

# GSO – AKTUALNI PREGLED PODROČJA

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# GSO – zelo aktualen

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Google

genetically modified food



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52 milionov zadetkov

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## Scholarly articles for genetically modified food

... with regard to **genetically modified food**—results of a ... - Bredahl - Cited b  
 ... Really Refuse To Buy **Genetically Modified Food**?\* - Nousseir - Cited by 2  
 ... on consumer acceptance of **genetically modified food**: ... - Lusk - Cited b

**Genetically modified food** - Wikipedia, the free encyclopedia  
[en.wikipedia.org/wiki/Genetically\\_modified\\_food](http://en.wikipedia.org/wiki/Genetically_modified_food) ▾ Wikipedia ▾

**Genetically modified foods** (or **GM foods**) are foods produced from organisms that have had specific changes introduced into their DNA using the methods of ...

Genetically modified food - Flavr Savr - Gene gun - AquAdvantage salmon

## Genetically Modified Foods: Harmful or Helpful? - CSA

[www.csa.com/discoveryguides/gmfood/overview.php](http://www.csa.com/discoveryguides/gmfood/overview.php) ▾

Recent studies about **genetically-modified foods** indicate that GMOs may cause harm to monarch butterfly caterpillars. Corn plants have been genetically ...

Company Profile - Deborah B. Whitman - Key Citations - Web Sites

## WHO | Food, Genetically modified

[www.who.int/.../food\\_genetically\\_modified/e...](http://www.who.int/.../food_genetically_modified/e...) ▾ World Health Organization ▾

Genetically modified (**GM**) **foods** are foods derived from organisms whose genetic material (DNA) has been modified in a way that does not occur naturally, e.g. ...



## Genetically modified food

Genetically modified foods are foods produced from organisms that have had specific changes introduced into their DNA using the methods of genetic engineering. [Wikipedia](#)

