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Биологически активные вещества растений – изучение и использование

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О-81 Биологически активные вещества растений — изучение и использование: материалы международной научной конференции 29–31 мая 2013 г., г. Минск. – Минск : ГНУ «Центральный ботанический сад Академии наук Беларуси», 2013. – 356 с.

Изложены материалы Международной научной конференции, посвященной обсуждению актуальных проблем по изучению и использованию биологически активных веществ растений, в том числе биотехнологических аспектов в растениеводстве с участием ученых из Беларуси, России, Украины, Молдовы, Казахстана, Кыргызстана, Венгрии.

На молекулярном, клеточном и организменном уровнях рассмотрены имеющие важное научное и практическое значение вопросы, в числе которых состав, структура, биосинтез и использование веществ вторичного метаболизма растений, антиоксидантная и антирадикальная активность и лечебно-профилактические препараты из растений, сырьевые источники БАВ, биотехнологии в растениеводстве.

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USE OF PROTEOMIC AND METABOLOMIC METHODS IN MEDICINAL PLANTS BIOTECHNOLOGY

Kuzovkova A.A.[1], Mazur T.V. [1], Novikova T.I.[2], Banaev E.V.[2], Reshetnikov V.N.[1]
[1] SSI «Central Botanical Gardens», NAS of Belarus, Minsk,
e-mail: fioraia@nm.ru
[2] FSIS Central Siberian Botanical Garden, SB RAS, Novosibirsk,
e-mail: tin27@mail.ru

We develop new strategy in biotechnology of biologically active substance (BAS) production by medicinal plant cell cultures on the basis of a proteomic and metabolomic method combination (within the framework of the B12SO-017 grant between the National Academy of Science of Belarus and the Siberian Branch of the Russian Academy of Science (2012–2014)). It is supposed that comparative analysis of dedifferentiated cell proteomic status of initial form and somaclones of medicinal herb *Agastache rugosa* (Fisch. & C.A.Mey.) Kuntze will highlight low- and high-expressing proteins-enzymes, that determine metabolomes of the somaclone callus cells, and will predict directions of BAS biosynthesis. It should be noted that the studied plants-somaclones of *A. rugosa* in comparison with the initial form are hyperproducers of flavonols and tannins (table 1).

Table 1. Content of BAS in the initial form and the plants-somaclones of *A. rugosa*

Plant	Total content of phenolic compounds, mg/g of dry weight	Total content of tannins, mg/g of dry weight	Total content of flavonols, mg/g of dry weight
Initial form	60,0	73,0	1,46
Somaclone *Aga11*	100,0	106	10,27
Somaclone *Aga20*	85,7	138,0	5,45
Somaclone *Aga34*	75,8	97,0	6,66
Somaclone *Aga36*	67,5	–	4,27

To date we have received leaf calluses from the initial form and 4th plants-somaclones of *A. rugosa*. We have isolated total protein pools from the calluses of 3th passage by trichloroacetic acid/acetone precipitation method. We have analyzed them by 1D acrylamide gel electrophoresis

in alkaline system at denaturant conditions. The comparative computer analysis (Quantity One Basic Software (Bio-Rad Laboratories, USA)) has showed that proteomes of the leaf calluses from *A. rugosa* plants-somaclones differ among themselves and from the initial form in expression of protein series. Similarity percent between the proteomes is presented in table 2.

Table 2. Comparative similarity matrix (in %) of the proteomes of the leaf calluses from the initial form and the plants-somaclones of *A. rugosa*

Calluse from	initial form	somaclone *Aga11*	somaclone *Aga20*	somaclone *Aga34*	somaclone *Aga36*
initial form	100	90,32	91,94	91,94	83,87
somaclone *Aga11*	90,32	100	98,39	98,39	93,55
somaclone *Aga20*	91,94	98,39	100	96,77	91,94
somaclone *Aga34*	91,94	98,39	96,77	100	91,94
somaclone *Aga36*	83,87	93,55	91,94	91,94	100

Thus, the proteomes of the *Aga20* and *Aga34* leaf calluses are closest to the initial form calluse proteome. Distinctions in 5 proteins are demonstrated and similarity percent makes 91,94. Among themselves the proteomes of the *Aga20* and *Aga34* calluses are similar to 96,97% (differ in 2 proteins). The proteome of the *Aga11* calluse is similar to the proteomes of the initial form calluse in 90,32 % (differ in 6 proteins), of the *Aga20* and *Aga34* – in 98,39 % (differ in 1 proteins), of the *Aga36* – in 83,87 % (differ in 10 proteins). The *Aga36* calluse possesses most specific proteome among all somaclone calluses: percent of distinction makes ~6,5 in relation to the *Aga11* proteome, ~8 – to the *Aga20* and *Aga34* proteomes, 16 – to the initial form calluse proteome.