

About the Region

Land Area: 79 million ha (35 million ha rangelands) .

Environment: Low and highly variable rainfall; extreme temperatures; mountains, deserts, steppe landscape. Diverse agriculture with high growth potential.

Economies: In structural transition from centrally planned to market-driven economies; decline in rural



*wild plantation of
Glycyrrhiza glabra
on saline lands*



Salicornia herbacea

Name of the Organization and e-mail address:

Dr. Kristina Toderich
Regional representative of the International Center for Biosaline Agriculture (ICBA) at Program Facilitation Unit, CGIAR Program for Central Asia and the Caucasus (CAC) / Regional Program of the International Center For Agricultural Research In The Dry Areas (ICARDA) for the CAC Region
Tashkent, Uzbekistan

Mail Address:
Program Facilitation Unit, P.O. Box 4564,
Tashkent, 100000, Uzbekistan
Street Address: 6, Murtazaev Street, Tashkent,

Utilization of Halophyte Biomass for Biogas Production



公立大学法人
北九州市立大学
大学院 国際環境工学研究科





Kalidium caspicum

Objectives of the action

Overall objective: To use marginal water and degraded saline lands as a great potential source for biomass production. To use biomass of halophytes (inedible biomass!) as a valuable source of methane-gas and important source of secure and sustainable energy in arid lands

Specific objectives

- On-farm establishment of renewable energy production options (wild or domesticated halophytes) on marginal lands;
- Using of anaerobic digestion (AD) of halophyte biomass for bioenergy (biogas) production;
- Development of AD-technology for halophyte biomass;
- To design some mini biogas reactor for one-two cattle-farms;
- Desalination, recovering of soil productivity.



Climacoptera lanata

Partners

National University of Uzbekistan named after

M.Ulugbek

(NUUz), Tashkent, Uzbekistan

The University of Kitakyushu

Kitakyushu, Fukuoka, Japan

Target groups

Small, remote, rural communities with limited energy supply .

Final beneficiaries

Small farmers and small rural enterprises (technologies); students (capacity building); society (clean, sustainable energy production).

Results

- Anaerobic degradation of wild halophytes (*Kalidium caspicum*, *Salicornia europaea* and *Climacoptera lanata*) from solonchaks of Kyzylkum desert was studied.
- Lab-scale reactors were fed with dried and milled plant biomass. Tests were operated under batch and continuous mode at mesophilic (M) and thermophilic (T) temperatures.
- High content of chlorides, sulphates, sodium and potassium and low concentrations of nutrients were revealed.
- Batch-tests showed that total methane-yields at M and T conditions were similar. Maximum biogas was produced in result of anaerobic degradation of *Kalidium caspicum* (about 1000 mL CH₄ from 1L of sludge at T and M-conditions).
- Obtained results revealed that 72-90% organic fraction of *K.caspicum* and 54-90% of *S.europaea* can be decomposed to CH₄ at 35°C within 30-days whereas approximately 50-70% of conversion was identified from the degradation of *C.lanata*.
- At T-conditions about 45-70% organic matter of plant biomass were converted into methane.
- Incubation at 55°C accelerated the CH₄ conversion rate up to 2 times.
- Preliminary study of anaerobic digestion of plant biomass under continuous mode demonstrated that it is possible to get about 300-500 mL CH₄ from 1L of anaerobic digestion sludge per day.