

## Project Update: May 2016

We are proud to be the part of ICYS 2016 on behalf of the Rufford Small Grants Foundation. Ms. Tamara JANKOVIC as a trainee in the frame of the project 'OrO' - part I won both Serbian national (28 March 2015) and international (16-22 April 2016) competitions of young scientists in the field of Life Science.





РЕПУБЛИКА СРБИЈА



МИНИСТАРСТВО ПРОСВЕТЕ, НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА



РЕГИОНАЛНИ ЦЕНТАР ЗА ТАЛЕНТЕ БЕОГРАД II

додељују

# ДИПЛОМУ

*Тамари Јанковић*

УЧЕНИЦИ 3. РАЗРЕДА

ТРЕЋЕ БЕОГРАДСКЕ ГИМНАЗИЈЕ

ЗА ОСВОЈЕНО 1. МЕСТО

ЗА ИСТРАЖИВАЧКИ РАД ИЗ ОБЛАСТИ  
ЖИВОТНИХ НАУКА /биологија, хемија/

НА

ДРЖАВНОМ ТАКМИЧЕЊУ ИСТРАЖИВАЧКИХ РАДОВА  
УЧЕНИКА СРЕДЊИХ ШКОЛА

Београд 28. 03. 2015. год.

МИНИСТАРСТВО ПРОСВЕТЕ, НАУКЕ И  
ТЕХНОЛОШКОГ РАЗВОЈА



МИНИСТАР, Др СРЂАН ВЕРБИЋ

РЕГИОНАЛНИ ЦЕНТАР ЗА ТАЛЕНТЕ  
БЕОГРАД II



ДИРЕКТОР, НИКОЛА СРЗЕНТИЋ

РЕПУБЛИКА СРБИЈА



МИНИСТАРСТВО ПРОСВЕТЕ,  
НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА

РЕГИОНАЛНИ ЦЕНТАР ЗА ТАЛЕНТЕ



БЕОГРАД II

додељују

# СЕРТИФИКАТ

## ***ТАМАРИ ЈАНКОВИЋ***

УЧЕНИЦИ ТРЕЋЕГ РАЗРЕДА ТРЕЋЕ БЕОГРАДСКЕ ГИМНАЗИЈЕ  
ЗА УЧЕШЋЕ НА ДРЖАВНОМ ПРВЕНСТВУ ИСТРАЖИВАЧКИХ РАДОВА  
УЧЕНИКА СРЕДЊИХ ШКОЛА ИЗ ОБЛАСТИ  
ЗАШТИТЕ ЖИВОТНЕ СРЕДИНЕ СА ИСТРАЖИВАЧКИМ ПРОЈЕКТОМ  
*„Еволутивно једноставнији организми као инспирација за нове антитуморске  
терапеутике“*

Београд 28. 03. 2015. год

РЕГИОНАЛНИ ЦЕНТАР ЗА ТАЛЕНТЕ  
БЕОГРАД II



*Јасмина*



MINISTERUL EDUCAȚIEI NAȚIONALE  
ȘI CERCETĂRII ȘTIINȚIFICE  
INSPECTORATUL ȘCOLAR  
JUDEȚEAN CLUJ



# CERTIFICATE

The 23<sup>rd</sup> International Conference of Young Scientists

**This certificate hereby acknowledges that**

**Tamara Jankovic**

has participated in the XXIII<sup>rd</sup> International Conference of  
Young Scientists in Cluj-Napoca, Romania.



Chief Inspector,  
Valentin Claudiu Ciubus



*Rajkovits Zsuzsanna*  
President of International  
Conference of Young Scientists,  
PhD. Rajkovits Zsuzsanna



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ȘI CERCETĂRII ȘTIINȚIFICE

INSPECTORATUL ȘCOLAR  
JUDEȚEAN CLUJ



# CERTIFICATE

The 23<sup>rd</sup> International Conference of Young Scientists

**Gold Medal in** \_\_\_\_\_ **Life Science**

*is awarded to*


**Tamara Jankovic (Serbia)**

for presenting his/her research project in the XXIII<sup>rd</sup>  
International Conference of Young Scientists in Cluj-Napoca, Romania.



