

## ***Bio-production of small molecules in yeast***

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Most valuable small molecules are made from fossil oils, from extraction of plant or other natural materials or obtained through specialized agriculture. The use of petrochemicals for manufacturing has its obvious drawbacks, but less appreciated is the fact that extraction from natural sources may lead to exhaustion of these, and though some agricultural production systems are perfectly sustainable, not all are. Thus, growing the plant or raising the animal may take more land, more water or more energy than it really should. Finally, any extraction process may require solvents or other processes which generate significant waste.

Making the compounds by fermentation instead can improve the product's sustainability greatly, avoiding deleterious use of fossil oils, natural source extraction or freeing land or other resources for other uses. Evolva's Genetic Chemistry technologies allow for this. State-of-the art methodologies for establishment of heterologous biosynthesis pathways in Baker's yeast allow for fast development of fermentation-based sustainable manufacturing routes. Added benefits are higher product quality (only one product formed at a time), improved supply chain stability (no seasonal variation) and the possibility for customization (blends of single components). Production of vanillin, resveratrol and Stevia sweeteners will be discussed.

<sup>1</sup>Naesby N., Nielsen S.V.S., Nielsen C.A.F., Green T.1, Tange T.O., Simón E., Knechtle P., Hansson A., Schwab M.S.1, Titiz1 O., Folly C., Archila R.E., Maver M., Fiet S.v.S., Boussemghoune T., Janes M., Kumar A.S.S., Sonkar S.P., Mitra P.P., Benjamin V.A.K., Korrapati N., Suman I., Hansen E.H., Thybo T., Goldsmith N. and Sorensen A.S. Yeast artificial chromosomes employed for random assembly of biosynthetic pathways and production of diverse compounds in *Saccharomyces cerevisiae*. *Microbial Cell Factories* 8:45 (2009)