

AL-FARABI KAZAKH NATIONAL UNIVERSITY

ZH. A. ABILOV AND M. IQBAL CHOUDHARY

WORKING TOGETHER

**AN EXAMPLE OF SUCCESSFUL SCIENTIFIC  
COLLABORATION BETWEEN PAKISTAN  
AND KAZAKHSTAN**



AL-FARABI KAZAKH  
NATIONAL UNIVERSITY  
(KazNU)

Department of Chemistry  
and Chemical Technology  
Almaty, Kazakhstan

The Center of Physical and  
Chemical Methods of Research and  
Analysis



INTERNATIONAL CENTER FOR  
CHEMICAL AND BIOLOGICAL  
SCIENCES (ICCBS)

(H. E. J. Research Institute of Chemistry  
Dr. Panjwani Center for  
Molecular Medicine and Drug Research)  
University of Karachi  
Karachi-75270, Pakistan



Inter-Islamic Scientific Cooperation Supported  
by the COMSTECH

Almaty 2012

## CONTENT

Foreword .....	5
Abstract – English .....	9
Abstract– Russian .....	10
Introduction .....	11
Scientific Visits (Pakistan) .....	12
Scientific Visits (Kazakhstan) .....	16
Training of Young Scholars .....	20

### RESEARCH PROJECTS PAK-KAZAKH SCIENTIFIC COLLABORATION PROJECT ENTITLED, "STUDIES on the BIOLOGICALLY ACTIVE METABOLITES from the PLANTS of CENTRAL ASIA"

N. A. Sultanova, M. Iqbal Choudhary, T. Makhmoor, V. B. Omurkamzinova, Atta-ur-Rahman, and Z. A. Abilov <b>Chemical investigation of genus <i>Tamarix</i> – <i>T. hispida</i>, <i>T. ramosissima</i> .....</b>	24
A.F. Miftahova, V. U. Ahmad, G. S. Burasheva, and Z. A. Abilov <b>Biological Active Compounds from <i>Halostachys caspica</i>, <i>Halocnemum strobilaceum</i>, <i>Suaeda physophora</i> and <i>Suaeda microphylla</i> .....</b>	36
F. Miftahova, A. Dar, A. U.Vikar, G. S. Burasheva, and Z. A. Abilov <b>Bioassay of Extracts from <i>Halocnemum strobilaceum</i>, <i>Suaeda Physophora</i>, <i>Suaeda microphylla</i> and <i>Halostachys caspica</i> .....</b>	48
L. Korulkina, G. E. Zhusupova, Z. A. Abilov and M. Iqbal Choudhary <b>Biologically Active Compounds from genus <i>Limonium</i> Mill .....</b>	50
R. A. Muzichkina, Y. A. Litvinenko, M. Iqbal Choudhary and T. Makhmoor <b>Method of Obtaining of Polyphenol Complex with Antioxidant Activity .....</b>	55
B. K. Yeskaliyeva, G. S. Burasheva., M. Iqbal. Choudhary and Z. A. Abilov <b>Saponins and Flavonoids from Aerial Parts of genus <i>Climacoptera</i> .....</b>	57
A. K.Umbetova, N. A. Sultanova, V.B. Omurkamzinova, M. Iqbal Choudhary and Z. A. Abilov <b>Chemical Research of Kazakhstan euhalophyte species <i>C. monspeliacum</i> of <i>Camphorosma</i> genus and <i>T. laxa</i>, <i>T. elongata</i> of <i>Tamarix</i> genus of <i>Chenopodiaceae</i>, <i>Tamaricaceae</i> families .....</b>	63
Z. Z. Karzhaubekova., B. S. Siddiqui, G. S. Burasheva and N. A. Sultanova <b>Triterpenoids from the Aerial Parts of <i>Kalidium</i> .....</b>	74



74.9  
77.5  
71.0  
67.1  
95.7  
74.8  
78.3  
72.1  
78.6  
62.5

**Chemical Research of Kazakhstan euhalophyte  
species *C. monspeliacum* of *Camphorosma* genus and  
*T. laxa*, *T. elongata* of *Tamarix* genus of *Chenopodiaceae*,  
*Tamaricaceae* families**

A. K. Umbetova, N. A. Sultanova, V. B. Omurkamzinova,  
M. Iqbal Choudhary and Z. A. Abilov

The objects of our investigation are the over-ground mass of *Camphorosma monspeliacum* (*Chenopodiaceae* family), *Tamarix laxa* and *Tamarix elongata* (*Tamaricaceae* family) plants. They were sampled in Almaty and Aral (dried bottom) areas in the blooming phase.