Chief Inspector,  
Valentin Claudiu Cuibus



  
President of International  
Conference of Young Scientists,  
PhD. Rajkovits Zsuzsanna

Doc, does my biopsy mean  
I have cancer?



New message:



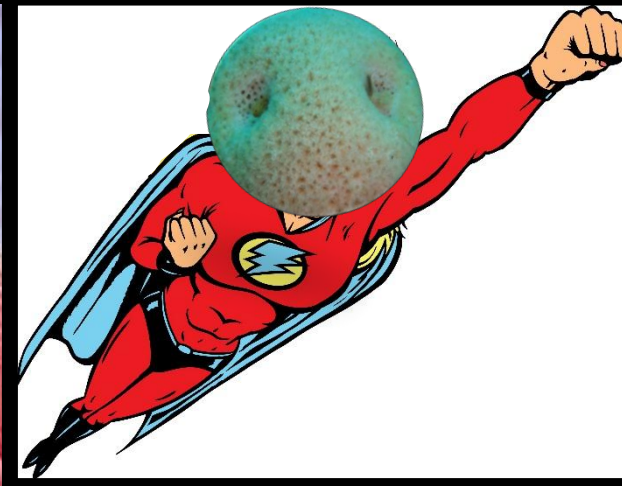
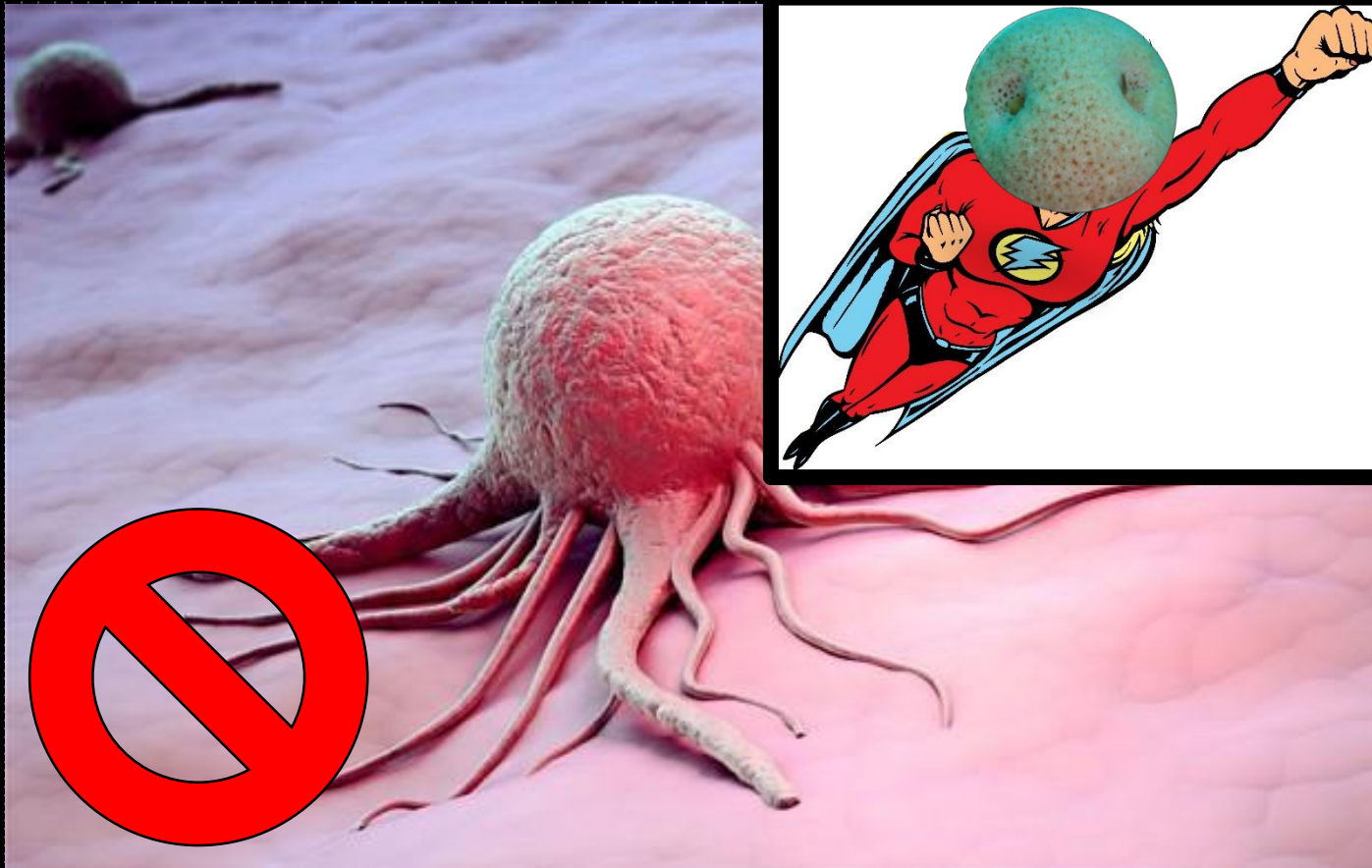
**BREAST**  
adeno**CARCINOMA**  
MCF-7 cells



