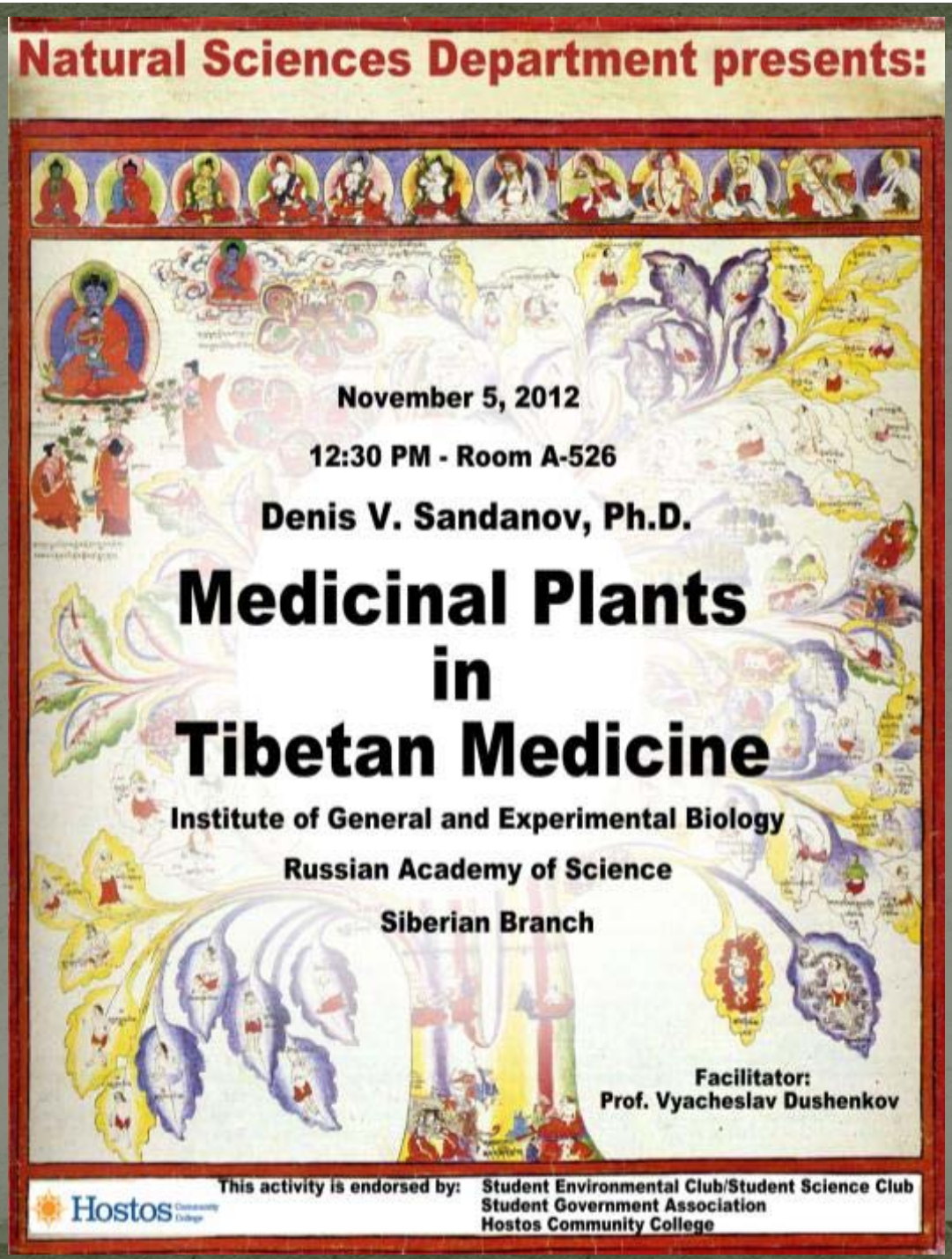
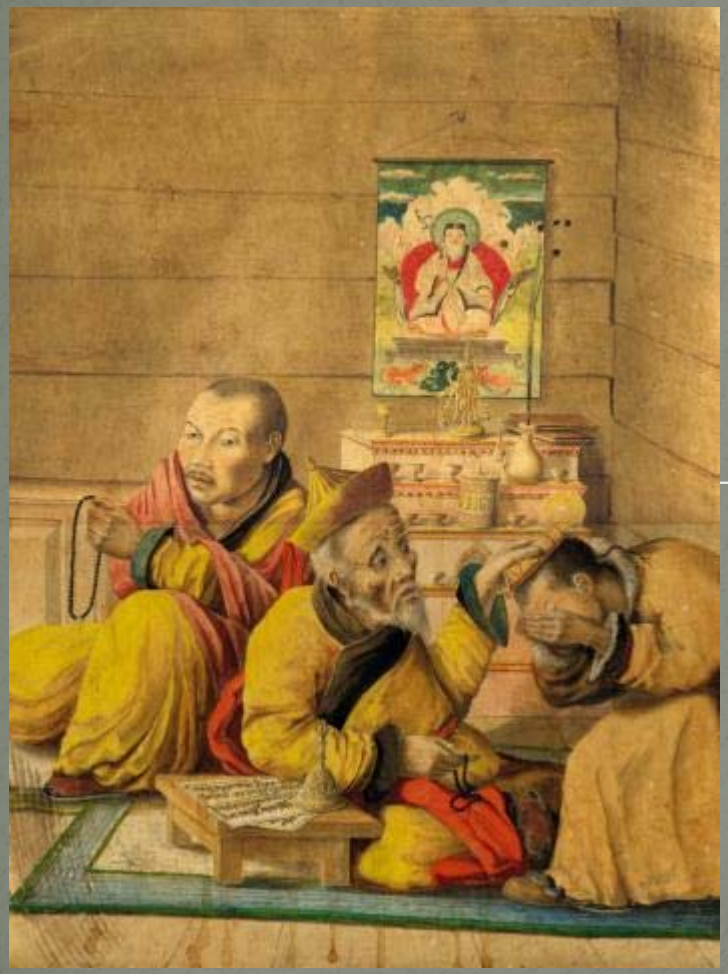

Natural Sciences Department presents:
November 5, 2012
12:30 PM - Room A-526
Denis V. Sandanov, Ph.D.
Medicinal Plants
in
Tibetan Medicine
Institute of General and Experimental Biology
Russian Academy of Science
Siberian Branch
Facilitator:
Prof. Vyacheslav Dushenkov
Hostos
This activity is endorsed by:
Student Environmental Club/Student Science Club
Student Government Association
Hostos Community College

Medicinal Plants in Tibetan Medicine



Dr. Denis Sandanov

Russian Academy of Science, Siberian Branch

Institute of General and Experimental Biology,

Department of Biologically Active Substances

What is Tibetan Medicine?
Or Sowa Rigpa?

- **It is a science because its principles are enumerated in a systematic and logical framework based on an understanding of the body and its relationship to the environment**

What is Tibetan Medicine?

It is an art because it uses diagnostic techniques based on the creativity, insight, subtlety and compassion of the medical practitioner

What is Tibetan Medicine?

And it is a philosophy because it embraces the key Buddhist principles of altruism, karma and ethics.

