

SMARTWASTE: Reusing wastes and by- products of agricultural industry to develop bioactive livestock feeds

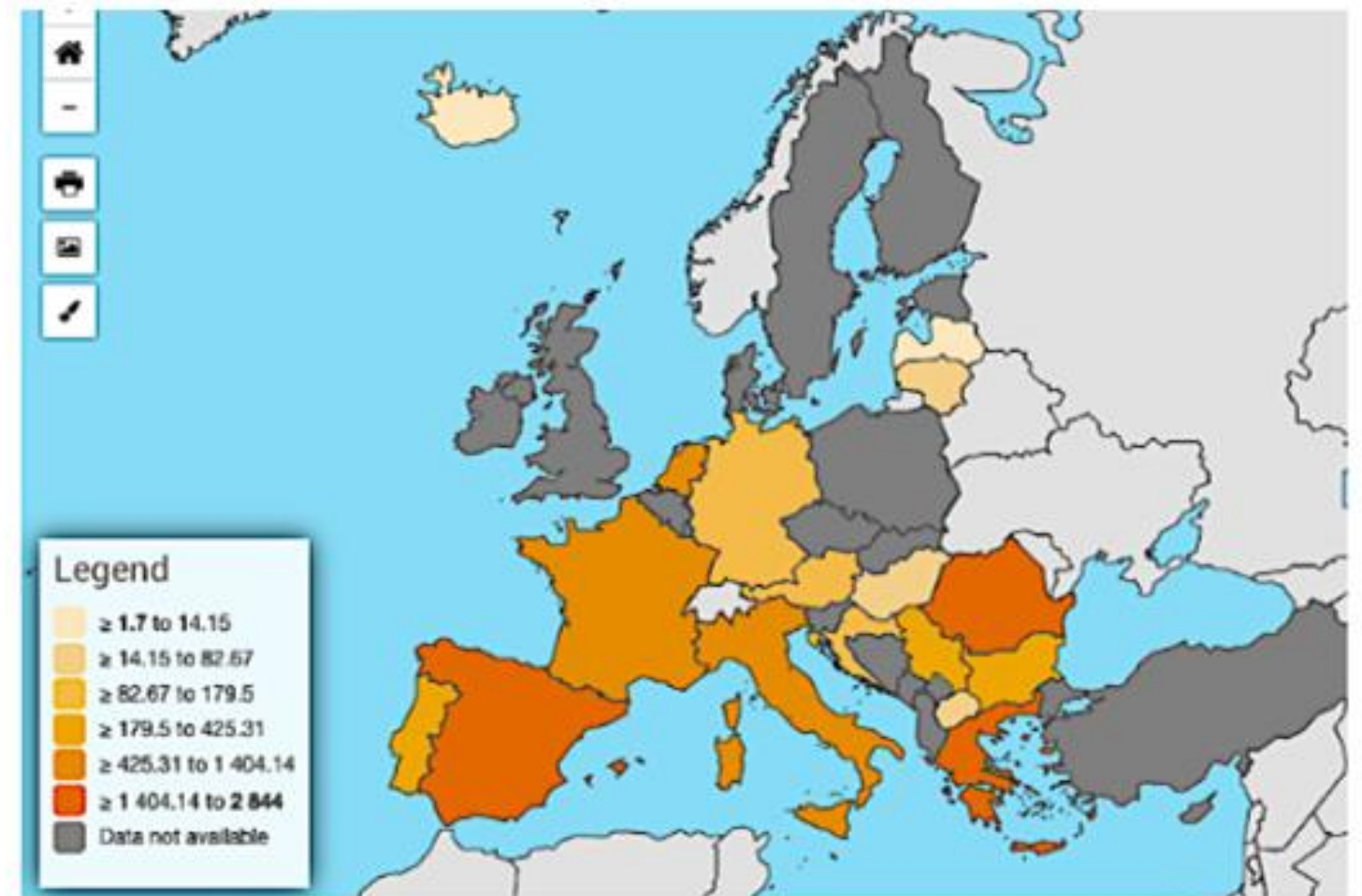
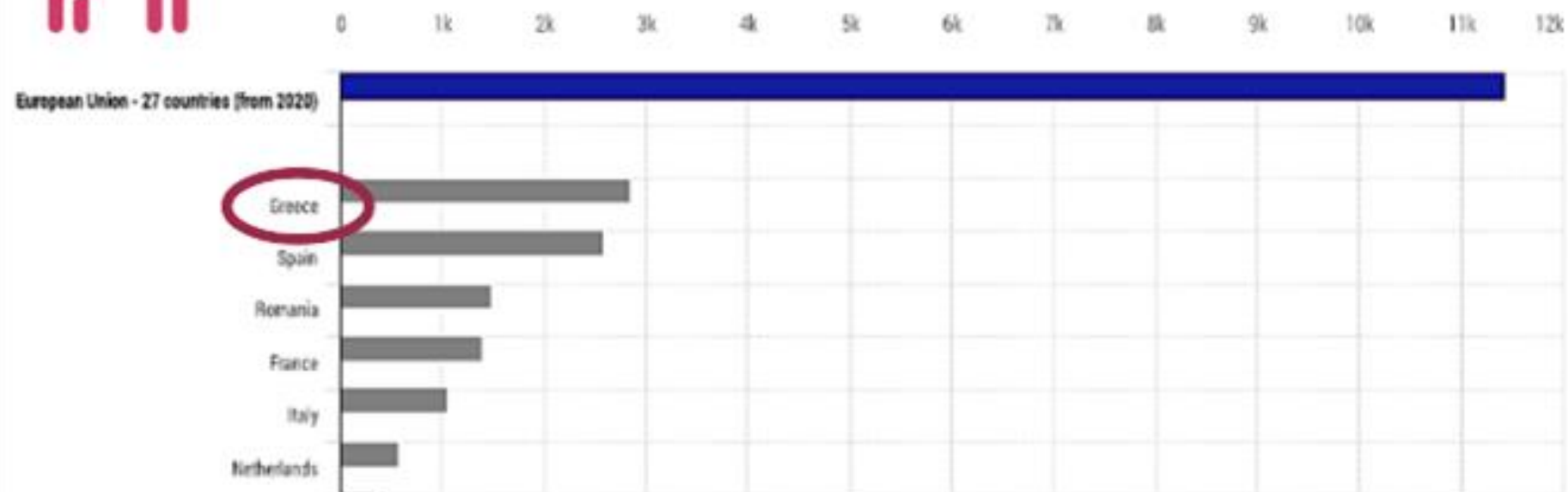
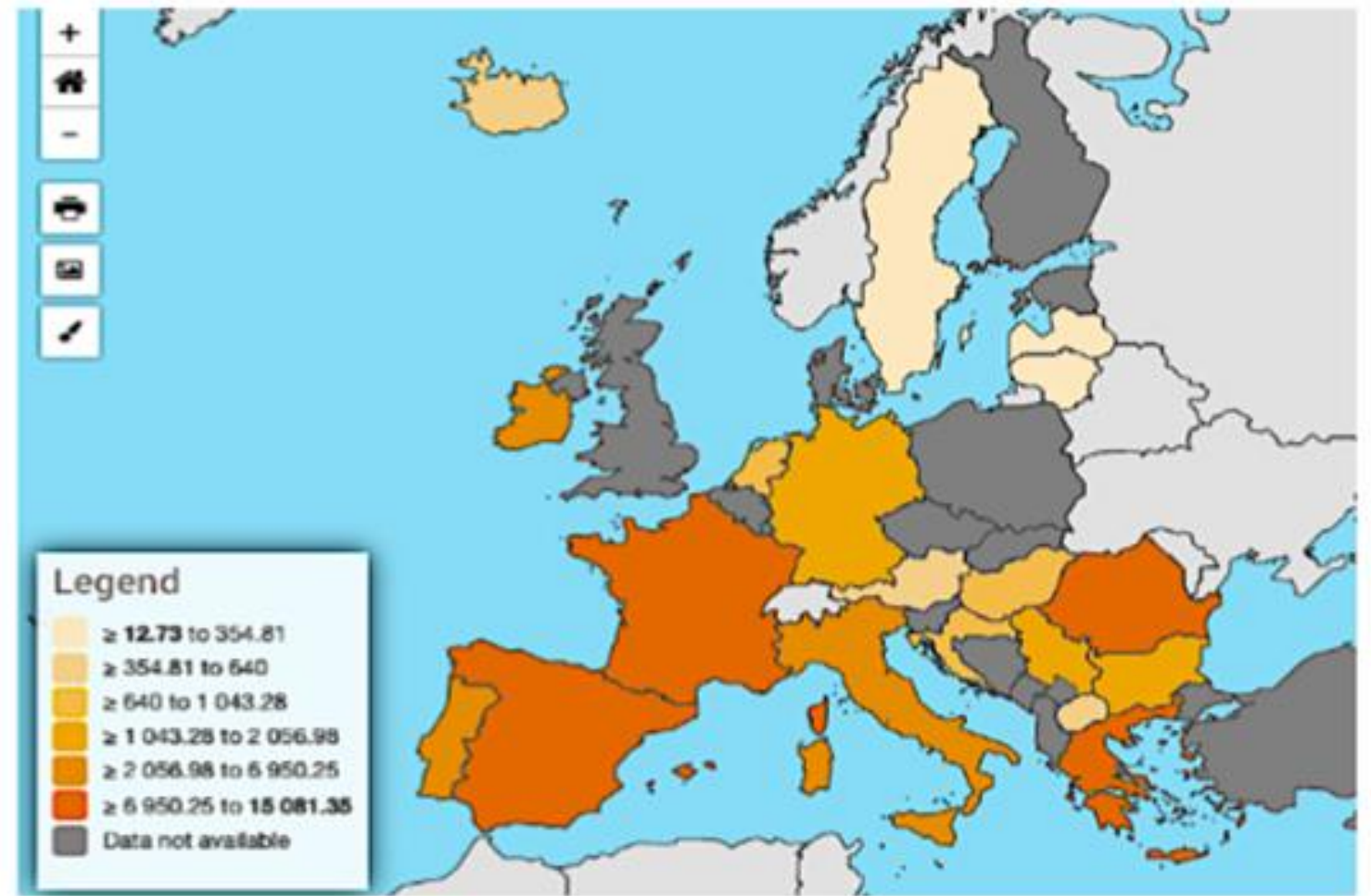