  
*Ochridaspongia*  
*rotunda:*  
For God's sake!  
We **MUST** help ...



Protect **SPONGES** and  
**SPONGES** will protect **YOU!**





Author:

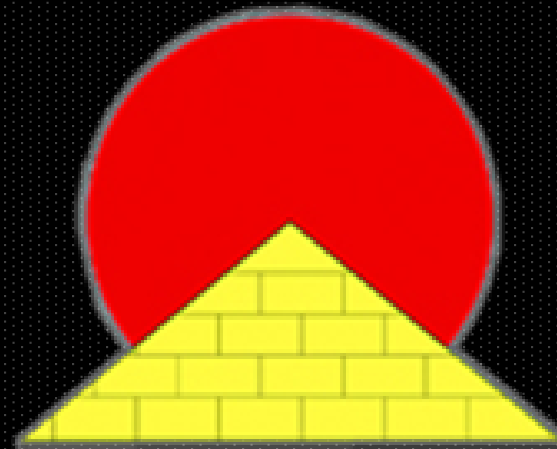
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Supervisors:

**BORIS PEJIN PhD & VESNA KOJIĆ PhD**





# IN VITRO BIOACTIVITY SCREENING OF LOWER ORGANISM EXTRACTS AGAINST BREAST ADENOCARCINOMA MCF-7 CELLS



Tamara Janković

Supervisors: Boris Pejin PhD and Vesna Kojić PhD

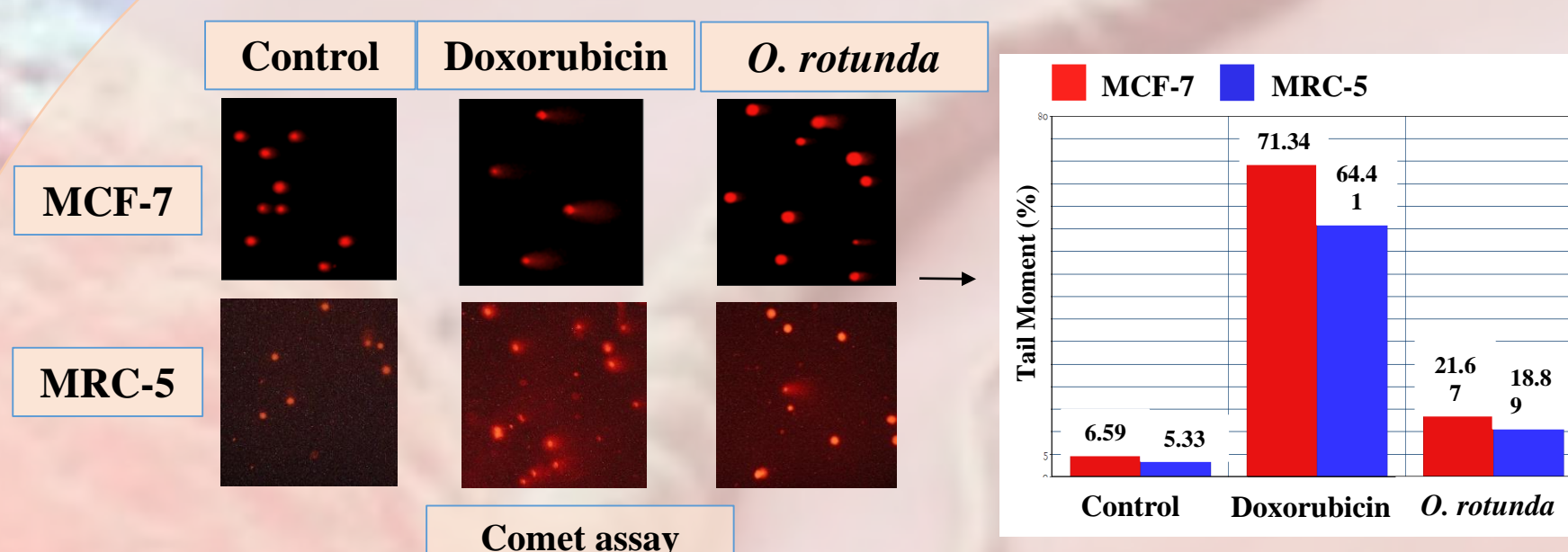
Regional Centre for Talented Youth Belgrade II, Belgrade, Serbia, tamara.jankovic.97@gmail.com



