

## Thème 1 – La Terre dans l'Univers, la vie, l'évolution du vivant

### 1-A – Génétique et évolution

#### GM Plants.

Discuss the interest of the so-called 'Golden Rice'.

##### Document 1:

Vitamin A is a fat-soluble vitamin that has several important functions in the body:

- It helps cells reproduce normally -- a process called "cellular differentiation."
- It is essential for good vision -- the first sign of a vitamin A deficiency is often poor sight at night.
- It is needed for the proper development of an embryo and foetus.

It plays a role in immune system function, growth, bone formation, reproduction, and wound healing.

Vitamin A comes from two sources. One group comes from animal sources and is called retinoid, which includes retinol. The other group comes from plants and is called carotenoids, which includes beta-carotene. The body converts beta-carotene to vitamin A.

Source: University of Maryland Medical Center <http://umm.edu/health/medical/altmed/supplement/vitamin-a-retinol>

##### Document 2:

Golden Rice grains are easily recognisable by their yellow to orange colour.

The stronger the colour the more  $\beta$ -carotene. While a yellow rice is still unfamiliar to most of us, it is hoped that the pleasant colour will help promote its adoption.



##### Document 3:

On November 7, 2013, Pope Francis gave his personal blessing to Golden Rice (GR). Why is this significant? Vitamin A deficiency (VAD) is responsible for 500,000 cases of irreversible blindness and up to 2 million deaths each year. Particularly susceptible are pregnant women and children. Across the globe, an estimated 19 million pregnant women and 190 million children suffer from the condition. The good news, however, is that dietary supplementation of vitamin A can eliminate VAD. One way that holds particular promise is the administration via GR, which had been engineered to produce large amounts of vitamin A. A 2012 study [...] that 100-150 g of cooked GR provided 60% of the Chinese Recommended Intake of vitamin A. Estimates suggest that supplementing GR for 20% of the diet of children and 10% for pregnant women and mothers will be enough to combat the effects of VAD.

Unfortunately, public misconceptions about genetically modified (GM) organisms have prevented GR from being available to the countries most affected by VAD. One such country is the Philippines, where more than 80% of the population identifies as Roman Catholic and field trials of GR are nearing completion. An official blessing of the church, therefore, could do a great deal to build support, allowing the Philippines to serve as a model for many of its neighbours on the potential health impacts of widespread availability and consumption of the golden grain.

Source : <http://www.goldenrice.org/>