

TOWARDS NEW SOLUTIONS FOR THE CHEMICAL DESICCATION OF SUNFLOWER

Vladimir Miklič, Jelena Ovuka, Goran Malidža, Branislav Ostojić, Velimir Radić, Nenad Dušanić, Siniša Jocić

Institute of Field and Vegetable Crops, Novi Sad, Serbia



WHY INTRODUCING CHEMICAL DESICCATION?

- Prevention of disease attacks
- Reducing of bird damage
- Prevention of seed shedding
- Reducing of plant lodging
- Preservation of seed qualities
- Weed control
- Avoiding early frost damage
- Faster and better quality harvesting
- Earlier field preparation for the next crop



At the IFVC, chemical desiccation has been applied to complete sunflower seed production for over 20 years.

THE BEST MOMENT FOR THE DESICCATION

- Background of the head turn from green to yellow (Schuler et al. 1978)
 - Yellow color of the back of the head, hardening of the shell, yellow of the lower leaves (Dembinski et al. 1974)
 - 50-60% of plants have a yellow background of the head, 20-30% yellow brown, 10-20% brown, grain moisture 30-35% (Degtyarenko, 1976)
 - When involucral bracts get brown (Cobia and Zimmer, 1978)
 - When on 70% of tubular flowers, corolla leaves fall off (Brown, 1978)
 - When the corolla leaves turn brown (Loubser and Grimbeek, 1982)
 - When a sunflower grain reaches 95% of maximum dry weight (Rodrigues Pereira, 1978)
 - When the max mass 1000 grains is reached. (Egly and Tekrony, 1997)
-
- Today, most authors believe that the moment of desiccation should be determined by the moisture content in the grain

OPTIMAL GRAIN MOISTURE CONTENT FOR DESICCATION

- 31.9% (Миронов, 1967)
 - 35% (Whitehead, 1980)
 - 36% (Robertson et al. 1978)
 - 38% (Barrett, 1978)
 - 40% (Anderson, 1975)
 - 34-44% (Robinson, 1983)
 - Wet years 44% dry years 31.5% (Баранова, 1968)
 - 43-45% for yield and 33% for 1000 seed weight (Црнобарац, 1992)
-
- At the Institute of Field and Vegetable Crops, Novi Sad, all the most important parental lines are treated at various stages of maturity and the optimal desiccation moment is determined (min 35%, max over 42%)

WHAT WAS USED FOR CHEMICAL DESICCATION ON SUNFLOWER?

- MgCl₂
- Dikipiridil fosfat
- Pentadin
- Gramoxone (Paraquat)
- Basta (Glufosinat amonium)
- Harvade (Dimethipin)
- Reglone (Diquat)
- ...
- For some crops in the past: sodium chlorate

The Bizarre Case of New Zealand's Exploding Pants

Most of these preparations have long been banned. After the recent restrictions on the use of Reglone, there is a question of registered desiccant for use on sunflower in Serbia. The aim of these studies was to try to find new solutions for sunflower chemical desiccation.



MATERIAL AND METHOD

Two preparations were used:

- **Kabuki 2.5 EC, a. i. pyraflufen-ethyl**, (at a dose of 1 l / ha), commonly used as a potato desiccant,
- **carfentrazone-ethyl**, (at a dose of 0.4 l / ha), commonly used against broadleaf weeds and for cotton regrowth desiccation.
- **Six female sunflower lines** from the breeding program of the Novi Sad Institute were treated.
- Depending on the line, the moisture content of the grain was 19-45% at the moment of desiccation.
- At 7 and 14 days after desiccation, the moisture content of the grain was determined again.
- Testing of germination and germination energies 40 and 54 days after harvest was done.
- Statistical processing: GenStat, Anova, split-split-plot