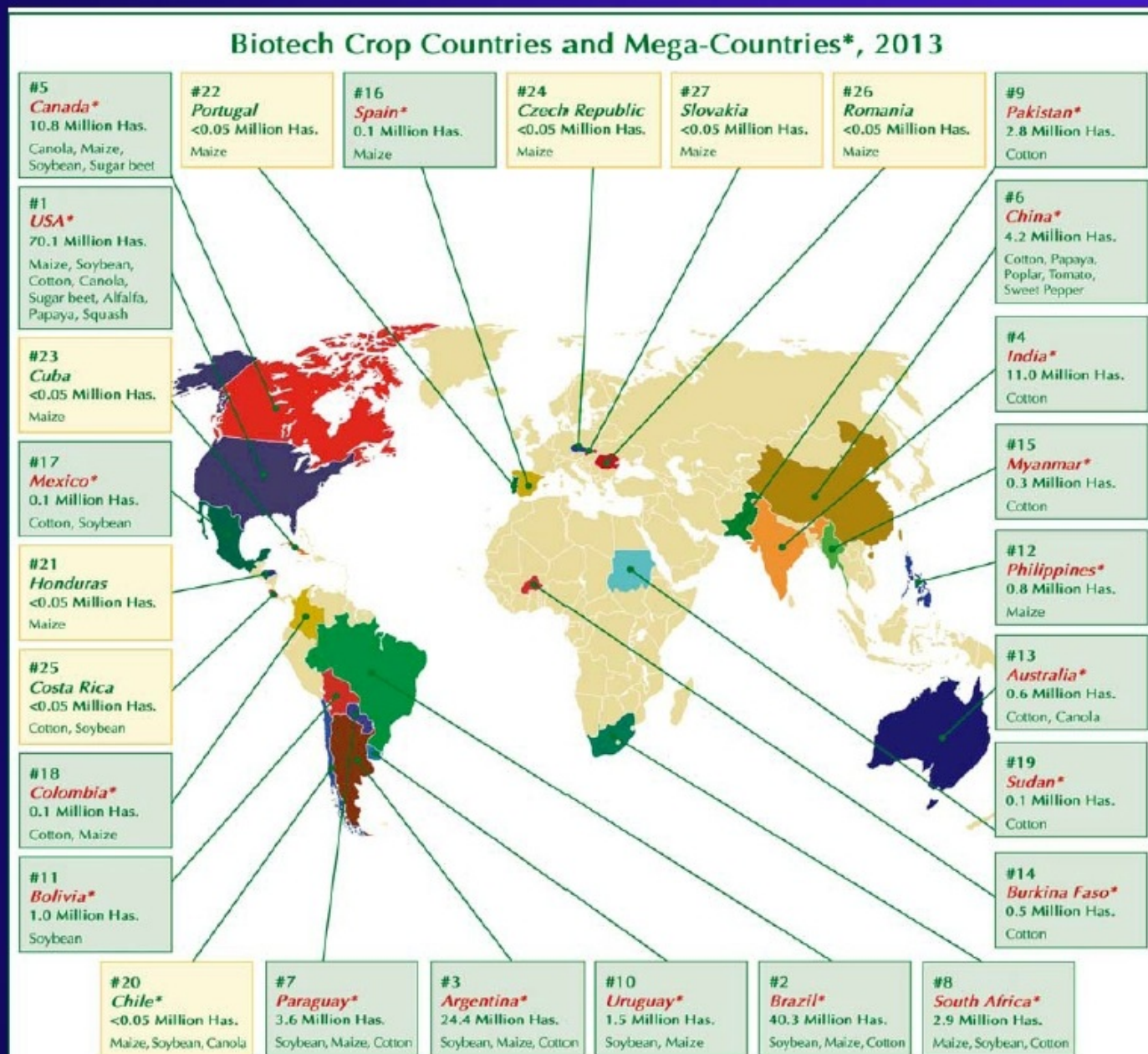
### Related topics

Although labeling of **genetically modified organism** (GMO) products in the marketplace is required in 64 countries, it is not required in the United States and no distinction between marketed **GMO** and non-GMO foods is recognized by the US FDA. [Wikipedia](#)  
 Explore: [Genetically modified organism](#)

The first commercially available genetically modified food was a tomato **engineered** to have a longer shelf life . . . [Wikipedia](#)  
 Explore: [Genetic engineering](#)

To date most genetic modification of foods have primarily focused on cash crops in high demand by farmers such as **soybean**, corn, canola, and cotton seed oil. [Wikipedia](#)  
 Explore: [Soybean](#)