What is Tibetan Medicine?

Science

Art

Philosophy

What is Tibetan Medicine?

SAP?

Energy

Vital body fluid

Solution of mineral salts, sugars, etc., that circulates in a plant

Medicinal plants used in Tibetan medicine

Scutellaria baicalensis

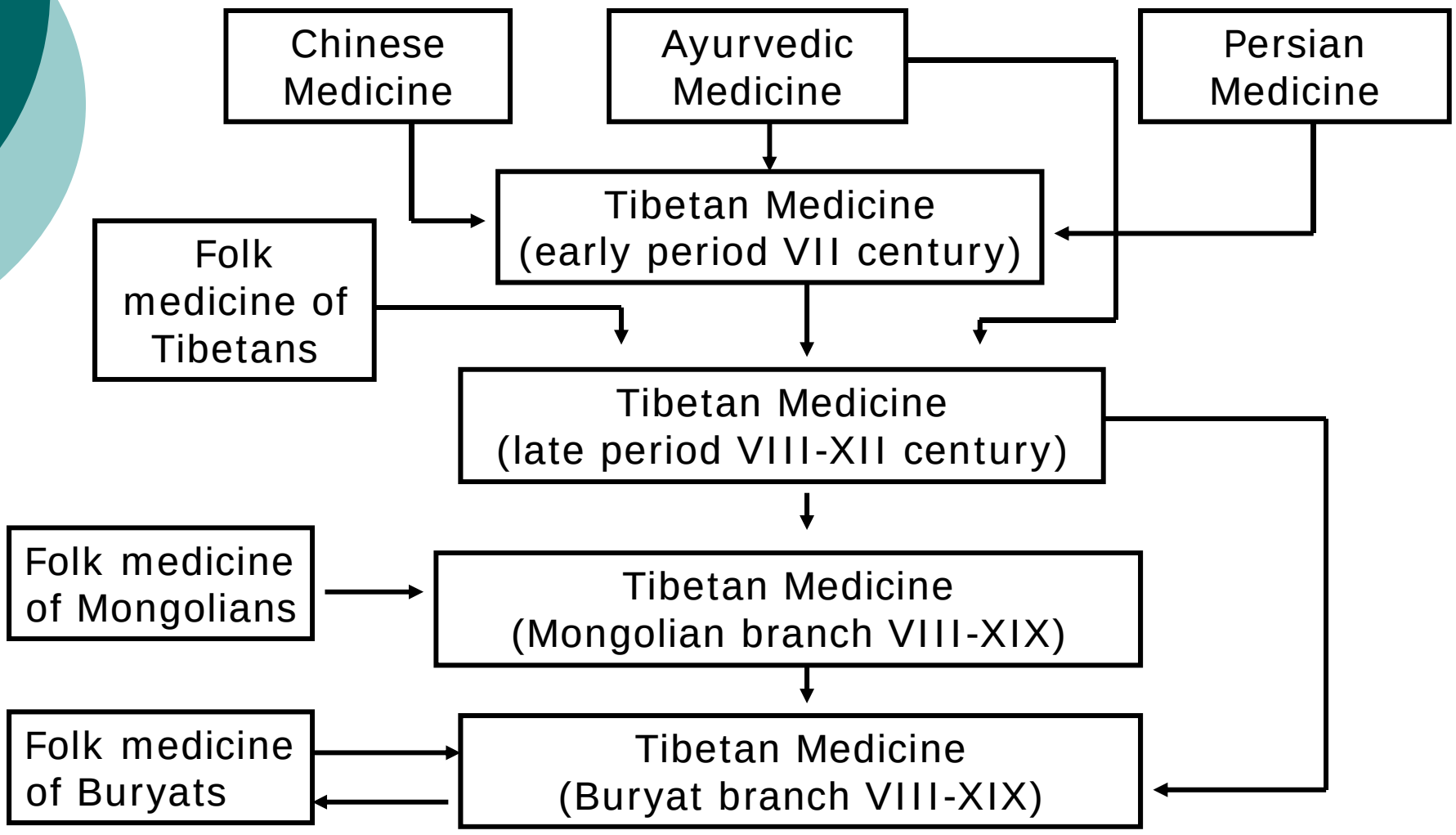
Picrorhiza sp.

Gentiana urnula

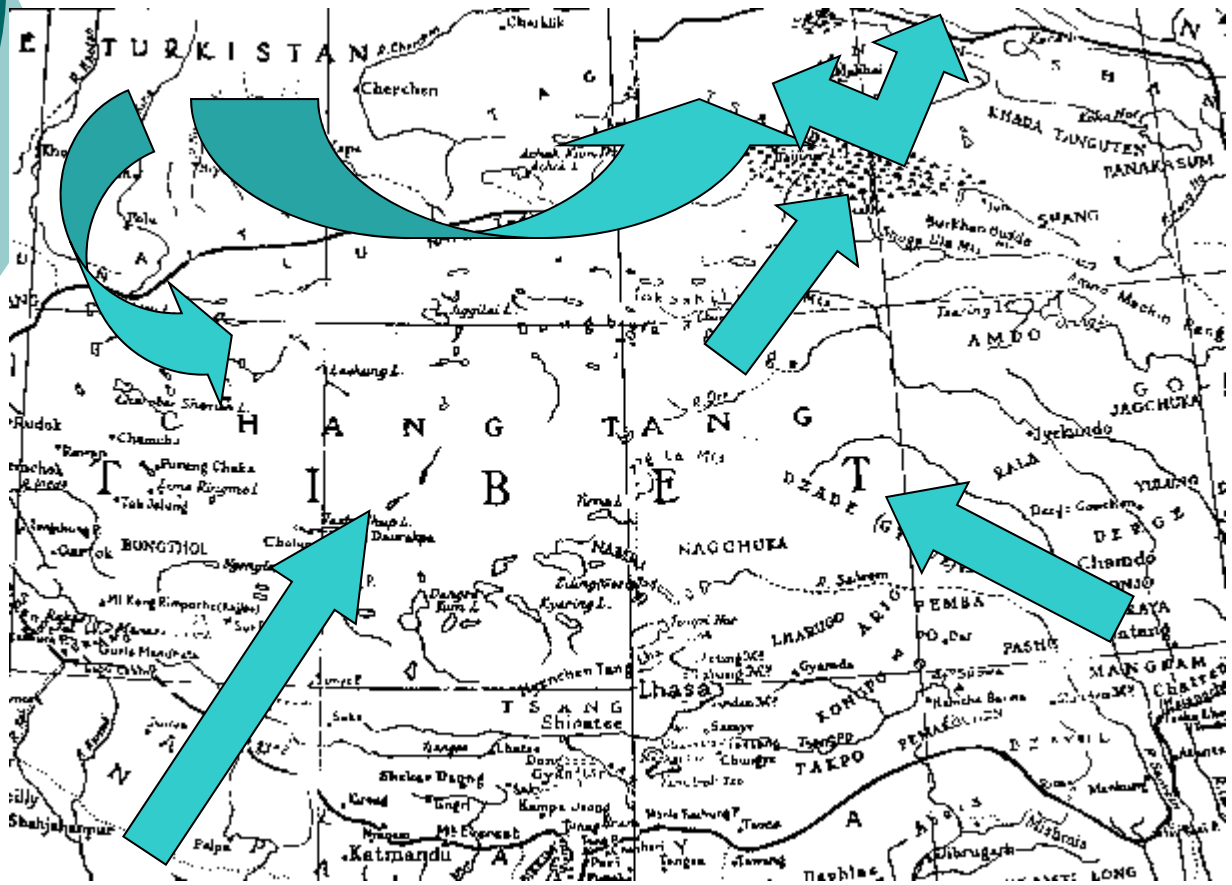
Leonurus sp.