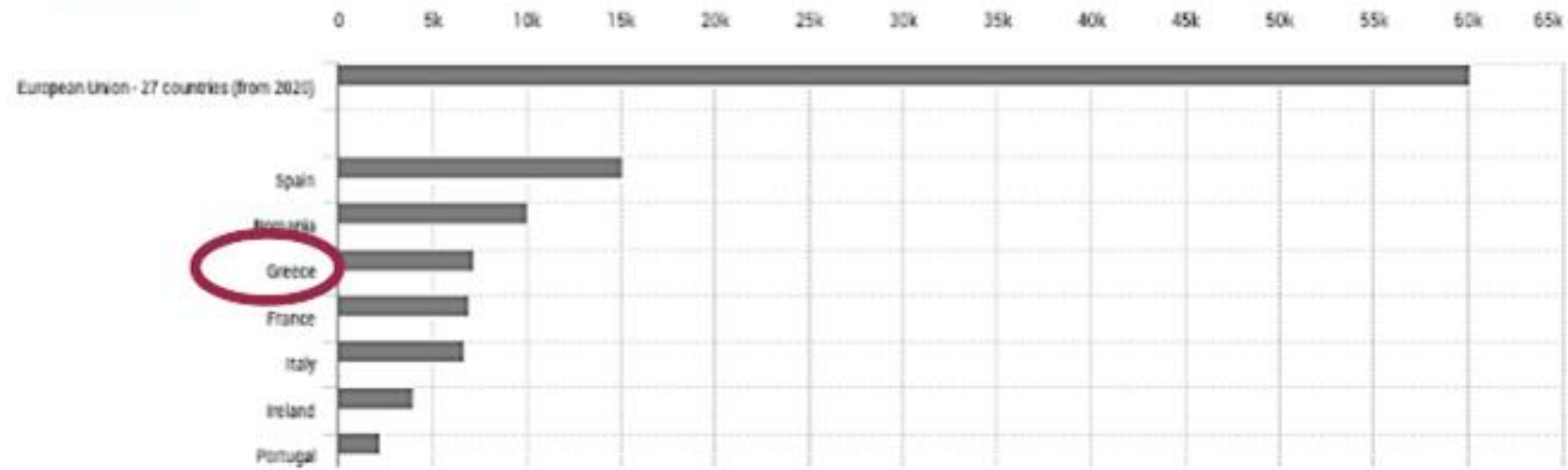
Smaragda Sotiraki, Stefanakis
Alexandros, Panagiota Ligda, Georgios
Maragkakis, Georgios Geourgoulakis

