further for standardization of medicinal plant raw materials of reindeer lichen and dosage forms on its basis. Quality control of usnic acid and polysaccharides can be carried out by more modern methods: HPLC (usnic acid) and spectrophotometric method (polysaccharides).

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SPECIFIC ASPECTS IN R&D OF NATURAL MEDICINAL PREPARATIONS

© ***Pozharitskaya O.N., Shikov A.N., Makarov V.G.***

Saint-Petersburg Institute of Pharmacy, Leningrad region, Vsevolozhsky district, 188663, Kuzmolovo P 245, Russia

There are many reasons that drugs fail to reach the market, including toxicity, lack of efficacy and marketing. It is also striking that about 40% of development compounds fail to reach the market due to poor pharmaceutical properties as a result of poor solubility, permeability and metabolic stability. This drives pharmaceutical companies to profile drug-like properties as early as possible and increase the success rate of compounds to the market. An extensive research is going on in the area of novel drug delivery and targeting for plant actives and extracts. However, research and development in this area is still at the exploratory stage.

Many problems in the research, production and application need to be solved. In addition, more attention should be paid to the research on the carrier materials in order to develop more suitable carriers which can reduce the toxicity of drugs, enhance their activity and improve the overall quality of the agents. Herbal drugs have enormous therapeutic potential which should be explored through some value added drug delivery systems. Lipid solubility and molecular size are the major limiting factors for drug molecules to pass the biological membrane to be absorbed systematically following oral or topical administration. Several plant extracts and phytomolecules, despite having excellent bio-activity in vitro demonstrate less or no in vivo actions due to their poor lipid solubility or improper molecular size or both, resulting poor absorption and poor bioavailability. Standardized plant extracts or mainly polar phytoconstituents like flavonoids, terpenoids, tannins, quinones when administered through novel drug delivery system show much better absorption profile which enables them to cross the biological membrane, resulting enhanced bioavailability. Hence more amount of active constituent becomes present at the site of action at similar or less dose as compared to the conventional plant extract or phytomolecule. Hence, the therapeutic action becomes enhanced, more detectable and prolonged. Selection of chemical markers is crucial for the quality control of herbal medicines, including authentication of genuine species, harvesting the best quality raw materials, evaluation of post-harvesting handling, assessment of intermediates and finished products, and detection of harmful or toxic ingredients. Several excellent phytoconstituents have been successfully delivered using novel drug delivery system. Hence there is a great potential in the development of novel drug delivery systems for the plant actives and extracts.