



*Silva Atoyán*

*Institute of Botany, National Academy of Sciences of the  
Republic of Armenia*

**Agrochemical characteristics and  
ways of efficient utilization of bio-  
residues separated in the process of  
obtaining biogas from poultry  
droppings**

# Objectives:

- ▶ effective utilization of natural resources,
- ▶ environmental protection.

# Issues:

- ▶ soil scarcity,
- ▶ conventional/intensive ways of soil cultivation,
- ▶ limited amount of organic fertilizers.



Armenian - Norwegian project to develop renewable energy industry in Armenia.

- ▶ Several experiments have been carried out in Hrazdan area of Kotayk region to utilize the bio-residues from biogas production as organic fertilizers for potato growing purposes.

## Agrochemical characteristics of the bio-residues separated during the process of biogas production from poultry manure

Name of the sample	N %	P2O5 %	K2O %	pH
Liquid residues	0.43	0.14	0.12	6.4
Solid residues	0.99	0.29	0.30	6.6

# Bio-residues impact on potato yield amount

Variants	Average yield per replications q/ha			Average yield q/ha	Additional yield	
	I	II	III		q/ha	%
Control (without fertilizers)	205.4	210.0	214.6	210.0	-	-
Solid phase 20 t/ha	309.4	304.8	302.0	305.4	94.5	45.4
Liquid phase 45 t/ha	292.6	284.0	282.0	286.2	76.2	36.3



## Impact of bio-residues on potato yield qualitative characteristics

Variants	Starch %	Vitamin C %	Nitrates mg/kg
Control (without fertilizers)	14.8	12.6	134.0
Solid phase 20 t/ha	16.4	14.0	174.0
Liquid phase 45 t/ha	15.2	13.8	173.0

## Economic efficiency of solid and liquid residues application on potato crops


Indexes	Variants		
	Control (without fertilizers)	Solid phase 20 t/ha	Liquid phase 45 t/ha
Mean yielding of variant, q/ha	210.0	305.4	286.2
Excessive yield compared with the control, q/ha	-	95.4	76.2
Cost of excessive yield, 1000 AMD	-	1908	1524
Fertilizers and costs, 1000 AMD	-	90	135
Harvesting, transportation and storage costs of excessive yield, 1000 AMD	-	109.7	87.6
Total costs, 1000 AMD	-	199.7	222.6
Additional benefit, 1000 AMD	-	1708.3	1301.4

## Recommendations :

-use bio-residues in order to:

- ▶ replenish the lack of organic fertilizers in RA,
- ▶ get high yield of ecologically sound and safe for human health crops.

**THANK YOU !**

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the frame, creating a dynamic, layered effect against the white background.