- Bulgarian drug agency (BDA), Medicinal products without prescription in the Republic of Bulgaria to date 26.03.2020. Available at: [https://www.bda.bg/images/stories/documents/new\\_registered/202002/OTC.pdf](https://www.bda.bg/images/stories/documents/new_registered/202002/OTC.pdf) (accessed 28.05.2020).
- Petkov, V., 1982. Modern phytotherapy, Medicine and physical education, Sofia, Phytotherapeutic prescriptions used mainly in respiratory diseases, pp. 258–260.
- World health organization (WHO), Influenza (Seasonal) 06.11.2018. Available at: [https://www.who.int/en/news-room/fact-sheets/detail/influenza-\(seasonal\)](https://www.who.int/en/news-room/fact-sheets/detail/influenza-(seasonal)) (accessed 28.05.20).