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Biodiversity of medicinal plants in the highlands: problems and perspectives

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от природы растворителя, которым проводят экстракцию из растительного сырья. Известно, что полиеновая структура каротиноидов обуславливает максимум светопоглощения при длине волны от 400 до 500 нм, что зависит от присутствия им окраски (жёлтой, оранжевой, красной и сочетания этих цветов).

Идентификацию суммы каротиноидов в пересчете на β -каротин проводили при длине волны 450 нм, что соответствует максимуму светопоглощения при гексановом извлечении из сырья (сумма каротиноидов). При экстрагировании гексаном из сухого остатка моркови, корней одуванчика, клубней топинамбура содержание каротиноидов в мкг на 100 г сухого веса составило: морковь – 4780 мкг/100 г, корни одуванчика – 320 мкг/100г, а корни топинамбура – 280 мкг/100 г сухого веса. Таким образом, наличие каротиноидов в лекарственных и пищевых растениях является важным фактором для сохранения здоровья и имеет большое значение в питании человека.

Известно, что каротиноиды проявляют А-противовитаминную активность. В живом организме не происходит синтез этого витамина, и они нуждаются в постоянном получении его с продуктами питания. Данные вещества являются незаменимыми для нормального функционирования органов зрения и репродукции. Они играют существенную роль в росте организмов млекопитающих, защите от бактериальных и грибковых инфекций, повышении иммунитета, а также для нормального функционирования кожи и слизистых.

Разработка биологически активных добавок на базе сырья из корней одуванчика, клубней топинамбура и моркови является одним из путей в решении проблемы сохранения здоровья и рационального питания человека.

BIODIVERSITY OF MEDICINAL PLANTS IN THE HIGHLANDS: PROBLEMS AND PERSPECTIVES

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Nowadays, pharmacopeia in almost all countries contain medications based on plants. So far plants remain the single greatest source of natural material for drugs. In the recent WHO report it was estimated that about 60,000 plant species are used for their medicinal, nutritional or aromatic properties globally, and every year over 500,000 tons of material from such species are traded. The ever growing global trade in plants for medicinal purposes reaches a value of over 2.5 billion USD.

The traditional medicine practices provide more than health care to these human communities, it is considered a way of life. In the modern world, health care remains pluralistic (a mix of different medical systems). In the regions of Asia, Africa, Latin America and the Middle East, 70–95% of the population depend on traditional medicine for primary

health care. In Canada, France, Germany, and Italy 70% to 90% and in the USA about 50% of their population have used traditional medicine as “complementary” medicine.

Multiple studies indicate that mountain areas harbor a high diversity of medicinal plants. Mountains support biodiversity by creating an ecological gradient. The climatic conditions of mountain habitats are greatly influenced by topography. In addition, the large differences in microclimate occur with small changes in elevation, and this complex interaction is an important determinant of mountain plant distributions.

The steep gradient of ecosystems generated by the altitudinal gradient creates constructive conditions of great biodiversity; hence, many of Holdridge’s life zones can be found in a compact area. This allows for adaptation and existence of different ecosystems in these relatively small areas. Because a single mountain may host a series of climatically different life zones over short elevation distances, mountains are often “hotspots” of biodiversity and consequently priority regions for conservation. Indeed, as many as 44% of all species of vascular plants are confined just to 25 commonly recognized hotspots, which comprise only 1.4% of the land surface of the Earth. In addition, highlands create highly variable and often stressful conditions for plant growth busting the production of secondary metabolites, which are usually the source of plants’ medicinal activity.

Climate change has been recognized as one of the greatest challenges to humankind and all other life on Earth. The status of medicinal plants is an important issue for the study of environment and climate change. In recent years, the impact of climate change has been increasing, and it has been observed that some plant species are not any longer in their original habitat with some shifting to a higher altitude for survival. Some of the medicinal plant species show changes in the chemical properties of their composition. It is reasonable to expect that any alteration in primary metabolism due to a climate change is likely to impact the secondary metabolism due to changes in metabolite flux, gene expression, and protein dynamics including the transporters.

Climate change is affecting medicinal plants around the world and could ultimately lead to losses of some key species, in particular species endemic to a region and causing plants to migrate to new ranges. As the situation unfolds, climate change may become a pressing issue for the herbal community, affecting medicinal plant supply chains with varying requirements for plant cultivation, resource management in the wild, harvesting, processing, and importantly marketing.

The effects of climate change on medicinal plants have not been well-studied and are not fully understood. So it is of a paramount importance to investigate the ecological status of medicinal plants in light of climate change. The conclusions and outcomes of those studies will provide basis for the steps to be taken to come out from this pressing issues in near future.