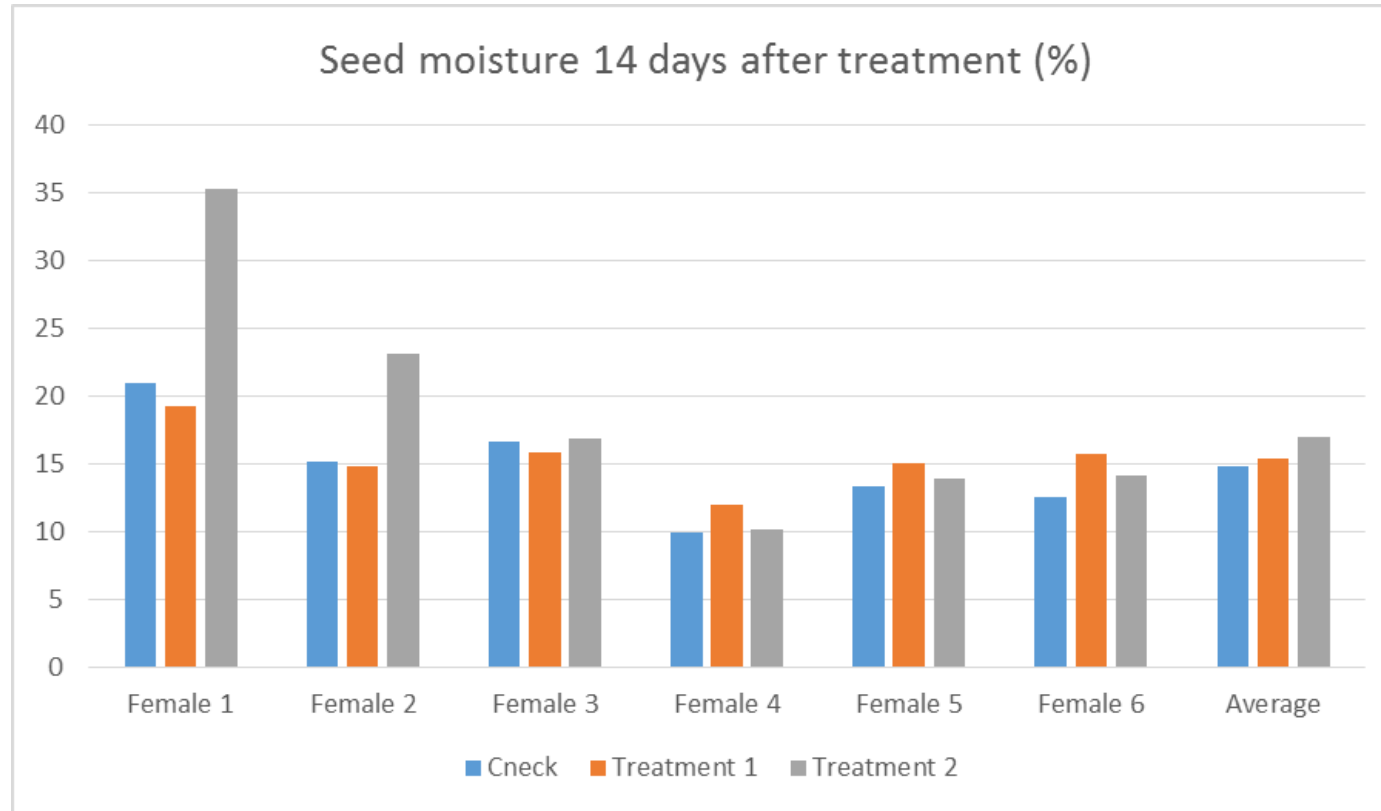
Kabuki



Check

RESULTS

EFFECT OF THE TREATMENTS ON SEED MOISTURE



- There was no statistically important influence of treatments on reducing the seed moisture!
- There was no many drying effect on leaves and heads, everything was similar to the check



