



Pro Golden Rice Handout

- “VAD is the primary cause of childhood blindness worldwide and is now recognized as a major contributing factor in an estimated 1 million–3 million child deaths each year” (WHO, 1995, 2008; Al-Babili & Beyer, 2005; Mayer, 2007).
- Rice is a staple food in many developing regions. For example, in Bangladesh nearly 80% of calorie intake comes from rice (Bois, 2000; Mayer, 2007).
- “The most recent calculations for India show that, in a scenario of widespread adoption and full government support, GR could reduce the number of VAD children by more than half” (Mayer, 2007, see also Al-Babili & Beyer, 2005).
- The complete daily recommended dosage of vitamin A is not required to bring about health improvements (Enserink, 2008).
- β -carotene (consumed from vegetable sources) must be absorbed in the gut and transformed to vitamin A in the body. This process is somewhat inefficient. In calculating the dosage of vitamin A resulting from the consumption of GR, it has sometimes been “assumed that the uptake of β -carotene by the human gut and its conversion into vitamin A were quite inefficient, resulting in one vitamin molecule for every twelve molecule of β -carotene [...] A soon-to-be-published study among healthy volunteers who ate GR, led by Robert Russell of Tufts University in Boston, suggests that it’s more like one [vitamin A molecule created] for every three or four [β -carotene molecules consumed]” (Enserink, 2008).
- A new version of GR has been created. “Dubbed GR₂, [this strain] produces up to 23 times more β -carotene in its seed [than the original Golden Rice, GR₁]” (Enserink, 2008). Even using the 12:1 conversion factor, “72g of GR₂ polished rice would provide 50% of the [recommended dietary allowances] for children” (Paine, 2005).
- The patent laws governing the use of GR fall under a Humanitarian License. Accordingly, farmers earning less than USD \$10,000 per year may use GR free of charge. Farmers may also keep seeds from each harvest and sow them the following season (Potrykus, 2001; Al-Babili & Beyer, 2005; Enserink, 2008).
- The GR trait can be introduced into any local variety making it easy to preserve the cultivation of traditional varieties with added value (Mayer, 2005; Enserink, 2008). This will adapt Golden Rice to local growth conditions, and will prevent the spread of monocultures.
- “Conventional breeders can bombard plant cells with chemicals and radiation to create useful mutants without having to check how it affects their DNA; a GM insertion must be “clean”—that is the extra genes must sit neatly in a row without disturbing other genes” (Enserink, 2008).
- Some populations may have limited-access to vitamin A-rich foods. Many families in poor countries cannot afford to buy a varied diet. Many of the fruits and vegetables that could provide vitamin A do not grow in the area, or are perishable, or they are only available seasonally. Meat products may also be difficult to obtain (Al-Babili & Beyer, 2005; Mayer, 2005; Enserink, 2008).
- “Experience with vitamin A supplementation [and fortification] programs revealed that coverage achieved over the last decade in 103 priority countries has stagnated at 58%, with high year-to-year fluctuation.” (Mayer, 2005, 2007; UNICEF, 2007). In addition, supplementation programs rely



on on-going funding to purchase and distribute the vitamin A. Golden Rice would only need to be distributed to farmers once, as the crops produced annually by these farmers would provide the required nutrients thereafter. It is a more sustainable strategy (Al-Babili & Beyer, 2005).

- “Excess dietary β -carotene [provided in Golden Rice], in contrast to excess vitamin A [provided in supplementation programs], has no harmful effects” (Guerinot, 2000).
- “A calculation by the World Bank predicts that [...] adoption of GR could signify a windfall of \$15 billion/year for Southeast Asia” (Pohl Nielsen & Anderson, 2003; Anderson et al., 2004).
- “Provitamin A [β -carotene] is normally produced in the green tissues of every plant and converted to vitamin A in the human body. Nobody has been able to come up with a scenario whereby the provitamin A-enriched grains of GR could pose a menace to the environment or to human health” (Potrykus, 2001; Mayer, 2005).
- It was not possible to develop Golden Rice using traditional breeding methods (Potrykus, 2001; Al-Babili & Beyer, 2005).
- The GR project was funded by not-for-profit and public sources: the philanthropic Rockefeller Foundation, the Swiss Federal Institute of Technology, the European Community Biotech Program and the Swiss Federal Office for Education and Science (Guerinot, 2000; Potrykus, 2001).
- Part of the public opposition to GMO stems from ignorance about biotechnology. “The 2005 Eurobarometer poll indicated that almost 25% of Europeans believe that a person’s genes can be modified by eating GM fruit, while 59% of Europeans do not believe tomatoes contain DNA” (Baggott, 2006). Both of these beliefs are wrong.
- “Extensive evidence from widespread production and consumption of GM plants—more than 90 million hectares planted in 2005—indicates that no specific harm emanates from transgenic crops, while clear life-threatening conditions arise from the lack of micronutrients” (Mayer, 2005).
- “GR is self-fertilizing, rice pollen grains are only viable for three to five minutes, and even if transgenic pollen made it to a wild rice plant, the genes it carried would not crowd out wild rice because its beefed-up β -carotene genes confer no leg up when it comes to natural selection” (Baggott, 2006).
- Rural Philippine rice growers were asked if they would grow a GMO rice strain that had a different color. Thirty out of 32 interviewed farmers indicated that they would, as long as this rice strain produced as high a yield as their current strain, and that it was safe to eat (Chong, 2003).