NEW USES OF BIOACTIVE PHYTOCOMPOUNDS DEPENDING ON MOLECULAR STRUCTURE

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It is known that plant secondary metabolites are bioactive phytochemicals, both through important vital roles which have the plant producing it, and through their effects on human and animal body at its exogenous application. Different phytochemical compounds, representatives of different phytochemicals classes exogenously applied in different systems shows stimulants plant growth, antioxidants, cells membranoprotectives, tissues regenerators and other activities. These manifestations of secondary metabolites plant bioactivity inspired the research described in this paper on stimulating activity of methanogenic microorganisms in the biochemical anaerobic fermentation processes on organic substrates with emission of biogas as an energy source. Were tested, in special conditions of a laboratory anaerobic digester (Covaliov V., Nenno V. and coauthors design) [1], biologically active substances from different phytochemicals classes: saponins, flavonoids, tannins, alkaloids, steroids, cumarins etc. A manifest intensification of anaerobic fermentation process occurred with the application of gypsoside (triterpenoid saponin), sclareol (bicyclic diterpenoid) and squalene (acyclic triterpenoid) as fermentation phytostimulators. As a substrate was used the mixture of pulp obtained after alcohol distillation and animal manure in weight ratio 3:1. The concentrations of the test compounds ranged from 10^{-3} - 10^{-5}% by weight of the substrate.

It is evident (Table 1) that addition of these three compounds in the reaction mixture increase biogas emission over a period of 220 hours by two times compared with control test - without addition of phytostimulator.

Table 1. Emission dynamics and total biogas volume (ml) produced under the experiment conditions

Time from the start of the experiment, h	Gypsoside	Sclareol	Squalene	Control test
0	0	0	0	0
2,5	50	40	30	30
5	60	50	60	40
24	83	75	81	40
27	83	80	117	40
40	150	116	160	40
43	158	125	72	25
65	50	137	38	25
70	37	137	38	25
75	50	40	35	17
144	25	20	20	15
170	20	20	20	15
195	20	20	18	12
220	12	12	12	12
Total biogas	**798**	**756**	**699**	**333**

The common element of these compounds is the isoprene structure of their molecules. All three compounds have biogenetic isoprene provenance.

References

1. Combined anaerobic bioreactor for the production of biomethane. Patent of invention MD no 4189. Inventors:COVALIOV, V., COVALIOVA, O., UNGUREANU, D., NENNO, V., BOBEICA, V., SLIUSARENCO, V., IONETS, I. Publ. BOPI, 2013, no.7, p.28-30.