

Tobacco as a Sustainable alternative to tobacco cultivation in traditionally suitable areas of Centre-South Italy (consultant DiAAA, University of Molise)

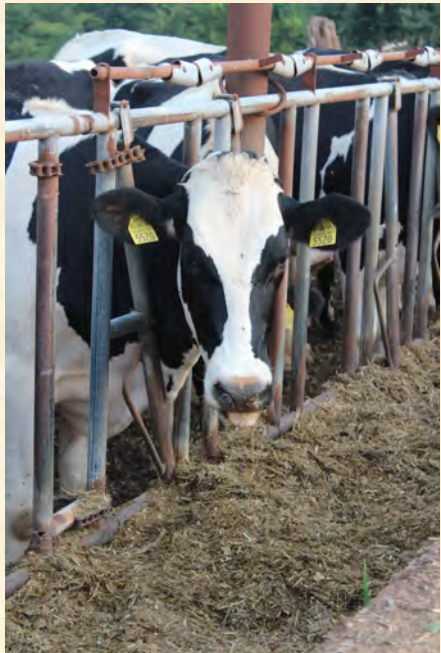


**Multi-purpose *Nicotiana tabacum* new cultivar
Solaris**

as energy crop and innovative feedstuffs



**Innovations applied to territories
through a circular economy approach**



Order: Solanales
Family: Solanaceae
Genus: *Nicotiana*
Species: ***Nicotiana tabacum L.***

Cultivar: ***Solaris***

(PCT/IB/2007/053412, Fogher 2008; owned by Sunchem BV)



Fig. 1 - cv. *Solaris* (left) compared to traditional smoking tobacco plant (right). *Courtesy DiAAA*

- Non-human food and non-genetically modified plant
- Maximized flowers/seeds production and reduced leaf growth
- No-smoking cultivar (contains no nicotine)
- Energy plant with multiple products

Nicotiana tabacum cv. *Solaris*

Main product: Oil obtained from seeds by cold press extraction

→ A1 - **Bio-jet fuel** 

Main co-products:

Seed cake → B1 - alternative protein source for animals

(1st harvest: replacing soybean meal)

Biomass → C1 - innovative forage for ruminants

(2nd harvest: ensiled whole green plant)

Biomass → C2 - possible innovative forage for ruminants

(1st harvest: hay from floral apexes)

Biomass → C3 - biomethane production 

(2nd harvest: biomass for burners from whole green plant)

Soluble proteins → B2 - extracted and purified to be possibly used in the food industry

Oil → A2 - other purposes in pet-food and possibly human nutraceuticals

(1st harvest: replacing canola oil)



Fig. 2 - cv. *Solaris* floral apexes and capsules with seeds. *Courtesy DiAAA.*

Nicotiana tabacum cv. *Solaris*



Fig. 3 - cv. *Solaris* oil (in the tube) and seed cake.



Fig. 4 - cv. *Solaris* dried floral apices.



Fig. 5 - cv. *Solaris* biomass used as innovative forage.

“*SiloSolaris*” Project, Fondo per la Crescita Sostenibile - Sportello “AGRIFOOD” PON I&C 2014-2020, Prog. n. F/200121/01-02/X45 dell’11-03-2021



- Understanding and optimizing the use as animal feed of co-products from *Solaris* tobacco cultivation in a large scale, for the improvement of the sustainability of the entire *Solaris* supply chain in Italy enhancing the remuneration of stakeholders
- Creating an integrated value-chain of the use of *Solaris* in Italy through supply chain agreements between tobacco growers, processors and livestock farmers

Recovering the know-how of tobacco cultivation could represent a resilient strategy vs the decline in the demand of smoking tobacco, especially for the small farming system of the Mediterranean areas



Fig. 6 - cv. *Solaris* cultivation in Benevento province during 2021.
Courtesy DiAAA

“*SiloSolaris*” Project, on field trial on *Solaris protein seedcake*



Assessing the chemical composition
of cv. *Solaris* protein seedcake



Testing the protein source in growing heifers
and beef cattle diet and effects on feed intake,
growth, welfare and nutritional profile

Preliminarily results:

- Good palatability and feed intake
- Good welfare indices of all animals
- Based on the preliminary observations, the introduction of this alternative vegetal protein source as feedstuff may represent further opportunity for the innovation in tobacco cultivation of marginal areas traditionally suited to tobacco and devoted to animal breeding.

“*SiloSolaris*” Project, on field trial on *innovative forage from ensiled biomass*



Assessing the chemical composition of the ensiled cv. *Solaris* whole plant



Testing the innovative tobacco silage (*SiloSolaris*) in growing heifers and beef cattle diet and effects on feed intake, growth, welfare and nutritional profile, and carcass characteristics

Preliminarily results:

- The feeding trial is currently underway
- Animals have been adapted to the innovative forage without showing any relevant problem
- At the end of the trial the productive performance of the animals/carcasses characteristics will be assessed