## 1. INTRODUCTION

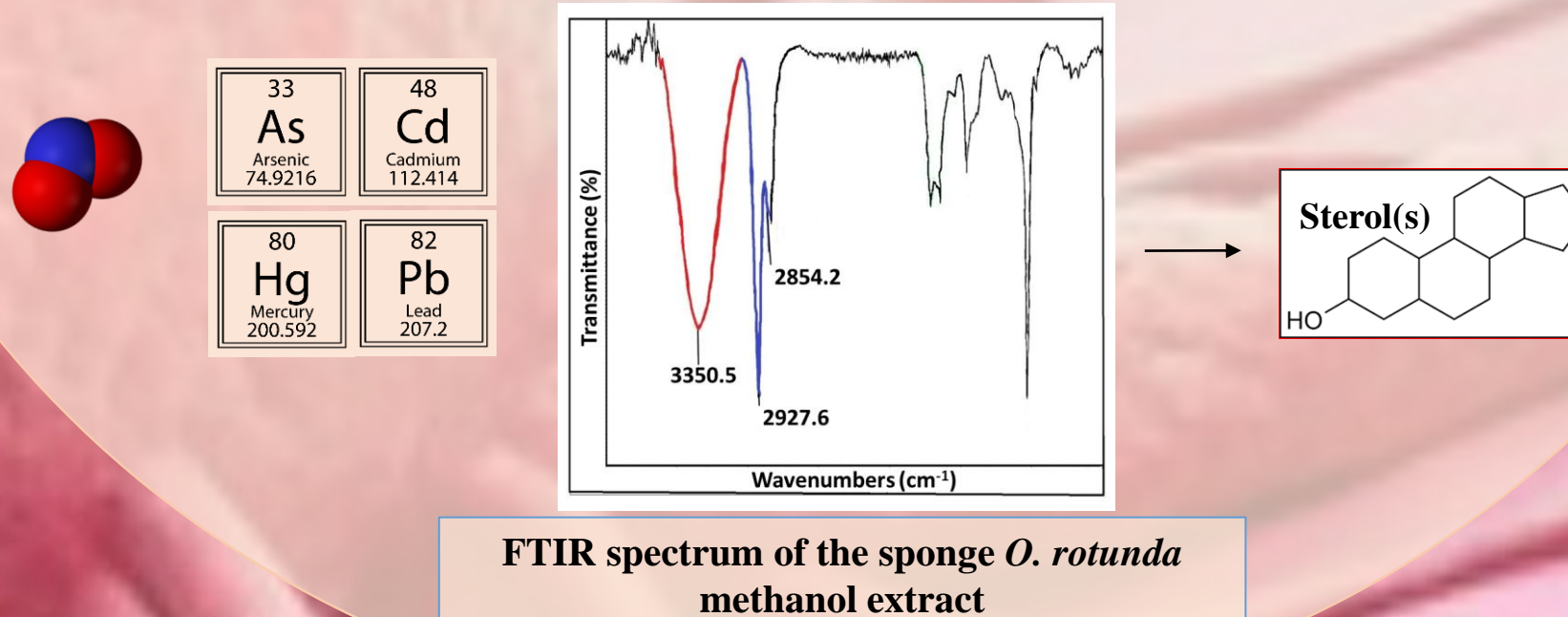
The aim of this study was to screen *in vitro* antitumor activity of methanol extracts of selected lower level organisms against the breast adenocarcinoma MCF-7 cell line and to identify potential bioactive principle(s) of the most effective species [1].