Lagotis junnanensis

Development of Tibetan Medicine



Expansion of Tibetan Medicine to Mongolia and Buryatia



– paths of spreading of traditional medical systems (Aurvedic, Chinese, etc.)

Analysis of Tibetan treatises

- Tibetan treatise “Shel-phreng” described some botanical characteristics of medicinal plants, areas and habitats where plants grow. Also you can find information about identification of plants by many senses: taste, smell, color, etc.

Comparative analysis of European and Tibetan botanical knowledge

Europe

- - Appearance of plant show the similarity, which give rise to image. This image gives the name; for example *Glycyrrhiza* – sweet root;
- - Some plants similar with animals ; for example *Geranium* – the crane;
- -Sometimes they looks like nature objects; for example *Selinum* – the Moon;
- - Name of plant reflects its structure; for example *Aster* – the star;
- - Treating activity usually used in plant names; for example *Althaea* – heal;
- - Also you can know the place were plant grows; for example *Empetrum* – the rock;
- - Sometimes plant names combine or reduce two or more words ; for example *Anemone* – blow as a wind.

Tibet

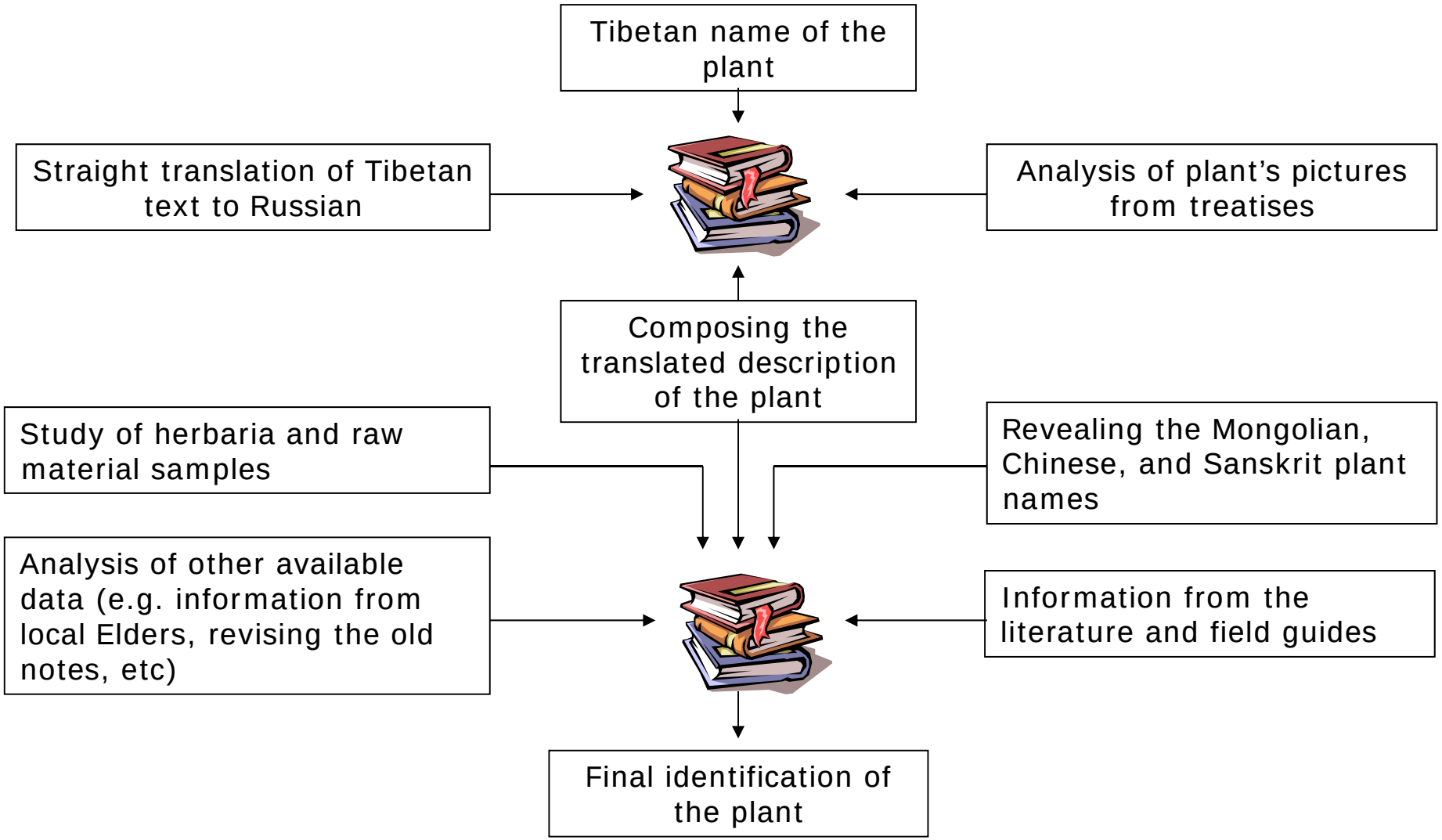
- - *Glycyrrhiza* calls shing mngar – sweet tree;
- - *Pedicularis* – lug ru – twisted ram horn
- - *Aster* – lug mig – ram eye
- - *Capsella bursa pastoris* – sog ka ba – shoulder blade;
- - *Momordica cochinchinensis* – gzong mchu – edge of drill;
- - *Thermopsis* –gu mo glo sman – the main lung remedy;
- - *Myricaria* – chu shing – river tree;
- - *Aconitum* – gangs kyi zhun chung – a piece of melted ice;
- - *Oxytropis* – lan pad phreng can – holding a lotus garland in arms.