# Biotech Crop Countries and Mega-Countries\*, 2013

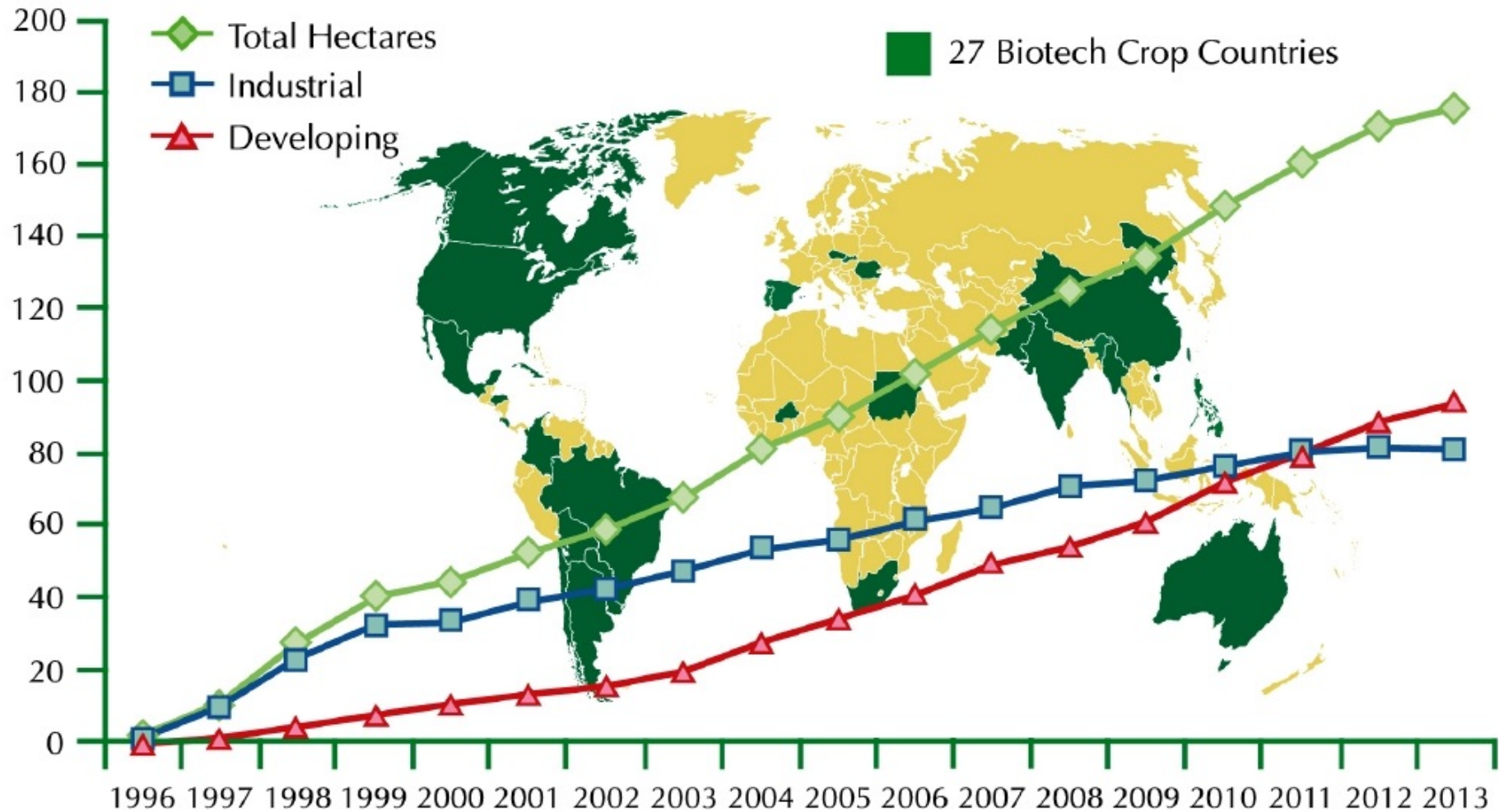


\*19 biotech mega-countries growing 50,000 hectares, or more, of biotech crops.

Source: Clive James, 2013.



## GLOBAL AREA OF BIOTECH CROPS Million