SCIENTIFIC CONSULTANT'S REPORT

for the dissertation work of PhD student Assel Baidildayeva on the topic "Research of microencapsulation technology of leather for footwear of people with pathological deviations of the feet" submitted for the degree of Doctor of Philosophy (PhD) in the educational program 8D07211 – Leather goods industry

The dissertation work prepared by Assel Baidildayeva is based on the relevance of the need to create a comfortable environment in the footwear of people with pathological foot deviations in accordance with hygienic requirements. The work confirms the relevance of the research carried out in accordance with the main directions of the modern leather industry, confirming the emergence of effective solutions.

The dissertation research was carried out in the certified testing laboratories of Ege University and Dokuz Eylul University and in the laboratory of Dulaty University.

The aim of the dissertation work is to improve the antibacterial properties of footwear leather by using special equipment and selecting environmentally friendly natural leather materials and linings, using microencapsulation technology. To achieve this goal, several tasks were studied.

The object and materials of the research: chitosan and laurel oil with antibacterial components and leather and three types of lining materials.

The scientific novelty of the dissertation research is to improve the type of finishing in order to increase the antibacterial properties of leather footbeds and linings, which were applied by two methods: spray and dip-coating, using microparticles obtained from solutions based on laurel oil and chitosan.

The research work used modern microencapsulation technology equipment, in particular the Unopex B 15 Mini Spray Dryer.

As a result of experimental research, all leather footbeds and lining samples showed significant antimicrobial activity against the tested microorganisms. Analytical results confirmed that the application of laurel oil-chitosan microparticles to leather footbeds surfaces and linings represents a successful method of natural hygienic control. This work showed that advances in production methodologies allow for significant improvements in foot health and hygiene. In addition, it was revealed that the use of this method has significant potential for the production of footbeds and linings with a rapid and long-term antimicrobial effect.

The results of Assel Baidildayeva's research are important for modern applied science and practice. The validity of her scientific provisions, conclusions and practical recommendations is obvious. To prove this, the PhD student provides sufficient consistent evidence. The scientific provisions, practical recommendations and conclusions of the work are justified. The dissertation work has scientific and practical significance.

The dissertation work presented by the PhD student is a complete research work. During her PhD studies, Assel Baidildayeva successfully completed the assigned

task. She was able to effectively solve the given problem thanks to her high qualifications, conducting a literature review of foreign and domestic authors. She showed inquisitiveness, responsibility, and a desire for knowledge. This quality allowed her to write a dissertation work at a high level.

The results of her work were published in 1 article in a journal included in the Web of Science / Scopus database, 2 articles in publications included in the list of the Science and Higher Education Quality Assurance Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan, 1 article in an international conference journal indexed in the Scopus database, and articles at international conferences.

The results of the dissertation work were implemented at the enterprises "Tarazski Kozhevennyi Zavod" LLP and «TarazKozhObuv» LLP.

In conclusion, the presented dissertation work meets the requirements for PhD dissertation works of the Science and Higher Education Quality Assurance Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan. I recommend the dissertation work of Assel Baidildayeva on the topic "Research of microencapsulation technology of leather for footwear of people with pathological deviations of the feet" for defense for the degree of Doctor of Philosophy (PhD) under the educational program 8D07211 - "Leather goods industry" and consider it worthy of receiving the degree of PhD.

Scientific consultant,
PhD, associate professor
Taraz University named after M.Kh. Dulaty _____ Indira Jiyembetova

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ҒЫЛЫМ ЖӘНЕ ЖОҒАРЫ БІЛІМ МИНИСТРЛІГІ М.Х. ДУЛАТИ АТЫНДАҒЫ ТАРАЗ УНИВЕРСИТЕТІ ПЕРСОНАЛДЫ БАСҚАРУ ҚЫЗМЕТІ

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