Ethno-botanical studies in Mongolia

Family	Latin name	English name	Mongolian name	Tibetan name	Use in medicine	Other properties, comments
Lilaceae (Lily Family)	*Lilium pumilum*	Low lily, Small lily, Coral lily	Odoi Saraana, Tsagaan Toms, Ulaan Saraana	A-bkhi-shja-gar-bo (bulbs)	Bulbs are used as medical treatment for liver diseases. Flowers are used to staunch the flow of blood.	Common in steppe communities. Locals eat bulbs with milk or cream.
Caryophyllaceae (Pink Family)	*Dianthus versicolor*	Variegated pink, Spotted pink	Alag Tsetsegt Bashir, Bamara Tsetseg	Yu-mo-deu-chzhin	Used in traditional medicine for women's and childbirth diseases.	Common in steppe communities
Ranunculaceae (Buttercup Family)	*Aconitum czekanovskyi*	Czekanovskyi monkshood	Chekanovskiin Khors	Bod-man-chen	Traditional medicinal uses include protection from diseases of the brain and nervous system.	All plant is very poisonous.
	Adonis sibirica	Siberian adonis	Sibir' Altan Khundaga	Njang-dzhi-brei	Contain heart-effected glycosides. Herb and flowers are good in treatment of cardiac and nervous system diseases.	Early blooming plant.
	Adonis mongolicus	Mongolian adonis	Mongol Altan Khundaga	-	Contain heart-effected glycosides. Herb and flowers are good in treatment of cardiac and nervous system diseases.	Endemic and rare species. Early blooming plant.
	Aquilegia sibirica	Siberian columbine	Sibir' Udval	Udbal-on-bo	Flowers used for liver and bile diseases.	Beautiful blue-lilac flowers

Meetings with local Elders

Schematic of finding the definitions for Tibetan plant names



Tibetan medicinal plants

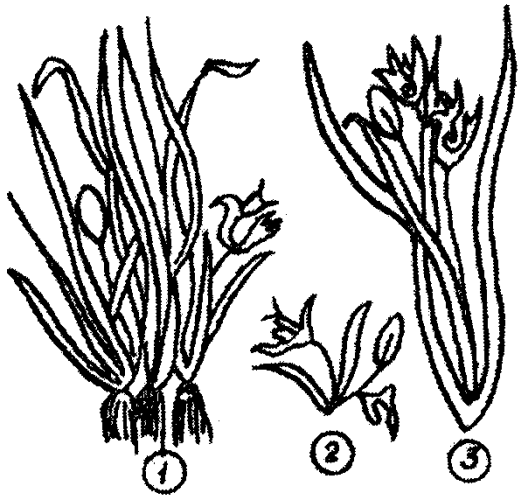
On the left: Military Orchid *Orchis militaris*

On the top: Dahurian Rhododendron *Rhododendron dauricum*

- These plants are known as “chudlens” – remedies that have a positive strenthening effect on the body (biostimulants).
- Military Orchid also has a heating effect and can be helpful during detoxification.
- Rhododendron also called “elixir of life”

Tibetan medicinal plants

Iris humilis



Iris sp.
Dres ma (Tib.)
1. Male individual
2. Female individual
3. Asexual individual

- From Rahchun-chab treatise: “Iris fruits can heal the warm diseases”

Tibetan medicinal plants

Phlomoides tuberosa

- This plant heals the “cold” diseases (e.g. lung diseases, drying of throat, etc.)
- The three kinds of this plant can be distinguished by the flowers: white, lilac, and lily-white. Distinguished by the roots: white, hard and rounded – male individuals, smaller and friable – asexual, big roots - female

Tibetan medicinal plants

Achillea millefolium

Yarrow

Yarrow can help with the leg's and hand's edemas.

From Krungs dpe treatise:
«Yarrow grows on the northern slopes and in meadows.
It has leaves and stems similar to caraway.
Has a strong, but not bad smell.
Males have flowers, females do not have flowers."

Tibetan medicinal plants

Ephedra monosperma

- This plant has a hemostatic effect and treats liver “heat”.
- The species which is growing in Siberia can be named as a “meadow” species in Tibetan tradition because it has leaves like needles and red fruits with black pits.

Tibetan medicinal plants

Oxytropis lanata

Locoweed

From treatise:

«Locoweed is the king of the herbs. It can help with digesting. If you put it on the wound it will heal. If you take it internally it will constrict vessels”

There are two kinds of locoweed: black and white. They grow in the same places and look similar. Bigger plants with the sweet smell are the white locoweed. Smaller plants with the bitter smell are the black ones.

Tibetan medicinal plants

Shrubby Dragon's Head

Dracocephalum fruticulosum

From treatise:

"Dragon's head grows in shady and sunny places.

It has blue flowers. Flowers looks like blue silk handkerchief.

The plant has a sweet and bitter taste and heals the liver diseases.

It can help stop blood flow and heal wounds."

Tibetan medicinal plants

Alpine Aster *Aster alpinus*

Tibetan name *lug mig* refers to the legend that says: “This plant starts to grow from the eye of Lug-skje-ma (Tibetan goddess)

The plants with big flowers looks like a sheep eye.

- Alpine Aster is good in treatment of fever diseases and helpful with detoxification
- This plant is also called “the enemy of 404 diseases”

Conclusions for 1st chapter

- The level of botanical knowledge described in Tibetan treatises from XI-XVIII centuries corresponded with European period (XVIII century before Karl Linney's system of plants).
- Originality of Tibetan botanical information revealed by analysis from different materials. The degree of adoption can be explained by historical and cultural connections between Central Asia, South-East Asia and Minor Asia.

Automatic Database “Tibetan Medicine” General structure

Institute of General and Experimental Biology, Siberian Branch, Russian Academy of Science

- Laboratory of Geography and Ecology of Soils
- Laboratory of Experimental Agro Chemistry
- Laboratory of Biochemistry of Soils
- Laboratory of Floristics and Geobotany
- Laboratory of Animal Ecology
- Laboratory of Microbiology
- Laboratory of Parasitology and Ecology of Aquatic Species

Department of Biologically Active Substances

- Laboratory of Experimental Pharmacology
- Laboratory of Medical and Biological Studies
- Laboratory of Safety of Biologically Active Substances

Institute of General and Experimental Biology

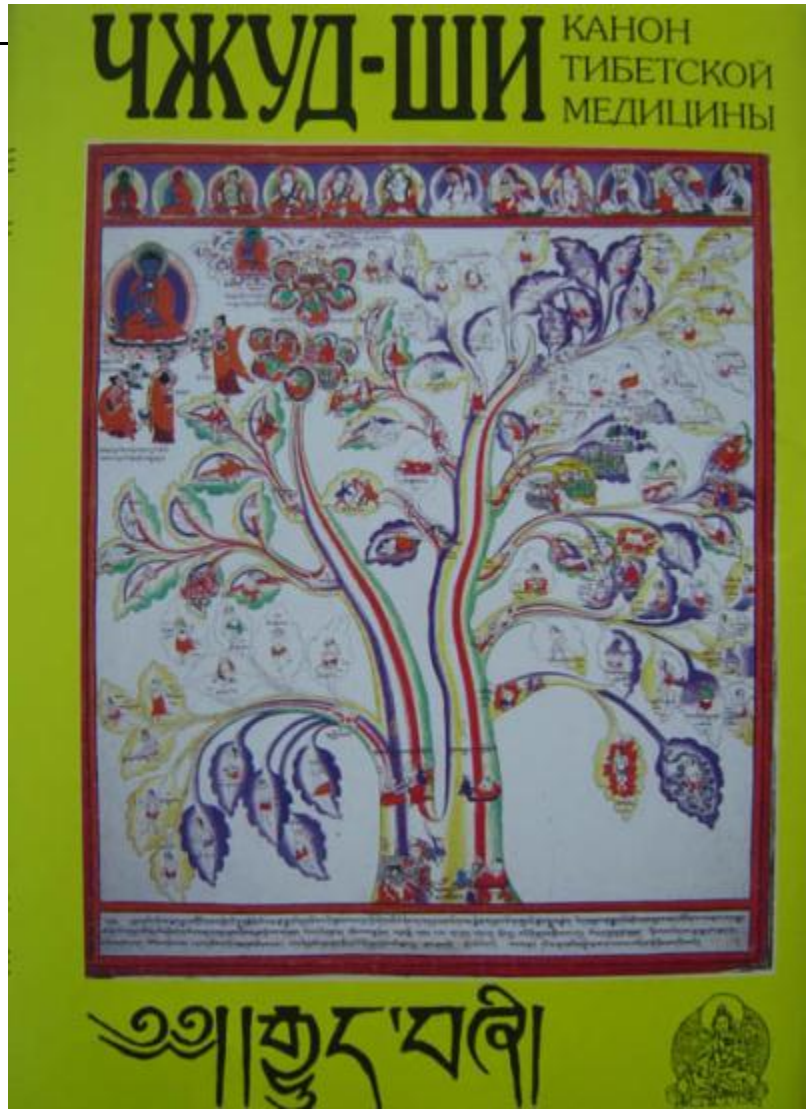
- The Institute has been studying the heritage of traditional Tibetan medicine. On this basis new medicines from plants are developed using different biotechnological procedures.
- The development of original medicines of significance far beyond the regional boundaries and is deemed as a revenue sources for Russia.
- According to growing interest in Tibetan medicine worldwide, the Institute provides unique historical and cultural materials.