Hectares (1996-2013)



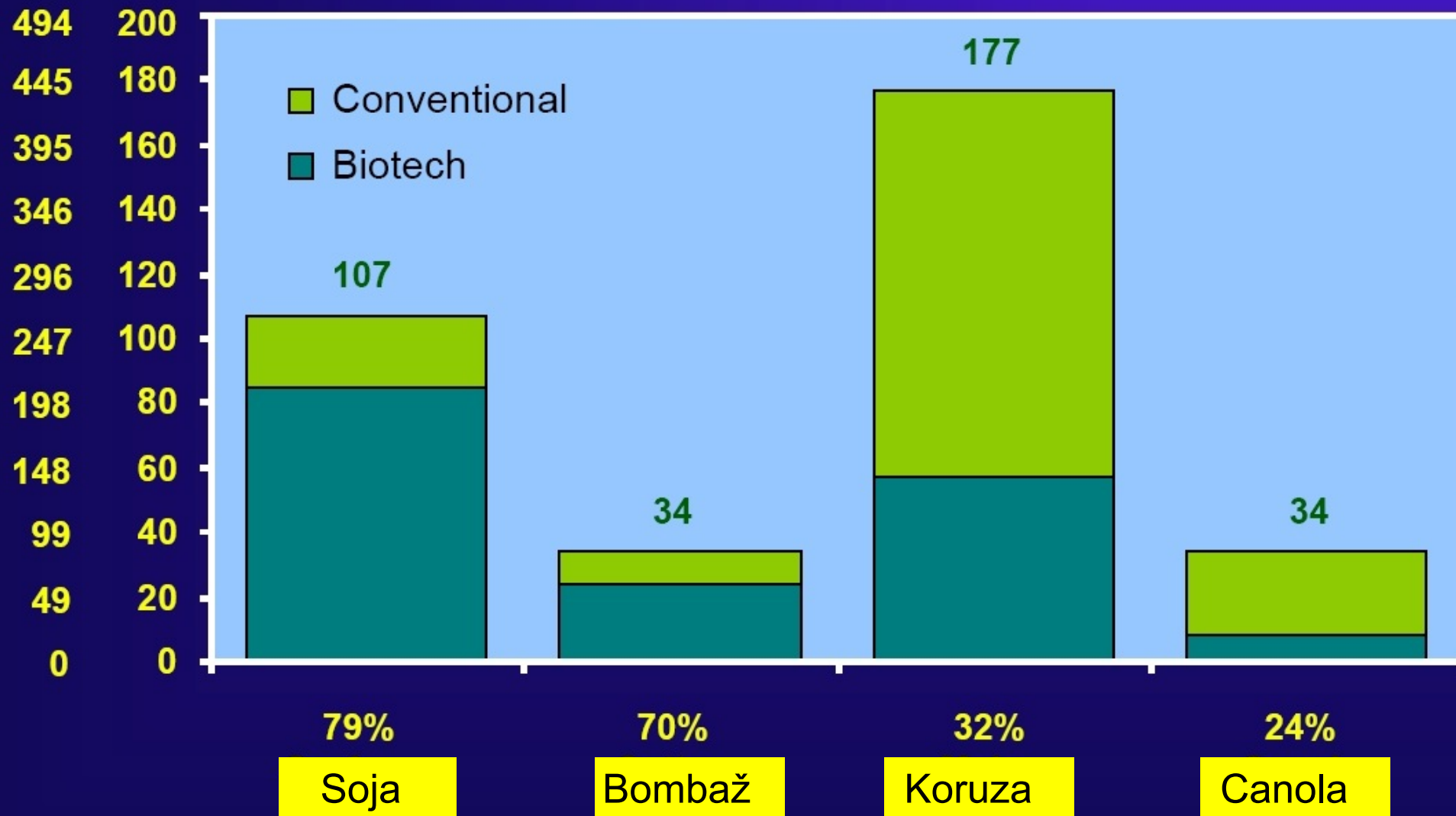
*A record 18 million farmers, in 27 countries, planted 175.2 million hectares (433 million acres) in 2013, a sustained increase of 3% or 5 million hectares (12 million acres) over 2012.*