A 3.5-fold lower fragmentation of DNA molecule in the presence of the sponge extract (vs. doxorubicin) pointed out that key mechanism of action may not be related to the nucleic acids.



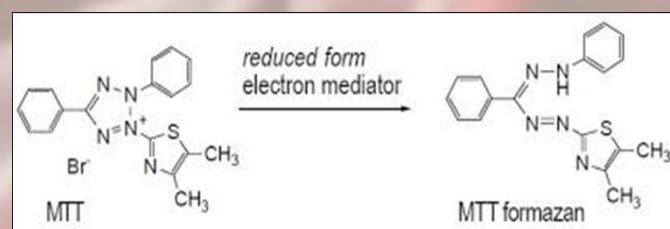
Comet assay

While both FTIR spectrum and meager content of simple phenolics (< 3.0 mg/kg) practically excluded these compounds among the antitumor leads, the same spectrum imposed the idea of sterol(s) as possible key bioactive(s) (hydroxyl and methylene groups 3350.5 and 2927.6 & 2854.2 cm<sup>-1</sup>, respectively) [2]. Furthermore, negligible contents of nitrites (< 0.1 mg/kg) and heavy metals (including one metalloid species) (< 2.3 mg/kg) are not much likely to affect the observed bioactivity.



## 2. MATERIALS AND METHODS

The sponge *Ochridaspongia rotunda* (Arndt, 1937), the bryozoan *Pectinatella magnifica* (Leidy, 1851), the lichen *Usnea barbata* (L.) Mott. and the moss *Rhodobryum ontariense* (Kindb.) Kindb. were screened for the first time. Antitumor activity and antimutagenicity were determined by MTT and comet assays, respectively. Chemical composition of the most promising organism was estimated using FTIR, UV-VIS, IEC and AAS.

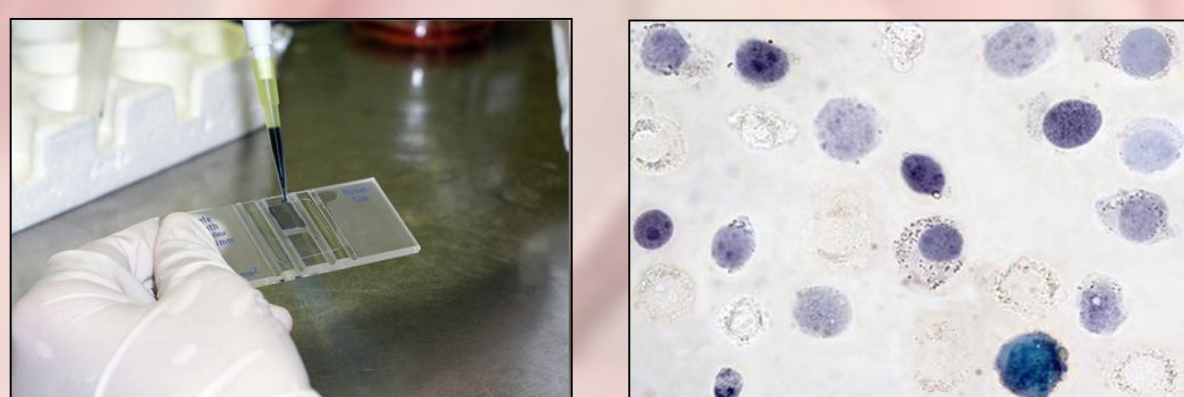


MCF-7

MRC-5

## 3. RESULTS AND DISCUSSION

*O. rotunda* methanol extract was found to be almost 55-fold more selective against MCF-7 vs. MRC-5 (normal) cells, compared to doxorubicin (positive control) that highly affected both normal and tumor cells.