- Veterinary Research Institute Hellenic
Agricultural Organisation DIMITRA
- ΣΥΡΑ Ο.Ε.



One of the most important agricultural activities is Sheep & Goat farming

- has a significant socio-economic contribution to the rural areas
- provides food to rural populations
- contributes significantly to the local ecosystems' maintenance
- is part of the cultural heritage of many region
- produces high quality traditional food products

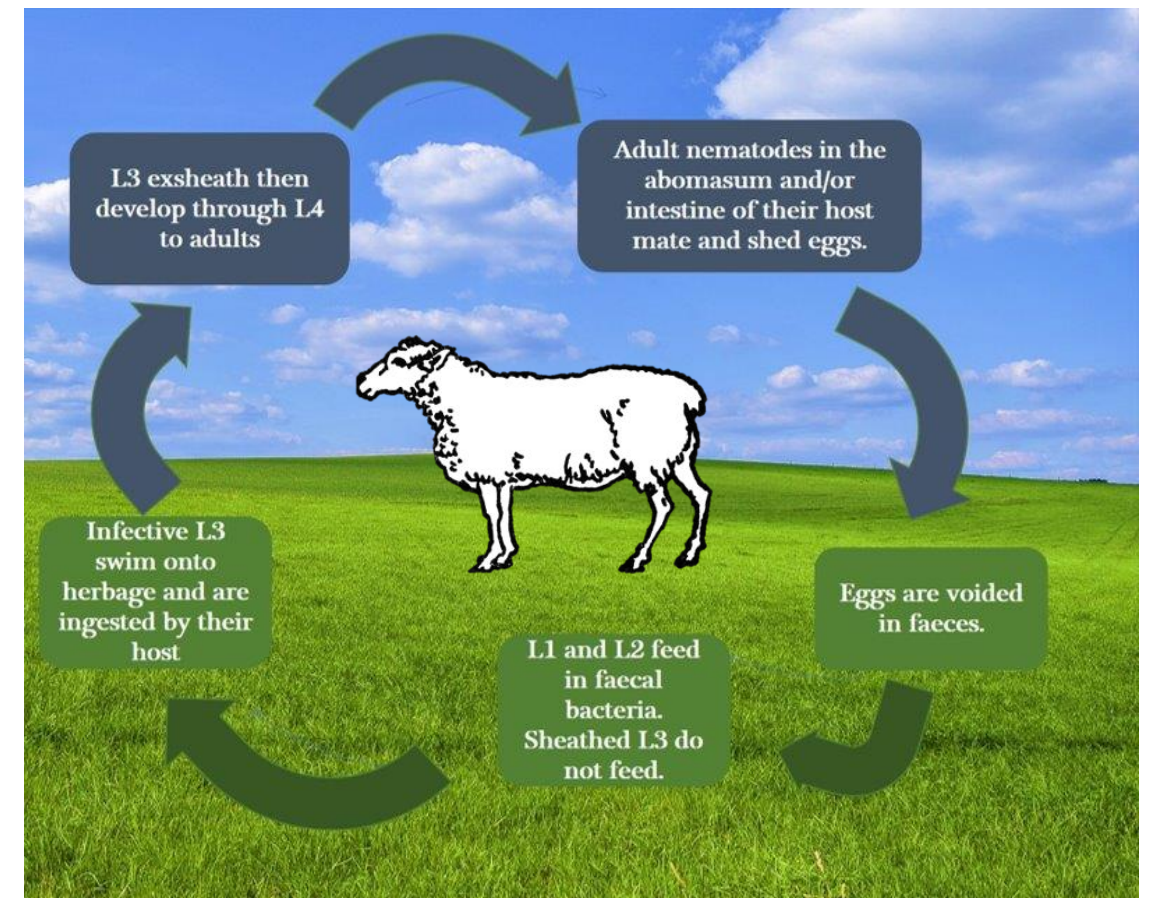


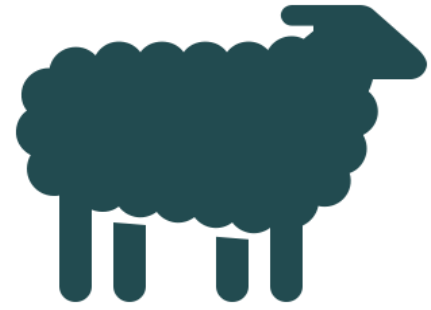


Animal farming
comes with
challenges

Grazing ruminants = parasites