Source: Clive James, 2013.

# Global Adoption Rates (%) for Principal Biotech Crops (Million Hectares, Million Acres), 2013



M Acres

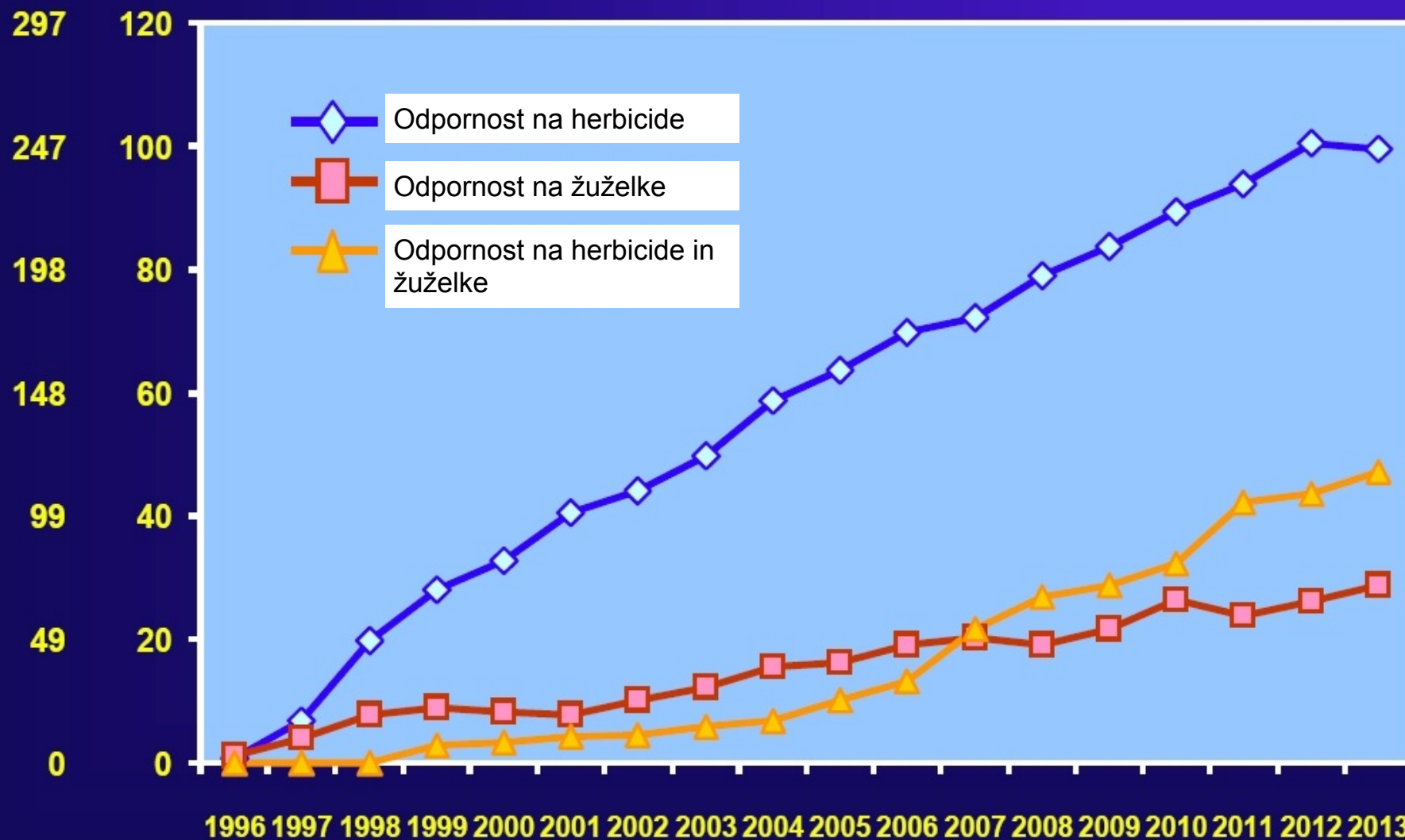


Source: Clive James, 2013

# Global Area of Biotech Crops, 1996 to 2013: By Trait (Million Hectares, Million Acres)



M Acres



Source: Clive James, 2013

# OZNAČEVANJE ŽIVIL in KRME- DOVOLJENI GSO

- 0,9% nenamerne prisotnosti na posamezno rastlinsko vrsto - ni potrebno označiti

# Krma – GSO za katero je bil začet postopek odobritve ali je odobritev zanjo potekla

- 0,1% za tiste GSO, ki:
  - Imajo vlogo v EU
  - So odobreni že drugje
  - Imajo pozitivno oceno tveganja od EFSE
  - Metoda za določanje je validirana

Uredba Komisije (EU) št. 619/2011, UL L 166,  
25.6.2011, str. 9–15



# NEDOVOLJENI GSO

- 0%

## Aktualen: riž iz Kitajske

- IZVEDBENI SKLEP KOMISIJE z dne 22. decembra 2011 o izrednih ukrepih glede nedovoljenega gensko spremenjenega riža v riževih proizvodih s poreklom iz Kitajske in razveljavitvi Odločbe 2008/289/ES(2011/884/EU)
- v praksi pomeni, da se ves riž, ki prihaja iz Kitajske testira na prisotnost GSO

# RAPID ALERT BT63 riž-choline chloride (riž kot nosilec)

Notifications list : 825 results

Search criteria

Hazard category GMO / novel food



<< First << << Previous 100 << Notifications **1 to 100** of 825 >> Next 100 >> >> Last >>

Classification	Date of case	Last change	Reference	Country	Subject	Product Category	Type
1. information for follow-up	11/03/2014	10/04/2014	<a href="#">2014.0329</a>	FI	unauthorised novel food ingredient 3,3 diindolylmethane (DIM) (synthetic) in food supplement manufactured in Finland, with raw material from France and China	dietetic foods, food supplements, fortified foods	food
2. information for follow-up	10/04/2014	10/04/2014	<a href="#">2014.0494</a>	BE	unauthorised genetically modified (Bt63 rice) choline chloride 60 % from China	feed additives	feed
3. information for attention	10/04/2014	10/04/2014	<a href="#">2014.0492</a>	NL	unauthorised genetically modified (p35S and tNos present) papaya powder from the United States	dietetic foods, food supplements, fortified foods	food
4. information for attention	10/04/2014	10/04/2014	<a href="#">2014.0491</a>	ES	unauthorised genetically modified (Bt63 rice) choline chloride 60% from China	feed additives	feed
5. information for attention	10/04/2014	10/04/2014	<a href="#">2014.0490</a>	ES	unauthorised genetically modified (Bt 63 rice) choline chloride 60% from China	feed additives	feed
6. border rejection	09/04/2014	09/04/2014	<a href="#">2014.APU</a>	PT	unauthorised novel food ingredient cinoptiolite in food supplements from the United States	dietetic foods, food supplements, fortified foods	food
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8. information for follow-up	25/02/2014	09/04/2014	<a href="#">2014.0272</a>	BE	unauthorised genetically modified (Bt63) rice in choline chloride 60% corn from China	feed additives	feed
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# Choline chloride (wikipedia)

- Choline chloride is an organic compound and a quaternary ammonium salt. It has a choline cation with chloride anion. Alternative names are hepacholine, biocolina and lipotril.