**Isolation and Separation of Biologically Active Compounds**

For extraction of bioactive substances from *C. monspeliacum*, *T. laxa* and *T. elongata*, comparative research of propyl, ethyl and methyl alcohols, acetone and their aqueous solutions was carried out. It was determined that the greatest BAS quantity is extracted by 70%-ethyl alcohol during 72 hours at room temperature. The obtained water-alcohol extracts were filtered then and concentrated in the vacuum of water jet pump until the full alcohol was removed. Prior the separation of bioactive substances, the fractional extraction of water-alcohol extracts of *C. monspeliacum*, *T. laxa* and *T. elongata* plants was carried out by means of chloroform and ethyl acetate. Chloroform, ethyl acetate and water solutions of investigated plant species were analyzed by means of GLC, PC and TLC methods. Chloroform extracts of *C. monspeliacum*, *T. laxa* and *T. elongata* plants contain chlorophylls, lipophilic substances, high saturated and unsaturated carboxylic acids (fatty acids) and terpenoids. However, the extracts of *C. monspeliacum* contain chromones. Ethyl acetate extracts of *C. monspeliacum*, *T. laxa* and *T. elongata* plants contain phenolic acids, flavonoids and their glycoside forms. Water solutions contain aminoacids and carbohydrates. Additionally, sulphate forms of flavonoids and hydrolysable tanning agents were identified in the water solutions of *T. laxa* and *T. elongata* plants. Hence, the 20 substances were shown in the water-alcohol



extracts of *C. monspeliacum* plants and 30 substances were obtained in the water-alcohol extracts of *T. laxa* and *T. elongata* plants.

Extraction of individual plants was carried out by means of adsorption distributing chromatography (polyamide, silica gel), gel chromatography (LH-20), preparative HPLC, PC and TLC. 10 individual compounds from *C. monspeliacum* plants: 3 terpenoids (substances 2.1, 2.4 and 2.5), 3 chromones (substances 2.6, 2.7 and 2.8), 3 flavonoids (substances 2.14, 2.20 and 2.22) and 1 phenolic acid (substance 2.17).

26 individual compounds were extracted from *T. laxa* and *T. elongata* plants: 3 terpenoids (substances 2.1 - 2.3). 17 Flavonoids (substances 2.9-2.16, 2.19-2.25, 2.26-2.28), 4 phenolic acids (substances 2.17, 2.18, 2.29, 2.30) and 2 hydrolyzable tannins (substances 2.31, 2.32) were also extracted.

#### Determination of Terpenoids Structure

In accordance to the results of TLC (the developer is sulfate of cerium) and positive reaction with the Liberman's reagent it is stated that the main components of chloroform extract are terpenoids: substances 2.4 and 2.5 from the plants of *C. monspeliacum*, substances 2.1-2.3 are from the plants of *T. laxa* and *T. elongata*. Five substances (2.1 - 2.5) were evolved from the chloroform extracts of *T. laxa*, *T. elongata* and *C. monspeliacum* by employing adsorption distributing chromatography (silica gel) and preparative TLC techniques.

Substance 2.1 was obtained from three investigated species of plants; substances 2.2 and 2.3 were obtained from the plants of *T. laxa* and *T. elongata* and substances 2.4 and 2.5 were obtained from the plants of *C. monspeliacum*.

On the basis of physical-chemical data and in comparison with the literature data substance 2.1 is  $\beta$ -sitosterol; substance 2.2 is methyl ether of the 3- $\beta$ -al-D-fridoolean-14-en-28 carboxylic acid; substance 2.3 is 3- $\alpha$ -[3",4"-Dihydroxy-trance-cinnamyl-oxy-D-fridoolean-14-en-28-carboxylic acid (izotamarixen); substance 2.4 is 3-O- $\beta$ -D-glucopiranoside of the oleanolic acid; substance 2.5 is 28-O- $\beta$ -D-glucopiranoside of the oleanolic acid.

Earlier  $\beta$ -sitosterol was identified by the others foreign and home scientists for the plants of *Chenopodiaceae* and *Tamaricaceae* families. It