The major objectives of our Department

- to translate fundamental Tibetan medical treatises into Russian and other European languages and put them into scientific use;
- to study the Tibetan medical tradition, particularly diagnostics, therapeutic and preventive techniques;
- to study the Tibetan remedies and develop new medicines on their basis, while determining mechanisms of their action, efficiency and safety;
- to integrate rational methods and effectiveness with modern recommendations and introduce them into clinical and prophylactic medicine.

“Dzhud-Shi”

- This treatise was translated into Russian by our scientists.
- After its publishing all interesting methods and principles of Tibetan medicine became available.



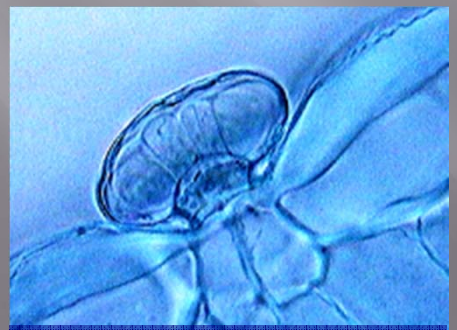
Laboratory of Medical and Biological Studies

Scientific tendencies

Pharmacognosy

Resource investigations

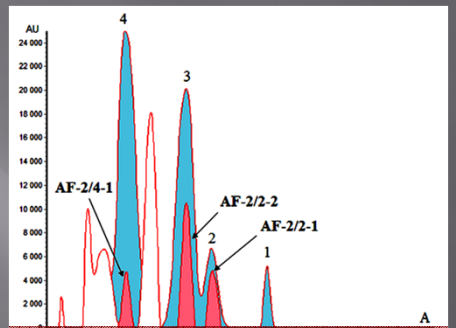
Macroscopis analysis



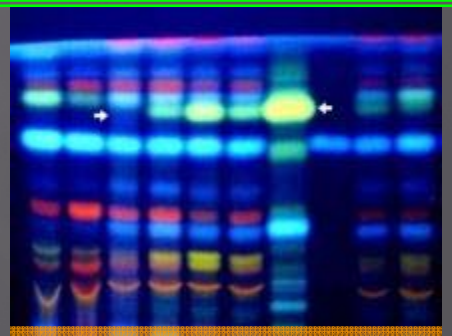
Anatomic structure

Merchandising analysis

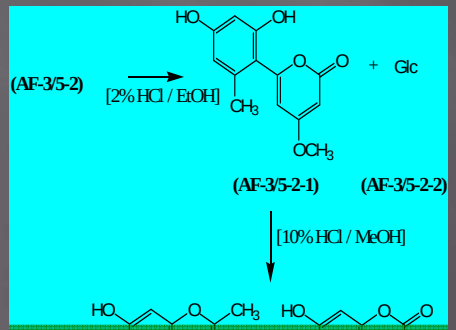
Phytochemistry



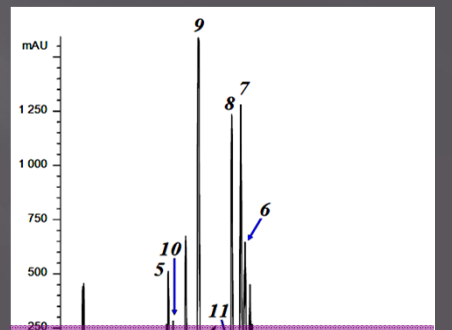
Phytochemical analysis



Authenticity criteria

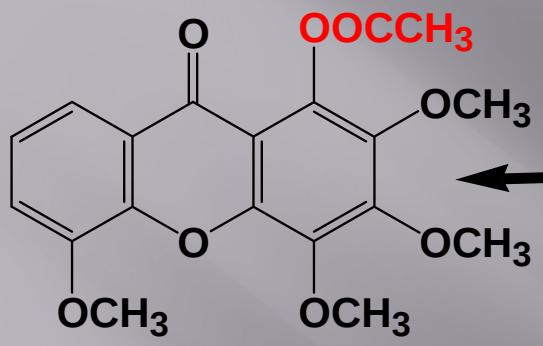


Structure modifications



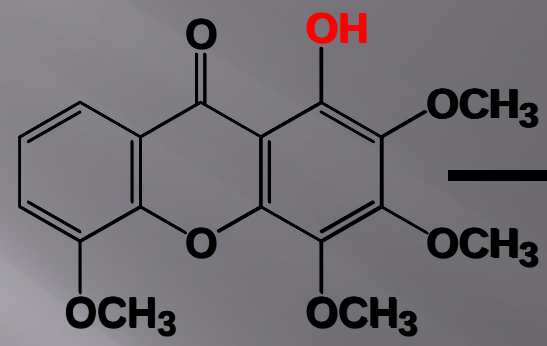
Quantitative analysis

MODIFICATION OF 1-HYDROXI-2,3,4,5-METOXIXANTONE



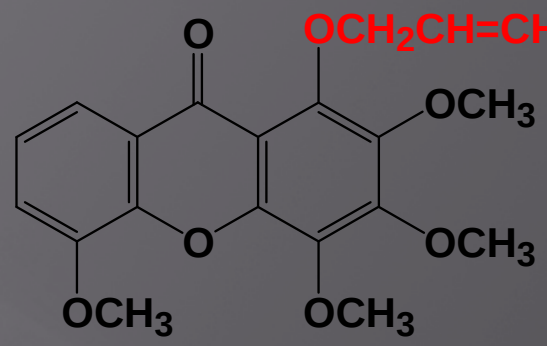
1-ацетокси-2,3,4,5-тетраметоксиксантон

II



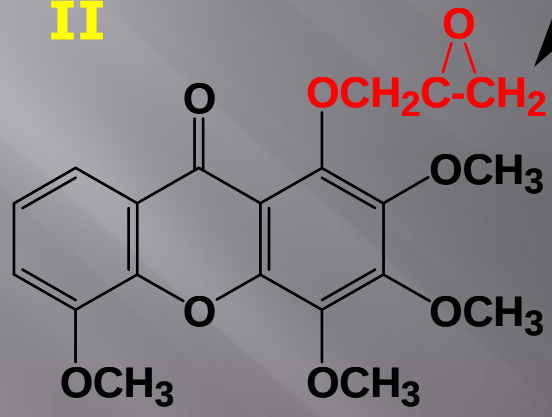
1-гидрокси-2,3,4,5-тетраметоксиксантон

I



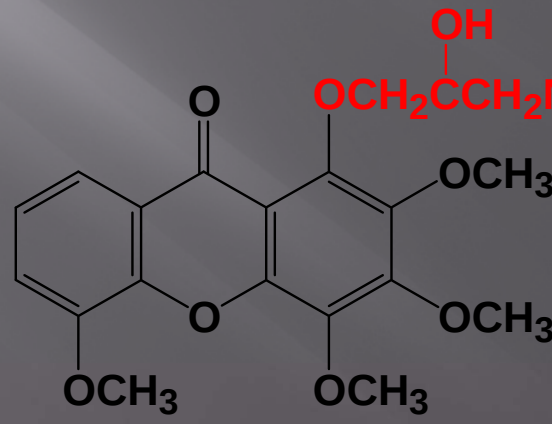
1-аллилокси-2,3,4,5-тетраметоксиксантон

III



1-(2,3-эпоксипропоксил)-2,3,4,5-тетраметоксиксантон

IV

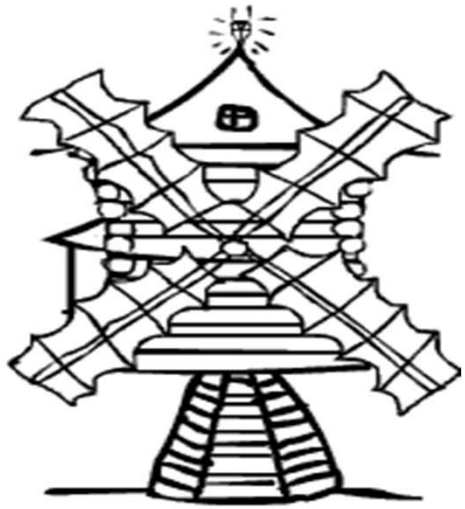


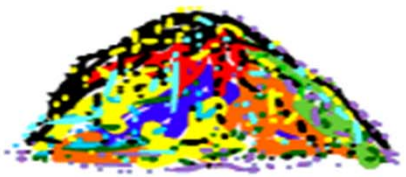
1-[(3-бензиламино-2-гидрокси)-пропокси]-2,3,4,5-тетраметоксиксантон

V

The main idea of the mechanochemical approach

The most effective mechanochemical technology combines physical and chemical transformation with milling operation





Cellular Materials - Biologically Active Substances: alkaloids, acids, glycosides, phytosterols …

Raw Plant Materials

+ Solid Reagent

Grinding

Mechanochemical reactions of BAS

Extraction by organic solvents

Extraction by water

Purification

Purification

Product

Product

Soluble bioavalaible forms of BAS:

- ✓ **Soluble salts and complexes**
- ✓ **Molecular complexes with soluble matrix**
- ✓ **Glycosides**