## Applications

- Choline chloride is mass-produced and is an important additive in feed especially for chickens where it accelerates growth. With urea it forms a deep eutectic solvent. Other commercial choline salts are choline hydroxide and choline bitartrate. In foodstuffs the compound is often present as phosphatidylcholine.

# Choline chloride

(<http://www.balchem.com/anh/choline-chloride>)

- Choline Chloride is an essential nutrient for optimum animal growth through building and maintaining cell structure and function. Choline is associated with the metabolism and synthesis of glycine, betaine, cysteine, serine, methionine and many other methyl containing biological compounds.
  - Choline Chloride has four primary metabolic functions:
  - Build, regulate and maintain cell membrane integrity and porosity, plus the normal maturation of bone cartilage, including the prevention of perosis in broilers;
  - Act as a lipotropic agent, to aid utilization and outward transport of fat in the liver, thus preventing abnormal fat accumulation or so-called "fatty liver";
  - A precursor for acetyl choline synthesis, the transmission agent for impulses along the sympathetic nervous system;
  - Provide labile methyl groups, essential for numerous biological functions.



# RAPID ALERT – drugo

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# GSO Z VEČ GENSKIMI ELEMENTI

- V EU dovoljena za predelavo koruza SmartStax - rezultat klasičnega križanja večih GSO
- Nosi odpornost proti nadzemnim in podzemnim žuželkam in dvem herbicidom
- Združen produkt dveh podjetij

# DOLOČANJE GSO Z VEČ GENSKIMI ELEMENTI

- določanje poteka tako, da določimo posamezne genske konstrukte
- v mešanem vzorcu ni možno ločiti GSO s posameznimi genskimi elementi od GSO, ki vsebuje več genskih elementov skupaj
- zato precenimo njihovo vsebnost
- ENGL delovna skupina (tudi NIB sodelovanje)
  - Ali z novimi tehnologijami lahko razlikujemo med posameznimi GSO in GSO, ki vsebujejo več genskih elementov v enem GSO?

**NIB**

NACIONALNI INŠTITUT ZA BIOLOGIJO

# NACIONALNI INŠTITUT ZA BIOLOGIJO





# Oddelek za biotehnologijo in sistemsko biologijo

## Raziskovalno delo

- Gensko spremenjeni organizmi
- Mikrobiologija
- Omski pristopi

## Aplikativno delo

- Raziskave za podjetja
- Določanje prisotnosti povzročiteljev bolezni in gensko spremenjenih rastlin



# DOLOČANJE GSO

- Strokovna in tehnična podpora pristojnim službam (MKO, inšpekcijske službe)
- Sodelovanje z referenčnim laboratorijem EU
- Analize hrane, krme, semen, rastlin za uradno kontrolo in podjetja

# Imenovanja in pooblastila / 1

## Nacionalni referenčni laboratorij

- MKO (MKGP) - Odločba o pooblastitvi NIB kot Nacionalni referenčnega laboratorija za določanje GSO v krmi 33202-5/2007
- MKO (MKGP) - Odločba določitvi nacionalnega referenčnega laboratorija (NRL) za GSO v živilih št.332-51/2011/3 (prej MZ – Odločba 520/26/2006-3)
- MKO (MOP) - Odločba o podelitvi javnega pooblastila za analiziranje in testiranje odvzetih vzorcev, razvoj analitičnih in testnih metod ter druge naloge, povezane s kontrolo določanja GSO št. 430-75/2010

# Imenovanja in pooblastila / 2

## Preizkusni laboratorij

- MKO (MKGP) – Imenovani kot preskusni laboratorij za določanje gensko spremenjenih organizmov v krmi 324/184/2004
- MKO (MKGP) -Odločba o določitvi uradnega laboratorija, ki opravlja laboratorijske analize v okviru uradnega nadzora varnosti živil, zlasti za GSO št. 332-51/2011/2
- MKO VURS (MKGP VURS) Odločba o imenovanju NIB laboratorija za izvajanje laboratorijskih analiz za določanje GSO v vzorcih uradnega veterinarskega nadzora 3441-6/2012/2
- MKO (MKGP) - Odločba o določitvi laboratorija za opravljanje posamezne laboratorijske analize v okviru spremljanja prisotnosti GSO, ki so dovoljeni za pridelavo, v kmetijskih rastlinah in pridelkih na kmetijskih gospodarstvih št. 332-17/2010/2