- * Often occurring
- * Widespread presence
- * Affect health & welfare of grazing ruminants
(anorexia, impaired digestion & nutrient absorption)
- * Reduction of farmer's income
- * Reduction in quantity and quality of products





Livestock

- Improved health
- Improved Welfare

People

- Ensure food security
- Safe, high quality food
- Support human health and wellbeing

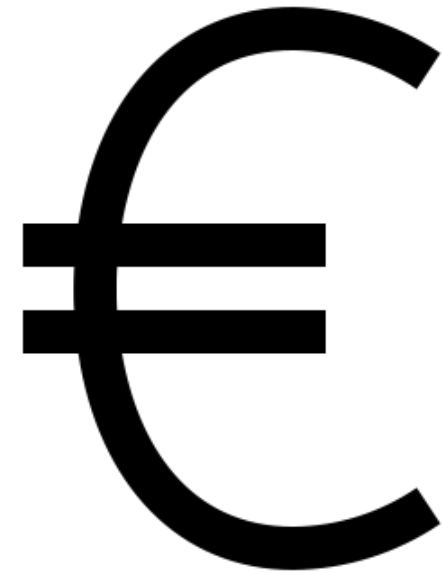
Profitability

- Improve productivity
- Support farming sector

Environment

- Reduce impact of livestock on GHG emission
- Ensure sustainable food production