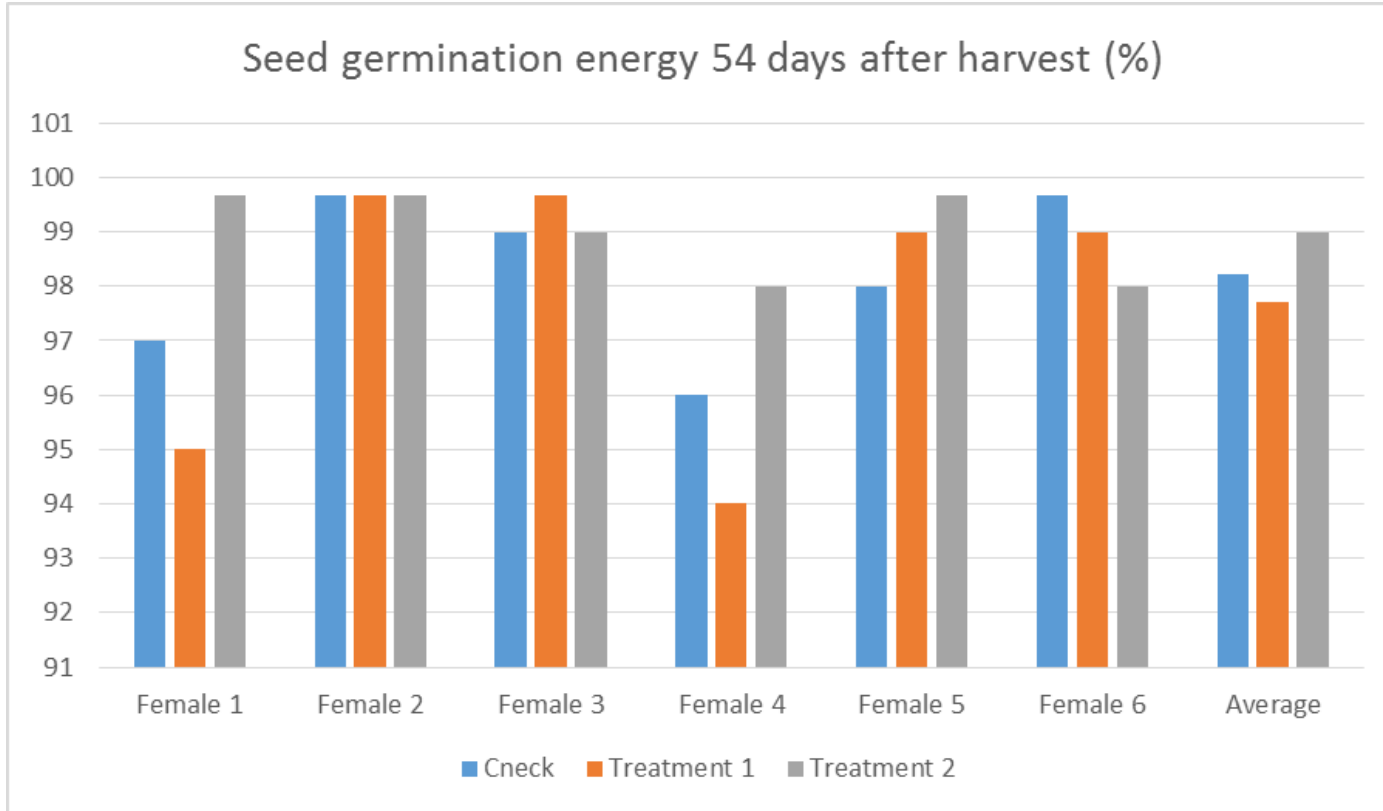
Kabuki



Check

- Treatment 1 – desiccant for potatoes (kabuki 2.5 ec) at a dose of 1.0 l / ha
- Treatment 2 – desiccant for wheat (a.i.carfentrazone) at a dose of 0.4 l / ha

