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Chalcone 3- Hydroxylase: yellow colouration of flowers

The novel method to form structured chromium layers uses electroplating at constant current density and initiates structure formation through temperature changes. Other than state of the art pulse electroplating, this method minimizes additives, energy consumption and risks. Structured chromium layers produced with the novel method have improved properties. They are very hard and wear resistant like conventional hard chrome. Depending on the parameters of the deposition process their surface topography can be adjusted for repellent - "easy to clean" properties – or vice versa for fluid retention properties as well, properties most needed in functional coatings like media contact surfaces.

BACKGROUND

Different yellow pigments can be responsible for the yellow colouration of flowers. This includes the wide-spread carotenoids, but also betalains, quinones, yellow flavonoids and anthochlore pigments (chalcones and aurones). Many popular ornamental plants do not produce yellow varieties or only ivory and pale yellow varieties despite of intensive conventional breeding efforts. World-wide, there are many attempts to use molecular breeding approaches for the creation of yellow varieties of such ornamental plants. Currently, two approaches are performed; one using aureusidine synthase (AUS) from snapdragon, the others chalcone reductase (CHR) present e.g. in soybean for the accumulation of stable 6'-deoxychalcones. However, there are no reports available on the creation of prototypes showing a satisfying yellow flower colour.

TECHNOLOGY

According to the invention it was found out that polypeptides, in particular hydroxylases, as for example flavonoid 3'-hydroxylases, are able to hydroxylate chalcones at position 3. The knowledge of such hydroxylases enables the modulation of the expression of these hydroxylases in order to, for example, overexpress or inhibit these in vivo. In particular, the knowledge of these enzymes enables the modulation of the quantity of hydroxylated chalcones in a plant or plant cell, respectively, in order to thus change the colour composition in the latter. Thus, plants, which comprise the nucleic acid molecules according to the invention, have, for example, flowers with an intensive yellow colouration.

BENEFITS

- Intensification of the yellow colouration due to the enrichment of chalcones with a 3,4-hydroxy pattern
- increased formation of aurones

POTENTIAL APPLICATIONS

This invention may be used for the creation of yellow flower colour in species which do not naturally produce yellow varieties. Possible target plants could be e.g.fuchsia, cyclamen, poinsettia, petunia, African violet, azalea, Easter lily, and geranium. Although pale yellow or ivory varieties of a few of these species exist, the availability of intensive yellow varieties would be a novel and interesting market input.

REFERENCE:
M022/09

OPTIONS:
R&D collaboration, license agreement, sale of patent

KEYWORDS:
chalcone 3-hydroxylase, molecular breeding , yellow flower colour

DEVELOPMENT STATUS:
Currently prototypes of gm-ornamental lily and pelargonium are created. A rapid evaluation of CH3H in combination with other genes is expected from gm-Arabidopsis plants before the end of 2010.

IPR:
AT, US, JP, NZ patents granted

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