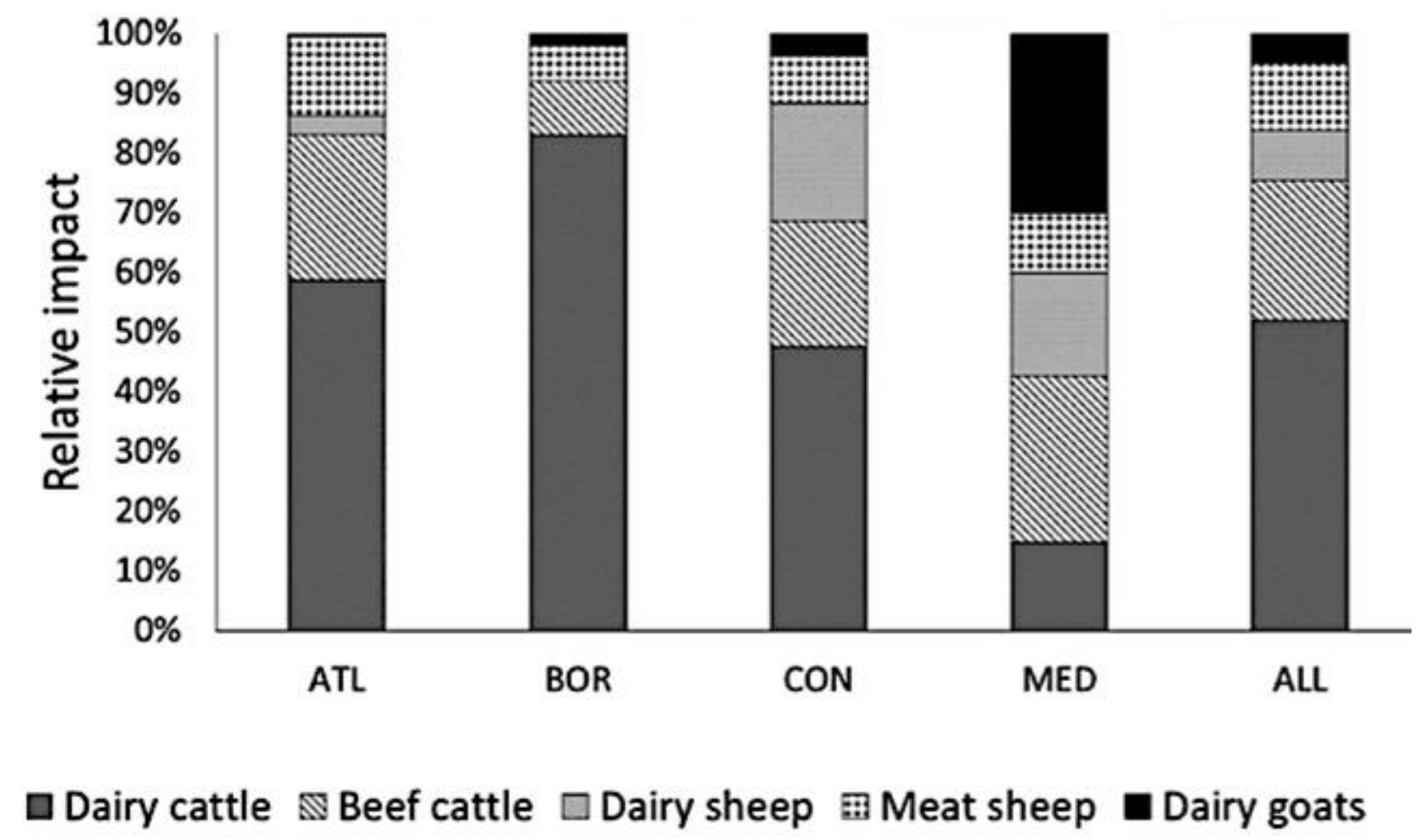
parasite control matters



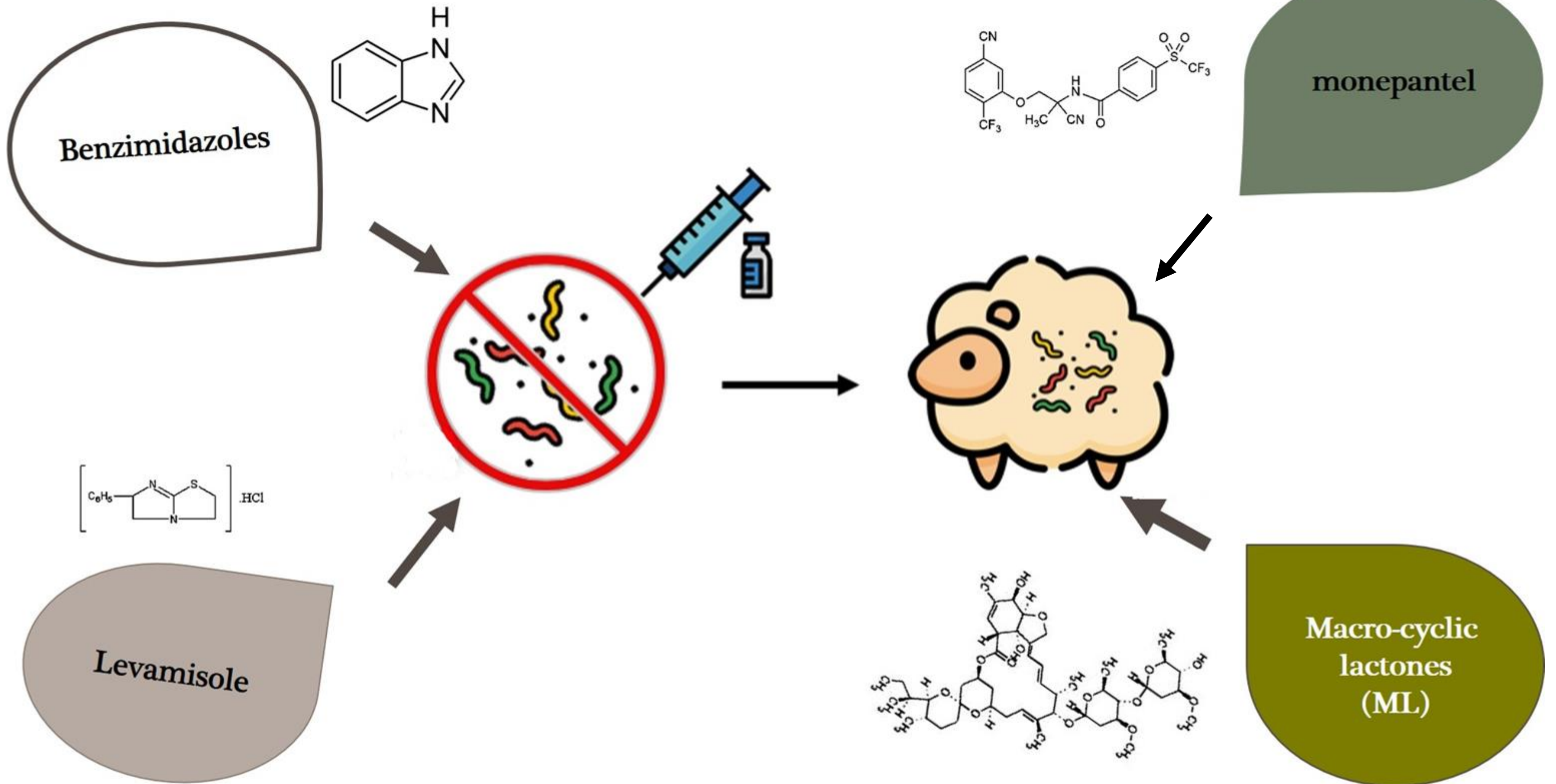
to Fig. 1): ATL = Atlantic (BE, FR, UK, IE, NL), BOR = Boreal (NO, SE), CON = Continental (AT, DE, LT, MK, PL, RO), MED = Mediterranean (ES, IL, IT, PT, TU), ALL = all combined.

Evidence infection

- Budgets of all known national and European research projects on the topic in Europe over 10 year period
 - € 2.7 M / year
- Annual investment / Annual cost:
 - 0.15%



How to control Parasites?



**INCREASED LIMITS
on the USE of AHs**

**NEED for ALTERNATIVE SOLUTIONS of
CONTROL**