New Product

Traditional Technology of BAS Production from Plant Materials

Raw Plant materials

Solvents

BAS and Ballast Compounds

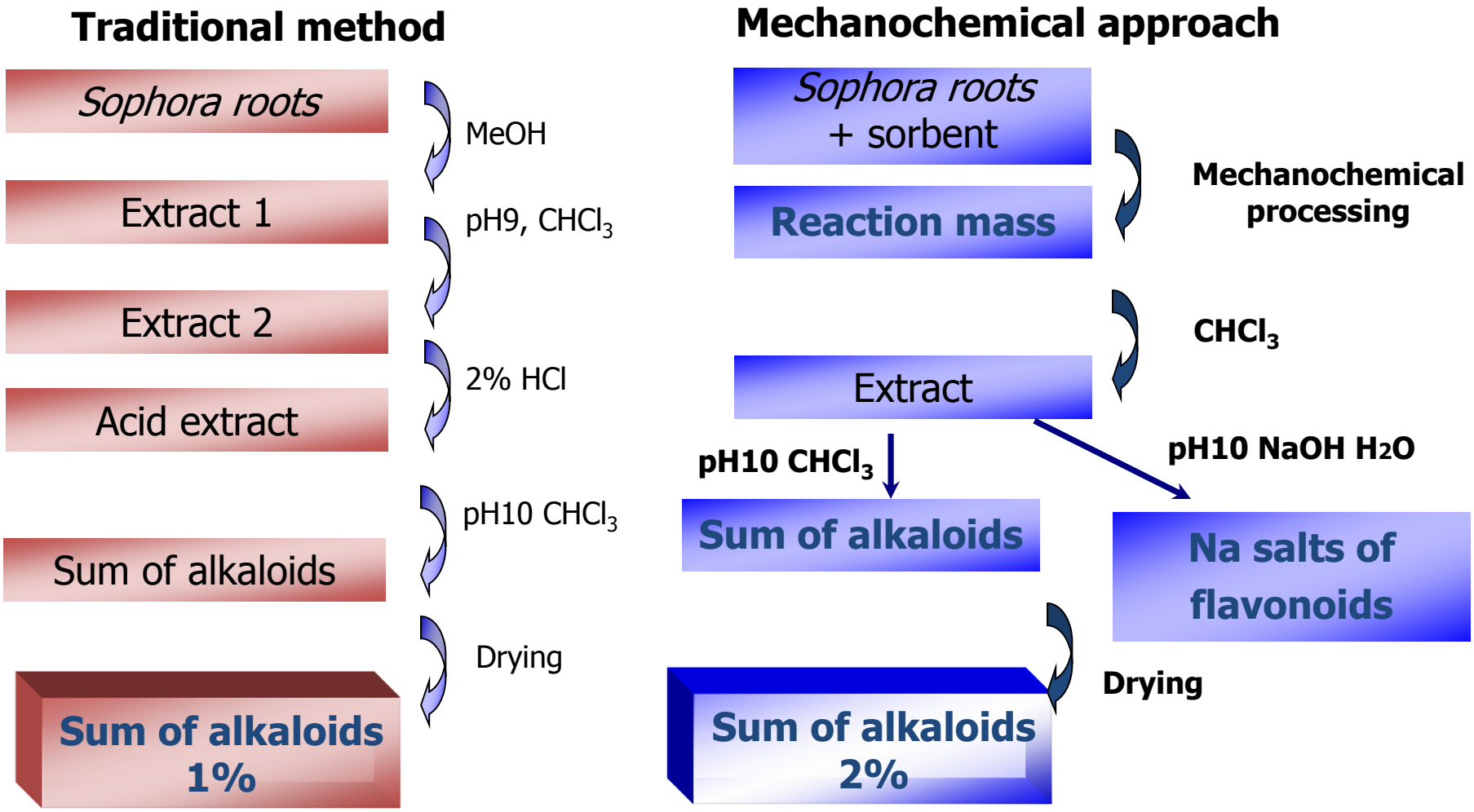
Purification

Ballast Compounds

Ballast Compounds

Alkaloids, acids, glycosides, phytosterols …

Production scheme of alkaloids derived from *Sophora flavescens*



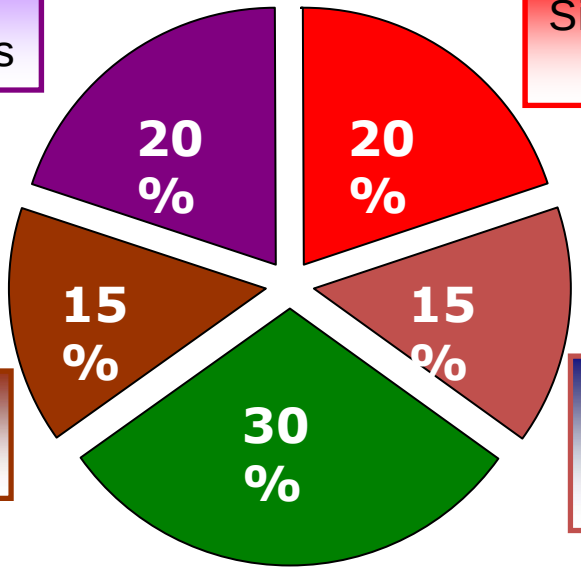
New remedy “Phytourosept”

Vaccinium vitis-idaea

Simple phenols, flavonoids, tanning agents