# Imenovanja in pooblastila / 3

## Potrdilo za delo z GSO

- MKO (MOP); Potrdilo o Zaprtem sistemu; za delo z gensko spremenjenimi organizmi v prvem varnostnem razredu vpisan v register gensko spremenjenih organizmov pod št. 0011/2007

## Nosilec nacionalnega etalona za množino snovi (na osnovi akreditacije določanja GSO)

- MGRT (MVZT) – Urad RS za meroslovje; Odločba o priznanju za nosilca nacionalnega etalona – Množina snovi – hrana rastlinskega izvora 6401/18/2008/74

## Sistem kakovosti

- NIB - Certifikat ISO 9001 (2004)
- Akreditacija za določanje GSO (SA, presojevalci iz tujine)
  - 2003 – za kvali- in kvantitativne analize
  - 2006 – delno fleksibilni obseg
  - 2014 – cca.50 akreditiranih metod (letno cca 6 novih)

# Zanesljivost metod določanja

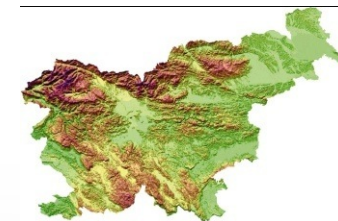
- Uporaba **pettarčne metode** (ne zajame več niti vseh v EU dovoljenih GSO)
- Večina laboratorijev ima dvotarčno metodo – zajame mnogo manj

# KAJ PREVERJATI

- bolje preverjati surovine, kot končne izdelke (npr. bolje soja, kot lecitin)



# SLOVENIJA



- HRANA - ni na policah živila, ki bi imelo oznako, da vsebuje GSO, izjemoma ugotovljena prisotnost npr. nedovoljeni riž, lan – takoj odstranjeno s polic
- KRMA – večina označena (zlasti vsebnost GS soje, nekaj koruze)

# DOLOČANJE GSO

Uporaba molekularnih metod – dosedaj PCR v realnem času



# MOLEKULARNE METODE

- Uporaba tudi:
  - določanje mikroorganizmov
    - Določanje povzročiteljev rastlinskih boleznikreditacija 17025 od leta 2012
    - Mikroorganizmov pomembnih za zdravje
  - Temeljne raziskave sistemske biologije

# NOVI PRISTOPI DOLOČANJA GSO

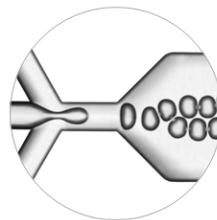
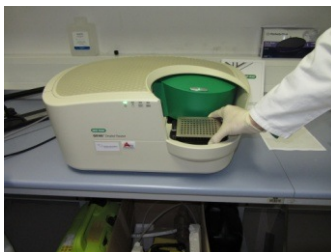
- Projekt GMOval (vodi NIB) – financiran s strani Food Safety agency (GB)
- Projekt DECATHLON – EU projekt (začetek dec.2013)



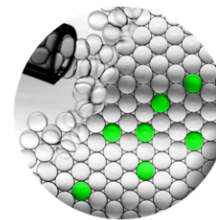
Novi pristopi določanja GSO, mikroorganizmov, za carino pomembnih organizmov (tobak, ogrožene vrste)

# Digitalni PCR

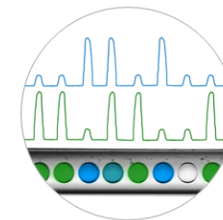
- Absolutna kvantifikacija, manjša odvisnost od referenčnega materiala



Make Droplets



PCR Droplets



Read Droplets

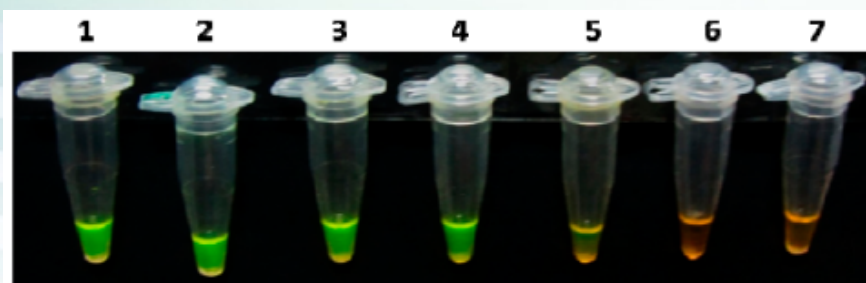


Results

MORISSET, Dany, ŠTEBIH, Dejan, MILAVEC, Mojca, GRUDEN, Kristina, ŽEL, Jana. Quantitative analysis of food and feed samples with droplet digital PCR. PloS one, 2013, vol. 8, issue 5,