SEED GERMINATION ENERGY



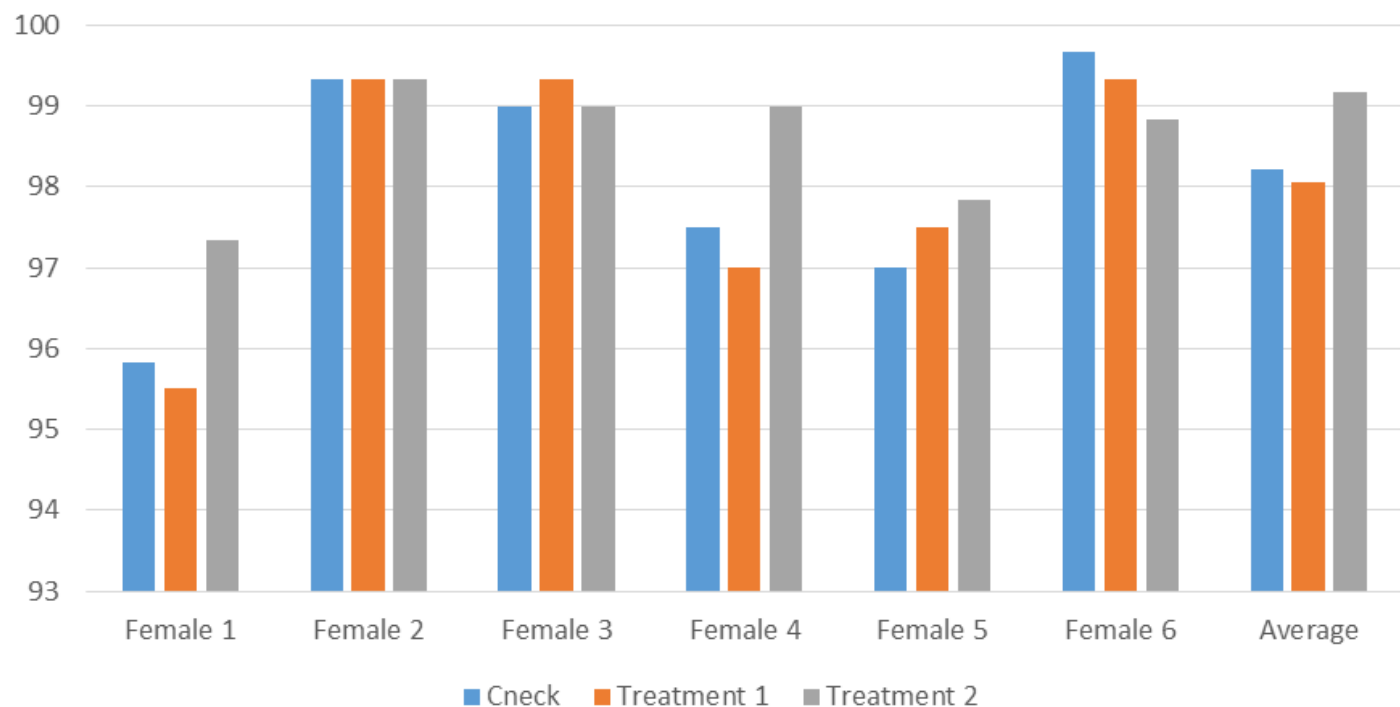
- There was no statistically important influence of treatments on the seed germination energy 54 days after harvest



- Treatment 1 – desiccant for potatoes (kabuki 2.5 ec) at a dose of 1.0 lit / ha
- Treatment 2 – desiccant for wheat (a.i.carfentrazone) at a dose of 0.4 liters / ha

SEED GERMINATION

Seed germination 54 days after harvest (%)



- There was no statistically important influence of treatments on the seed germination 54 days after harvest



- Treatment 1 – desiccant for potatoes (kabuki 2.5 ec) at a dose of 1.0 lit / ha
- Treatment 2 – desiccant for wheat (a.i.carfentrazone) at a dose of 0.4 liters / ha

CONCLUSIONS

- There was no influence of treatments on reducing the seed moisture!
- There was no many drying effect on leaves and heads everything was very similar to the check
- There was no influence of treatments on the seed germination energy and germination



Different moment of desiccation with Reglone had a great impact on all tested properties. Timely implementation of this measure increased the yield and oil content as well as germination and germination energy in relation to the untreated control.

Miklic, 2001.

So, the good desiccant is not only allowing earlier harvesting but also bringing the better seed qualities!!

WHAT CAN WE DO?

- To continue search for the usable desiccant already on the market. We have already tried several: Roundup extra and others – no success!
- To hope that new sunflower desiccant is going to appear on the market.
- To hope (and pray) that Reglone will be allowed for use, some more time.
- Without chemical desiccation in sunflower seed production we will face with lot of difficulties and the seed qualities could be often reduced!!!



THANKS FOR YOUR ATTENTION!

