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REPORT

of foreign scientific advisor Professor Alain Berthod, University of Lyon, France
on thesis of Adekenova Aigerim Serikovna,
topic "Domestic reference standards of groshemin, cynaropicrin and harmine for quality control of original medicines production"
submitted for Doctor of Philosophy (PhD) degree on specialty 6D110400 - Pharmacy

The PhD dissertation work of Adekenova Aigerim Serikovna is devoted to the actual and priority task such as the development of national reference standards of general products of the republic of Kazakhstan (GP RK) for the control of production and quality assessment of domestic medicinal plant raw materials and plant medicinal products according to international standards.

Under my collaborative scientific supervision with her advisor of the Karaganda State Medical University, Aigerim was engaged in the development of a new method of isolation and purification of two sesquiterpene lactones, namely groshemin and cynaropicrin, from ethyl acetate extract of *Chartolepis intermedia* Boiss., and the alkaloid harmine from ethanol extract of *Peganum harmala* L., using modern instrumental chromatographic methods, namely centrifugal partition chromatography and high performance liquid chromatography.

It should be noted that Aigerim acquired excellent skills in chromatographic methods for preparative separation and analysis. She can correctly plan and conduct scientific experiments, and also analyze obtained results taking into following modern protocols and using modern softwares. Aigerim has proved herself to be a promising, creative student able to become a qualified specialist.

The candidate for the degree performed personally all the experimental works on separation of the ethyl acetate extracts of *Chartolepis intermedia* Boiss. and ethanol extracts of *Peganum harmala* L. via fast centrifugal partition chromatograph, conducted the processing and analyses of the obtained fractions, as well as recrystallization and quality assessment of the finished products.

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The logical results of the work performed professionally are:

- the development of a new method for the isolation and purification of the sesquiterpene lactones: groshemin, cynaropicrin and the alkaloid harmine with the use of modern chromatographic methods;
- the introduction of an effective, economical and ecologically safe technology to obtain the reference standards: groshemin, cynaropicrin and harmine, providing a quantitative yield of qualitative end products.

The results were published in the foreign scientific journal *Chromatographia*, included in the ISI Web of Science and Thomson Reuters databases among numerous others.

The practical significance of the dissertation (PhD) work of Adekenova Aigerim Serikovna is that, for the first time, the three compounds groshemin, cynaropicrin and harmine could be included in the GP RK as three national reference standards for the GP RK for identification and quantitative determination in medicinal plant raw materials and medicinal plant preparations and their introduction in pharmacopeia.

I think that Adekenova Aigerim Serikovna was formed as a highly qualified specialist in the field of pharmacy who is able to formulate and solve complex scientific problems on her own. She deserves to be granted the degree of doctor of philosophy (PhD) of the Karaganda State Medical University of Kazakhstan, on specialty 6D110400 - Pharmacy.

Scientific foreign advisor:
Professor of the University of Lyon **Alain Berthod**

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Thursday, 22 September 2016