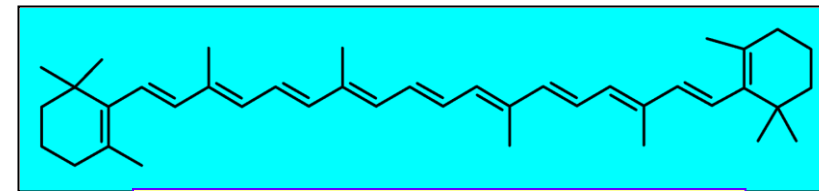
Limits

- Worldwide development & diffusion of drug resistance
- Increasing number of multiresistant isolates in small ruminants
- **Exclusive reliance on AH is not a sustainable option**
- Increased expectations to reduce chemicals in agriculture (organic products)
- Increased constraints in the regulation to use commercial AHs

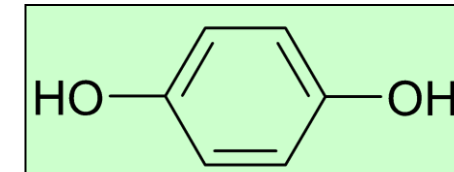
Seek for alternative solutions

- Biological control, vaccine, genetic selection
- interaction host nutrition
- **Natural bioactive compounds of plants (plants secondary metabolites)**