DET test: Viability determination

Antitumor activity of tested methanol extracts and doxorubicin (Dox)

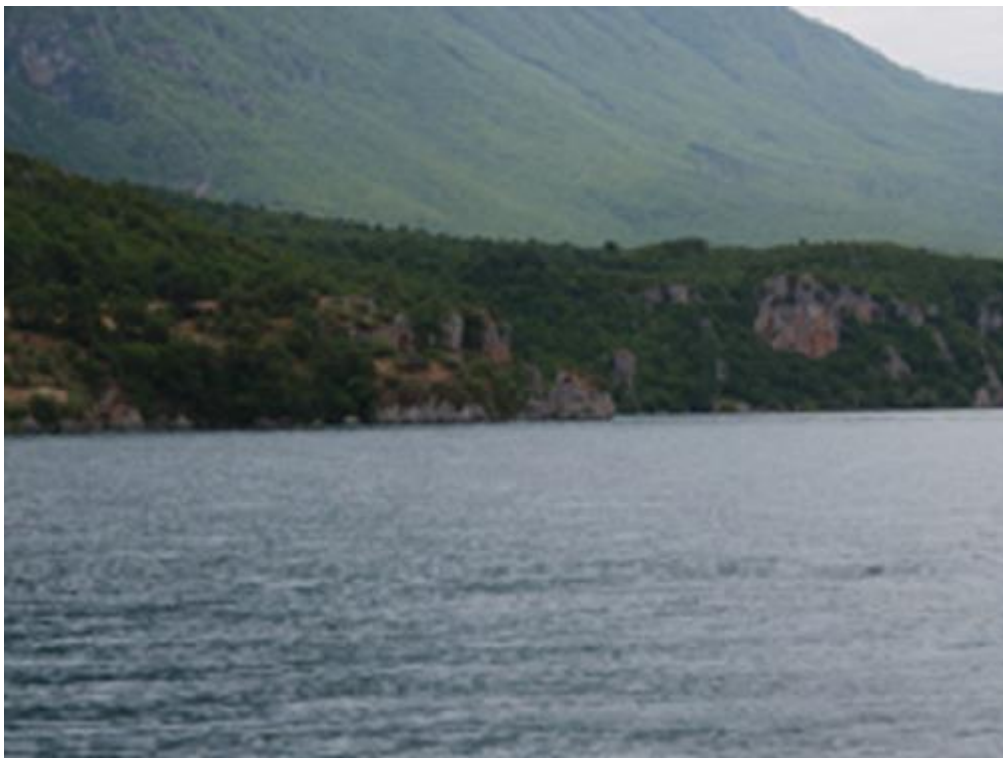
IC <sub>50</sub> (µg/mL)	<i>O. rotunda</i>	<i>P. magnifica</i>	<i>U. barbata</i>	<i>R. ontariense</i>	Dox
MCF-7	5.03	25.62	7.25	24.62	0.05
MRC-5	296.65	491.01	100.98	501.42	0.21

## 4. CONCLUSION

*O. rotunda* methanol extract may afford novel drug for breast tumor and/or inspire its design. Among the rest, further research should be directed towards isolation and identification of the sponge bioactive compound(s). The origin of this/these natural product(s) should be carefully addressed. Indeed, there is a great chance that real producer(s) may be the sponge symbiotic microorganism(s), primarily some of its bacterial strain(s) [3].

## 5. REFERENCES

- [1] D.J. Newman and G.M. Cragg. 2012. J. Nat. Prod. 75, 311-335.
- [2] I.B. de Barros et al. 2013. Biochem. Syst. Ecol. 49, 167-171.
- [3] T. Keller-Costa et al. 2014. PLoS ONE 9:e88429/1- e88429/15.



Lake Ohrid, Veli Dab Ohrid, Republic of Macedonia



The freshwater sponge *Ochridaspongia rotunda* (Arndt, 1937)