Arctostaphyllos uva-ursi

Simple phenols, catechins, tanning agents



Urtica dioica

Chlorophylls, phenolic acids, polysaccharides

Calendula officinalis

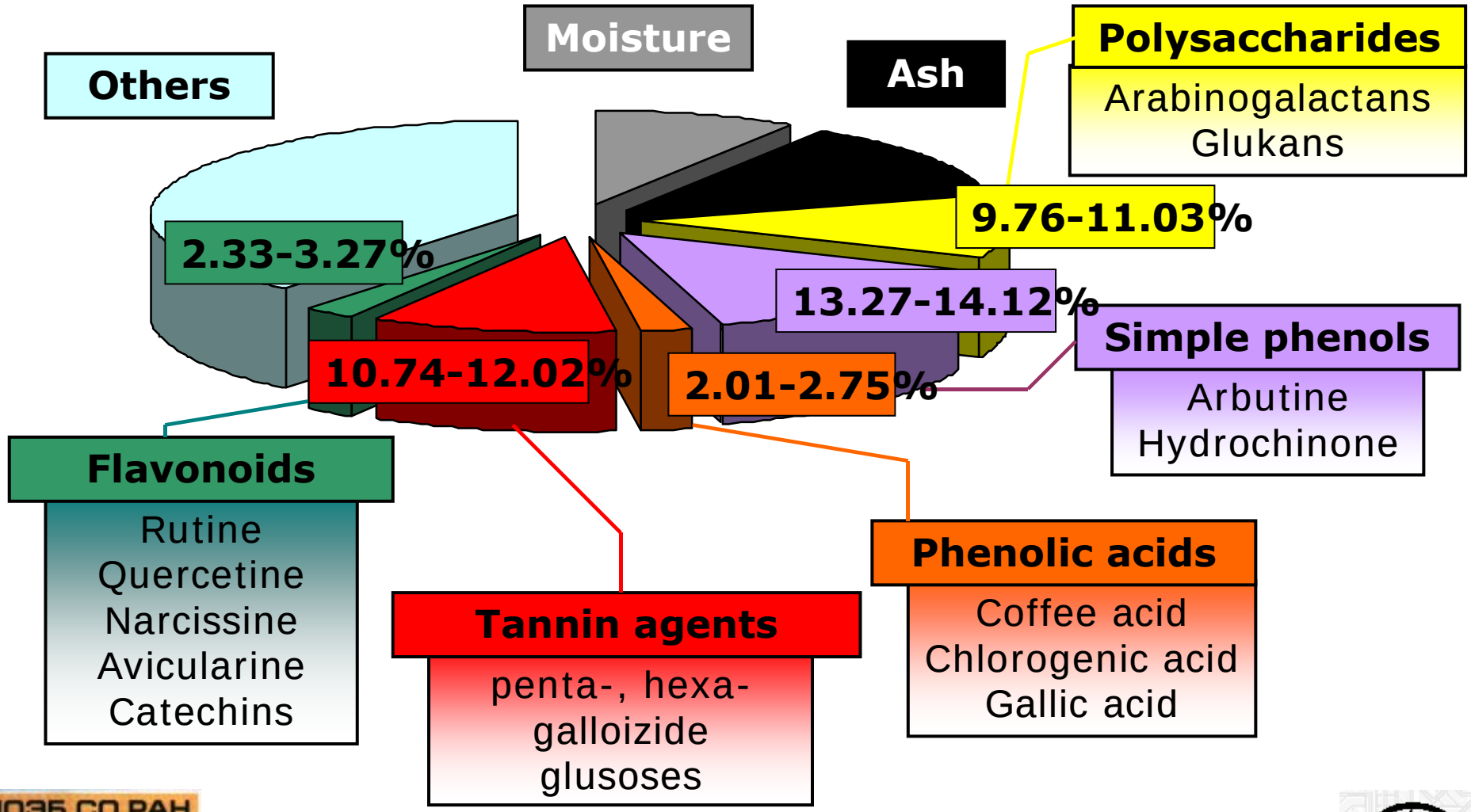
Carotinoids, triterpens, flavonoids, polysaccharides

Polygonum aviculare

Flavonoids, polysaccharides, silicon compounds

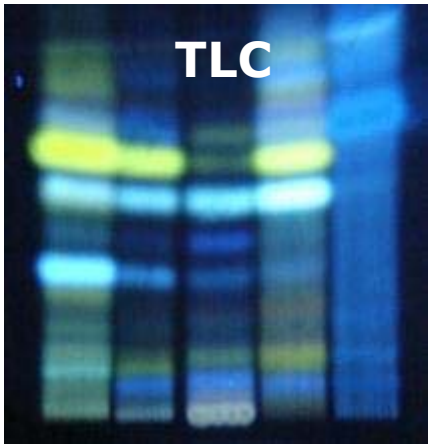
ИОЭБ СО РАН

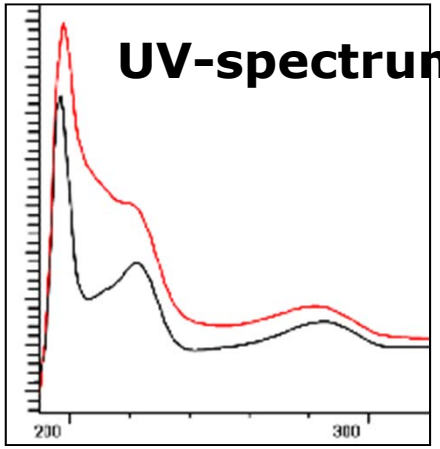
New remedy "Phytourosept". Chemical composition