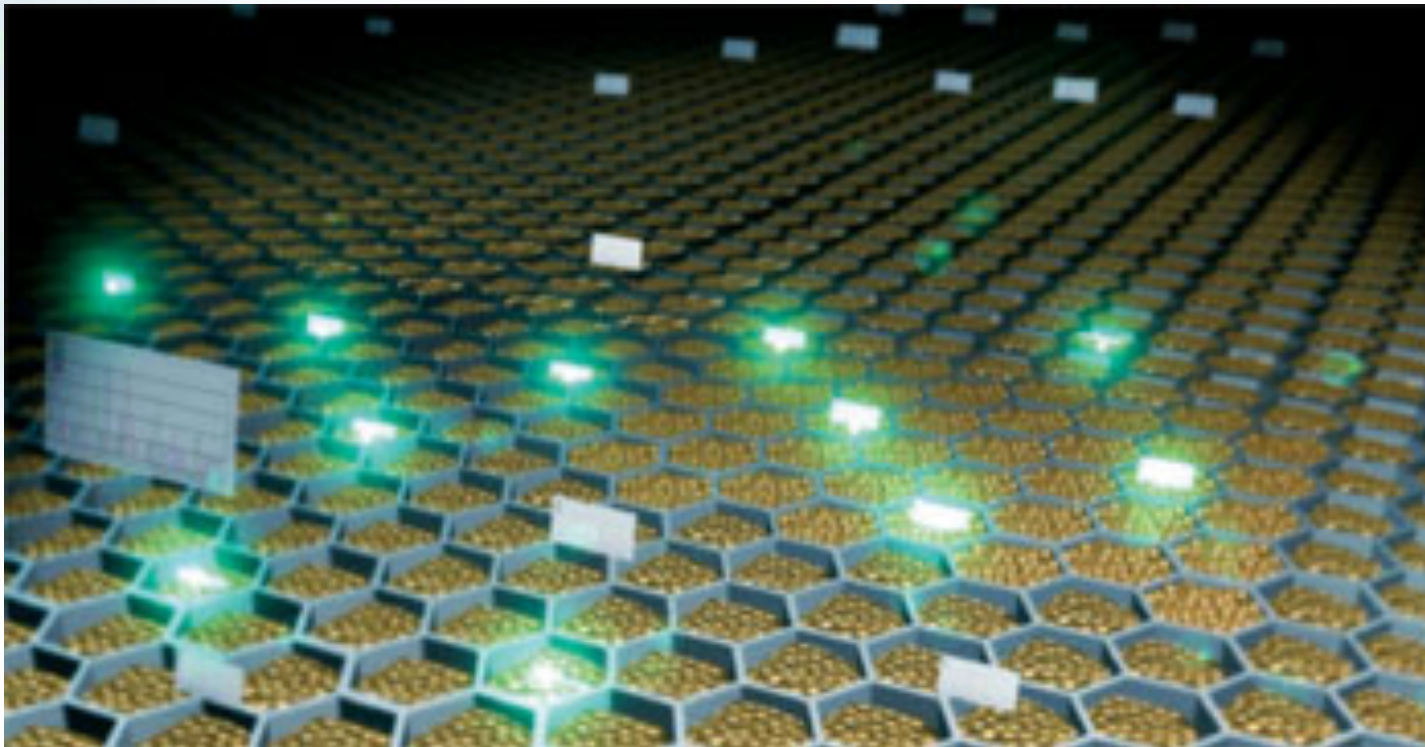
# Izotermalne metode

- LAMP – hitrejša, zaenkrat kvalitativna



RANDHAWA, Gurinder Jit, SINGH, Monika, MORISSET, Dany, SOOD, Payal, ŽEL, Jana. Loop-mediated isothermal amplification : rapid visual and real-time methods for detection of genetically modified crops. Journal of agricultural and food chemistry, 2013, vol. 61, no. 47, str. 11338-11346.

# Nove generacije sekveniranja



<http://www.nature.com/nbt/focus/sequencing/sponsors.html>

# DISKUSIJA

