Breeding for Hypoallergenic Peanuts in the EU

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Overview

1. Crop introduction
2. Market in EU
3. Breeding Idea
4. Breeding Goals
5. Stakeholders
6. SWOT Diagram
Peanut / Groundnut (*Arachis hypogea L.*)

Agronomy:

- Leguminosae: nitrogen fixing
- Allotetraploid
- Drought & Salt tolerant
- Mechanized
- 4 months, May-october

Rotation:
- Winter wheat
  - Barley
  - June
- Peanut
  - 4-5 months
- Winter wheat
  - Sugar beet
  - Barley
  - End of October
Peanuts in the EU

550,000 T of peanuts consumed in Europe - 99% imported, Argentina main exporter

Already grown: Spain, Portugal, Bulgaria, Cyprus

PepsiCo recently introduced varieties to Spain and Portugal to supply their production needs.
Less allergic peanuts adapted to mediterranean conditions
Breeding Goals:

**Primary Traits:**
Hypoallergenicity, Yield, Seed size, Taste

**Secondary Traits:**
Oil quality, Disease resistance, Blanchability

Evaluation of landraces and currently cultivated varieties
Germplasm banks from public institutions:
COMAV Spain
ICRISAT India
USDA USA
EMBRAPA Brazil
INTA Argentina
Stakeholders

Breeding Program
- Buy certified seeds
- Contract

Farmers
- Sold production
- Varieties adapted
- N fixation

Food companies (e.g. PepsiCo)
- Fully Supply EU Market
- Better control Final Product

Public Health
- Less allergic
- Healthier Product

Consumer
- Trusted product
- High Quality
- Less allergic
- Healthier Product
Allergenicity in Peanut

Affects 1-2% world's population
Commonest fatal food-related allergic reactions
Allergy rate doubled over a 5-year period in Europe
13 peanut allergens (Ara h 1 - Ara h 13) - 15-20% of the total seed protein.
Ara h1 affects more than 90% of peanut-sensitive individuals

Techniques:
    Tilling
    Crispr-cas
### Taste Quantity (Fat)

<table>
<thead>
<tr>
<th>Peanut (1 oz.)</th>
<th>Saturated Fat</th>
<th>Monounsaturated Fat</th>
<th>Polyunsaturated Fat</th>
<th>Total Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Peanut</td>
<td>1.9 g</td>
<td>6.9 g</td>
<td>4.4 g</td>
<td>14 g</td>
</tr>
<tr>
<td>Dry Roasted, Salted Peanuts</td>
<td>2.0 g</td>
<td>7.0 g</td>
<td>4.5 g</td>
<td>14.1 g</td>
</tr>
<tr>
<td>Oil-Roasted, Salted Peanuts</td>
<td>2.5 g</td>
<td>7.4 g</td>
<td>4.3 g</td>
<td>14.9 g</td>
</tr>
<tr>
<td>Peanut Butter, smooth style, with salt (2tbsp.)</td>
<td><strong>3.3 g</strong></td>
<td>7.6 g</td>
<td>4.4 g</td>
<td><strong>16.1 g</strong></td>
</tr>
</tbody>
</table>

- Treated peanut’s saturated fat is higher than raw peanuts.
- Saturated fat acids are very low.

### Blanchability  (Skin removed from kernel by heating followed by abrasion)

- Blanchability is under strong genetic control.
- The genetic control and breeding potential for the blanching trait in order to better select parents for the breeding of improved blanchability.
- Early generation selection - Blanched %
- Shokraii et al. (1985) referred to a 36-kD polypeptide related to blanchability in peanuts. It is probable that the same polypeptide is identified as the 38-kD band in Bianchi-Hall et al. (1994) study.
Strengths

- Germplasm adapted to Mediterranean Cond.
- Easy access to Public germplasms
- Breeding in the production region

Weaknesses

- New in this crop (Practical knowledge)
- No starting funds

Opportunities

- European production is rising
- Not yet hypoallergenic varieties in the market
- European consumers are receptive to hypoallergenic and healthy products
- No european peanut breeding companies
- Already existing Interest/ Market
- Aflatoxins lower with EU farm management
- Secure - Food chain supply

Threats

- Public foreign competitors (USDA, China, India, Brazil, Argentina)
- Aranex Biotech
- Cost of production in Europe
Thank you for your attention