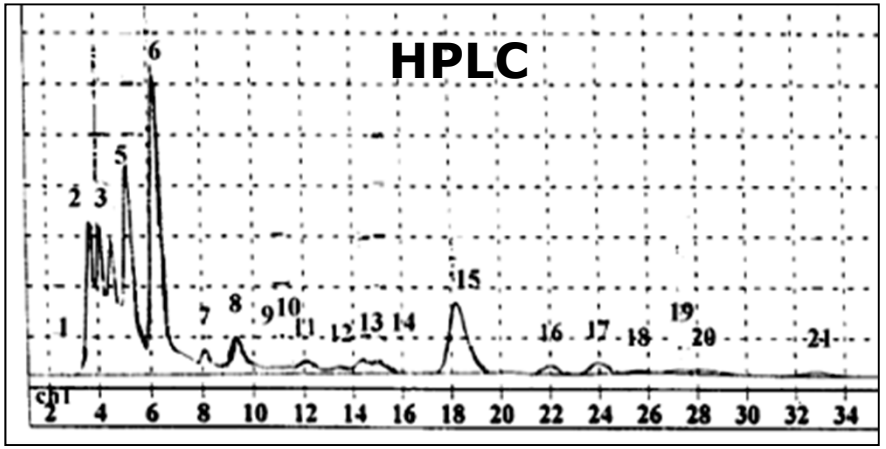


New remedy “Phytourosept”. Standartization

Authentical analysis





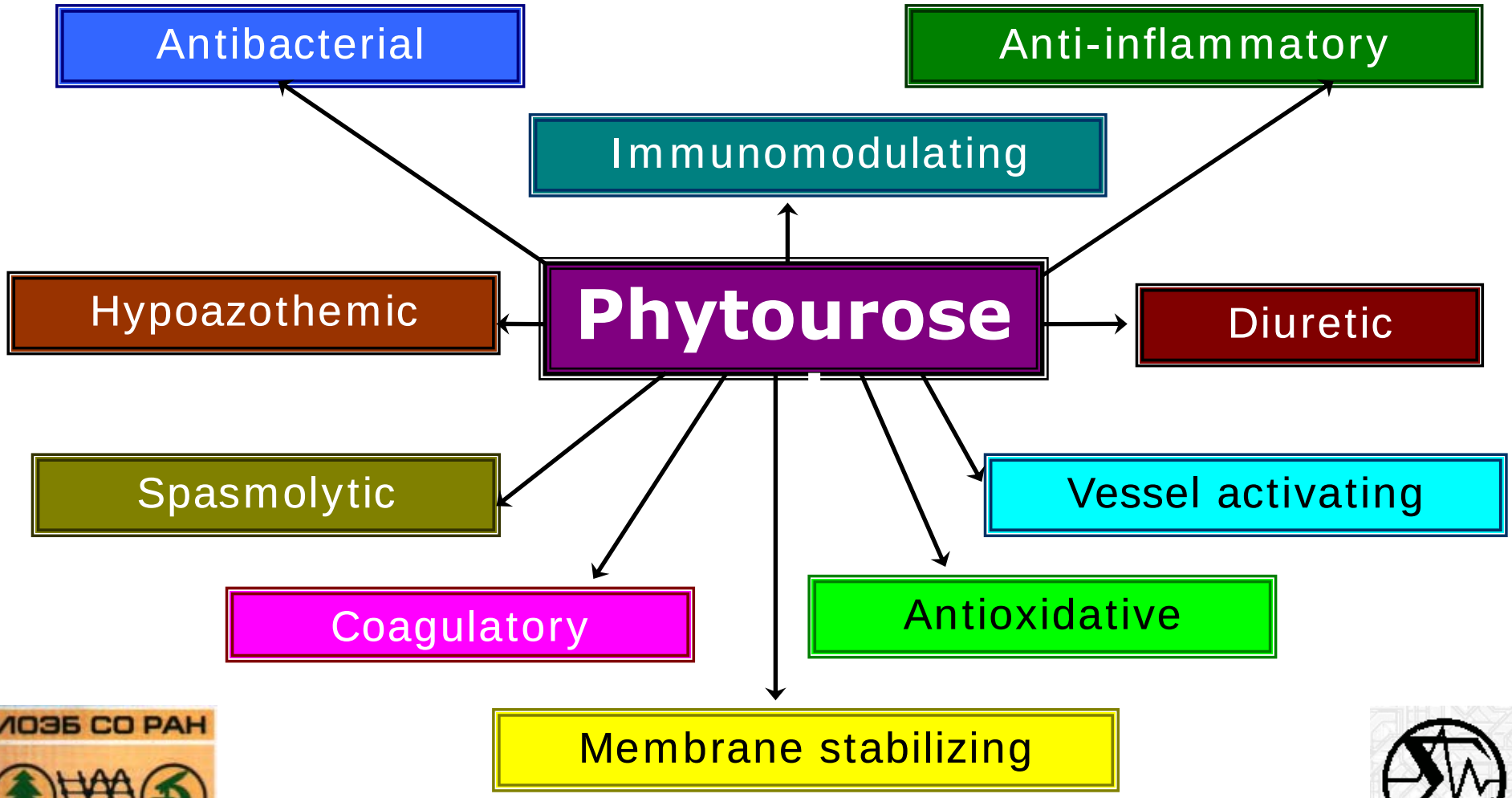


Quantitative spectrophotometric analysis

The sum of flavonoids 11.73-14.79%.

ИОЭБ СО РАН

New remedy “Phytourosept”. Biological activity



Laboratory of Medical and Biological Researches

Created medical preparations

Lamiaceae

Scutellaria baicalensis herb flavonoid fraction (Escubai®) - hepatoprotective, immunostimulant

Lophanthus chinensis herb extract (Lolique®) - antiapoplexy

Schizonepeta multifida herb extract (Schimulique®) - cerebral circulation stimulant

Panzerina lanata herb extract (Pala®) - hypotenzive

Fabaceae

Sophora flavescens herb (Soflaven®) - antiinflamatory, immunostimulant

Astragalus membranaceus herb extract (Amemex®) - cerebral circulation stimulant

Caragana's semen extract (Caseks®) - immunostimulant

Succulents

Callisia fragrans shoot juise - immunostimulant

Aloe arborescent leave juice - biostimulant

Compositae

Cacalia hastata leaves phytofilm (Hastaplen®) – anti-parodontosis

Inula helenium roots extract (Inuliun®) – antiinflamatory

Saussurea lappa roots extract (Salalium®) – antiinflamatory

Gentianaceae

Gentianopsis barbata herb extract (Gebahept®), ***Halenia corniculata*** herb extract (Hacohept®), - hepatoprotective

- Remedies developed by the Department of Biologically Active Substances

The patents (licenses)

Future plans:

- Translation into Russian of other valuable treatises of Tibetan medicine;
- Elaboration and development of new effective biotechnology methods;
- Integration of Tibetan medical tradition with achievements of modern medical and pharmaceutical sciences.

Questions?