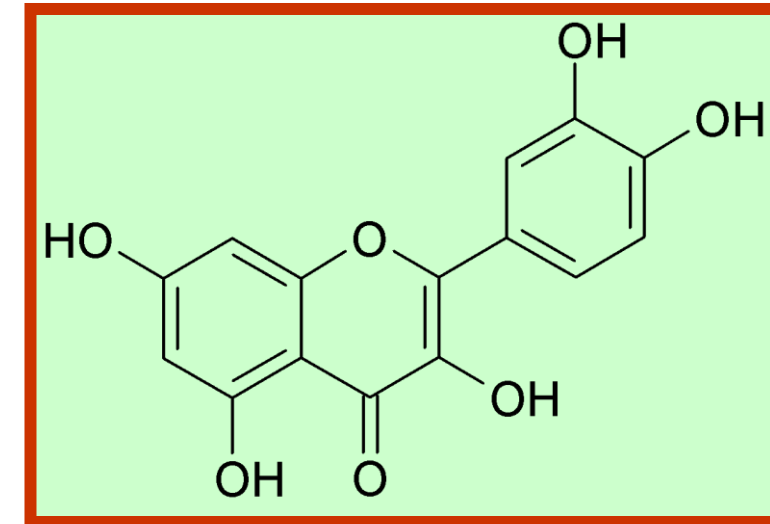
What are Plant Secondary Metabolites (PSMs)?



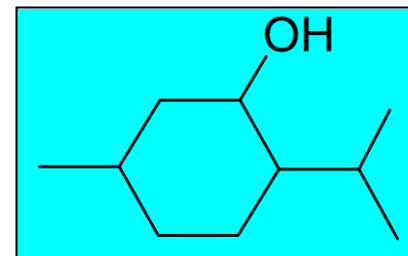
Carotenoids



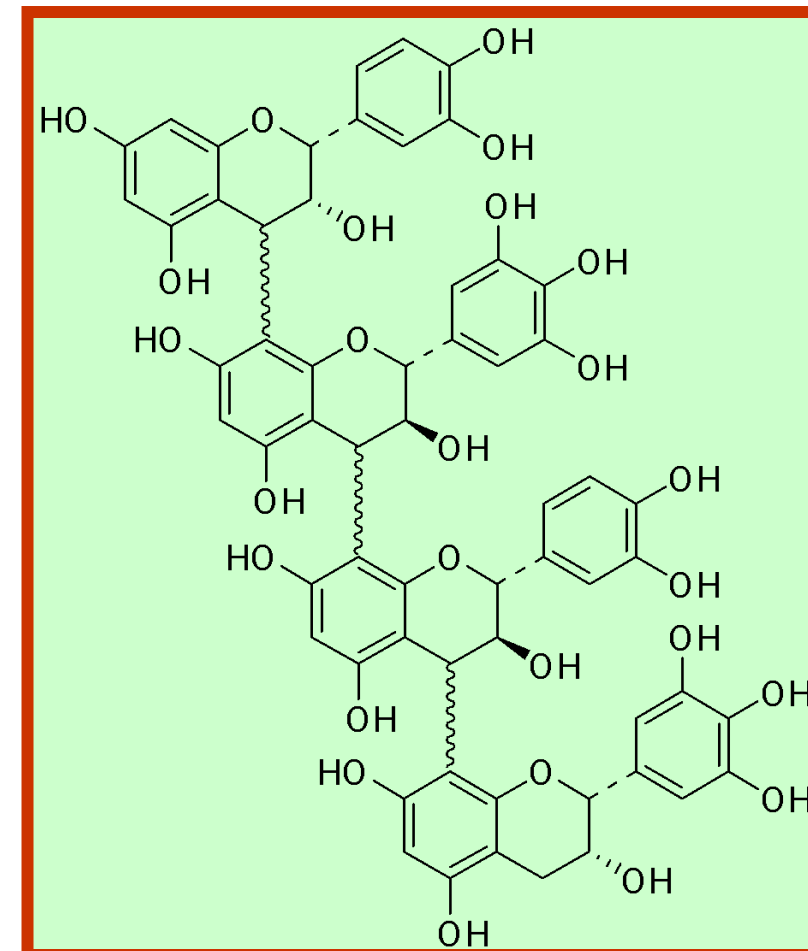
Phenolics



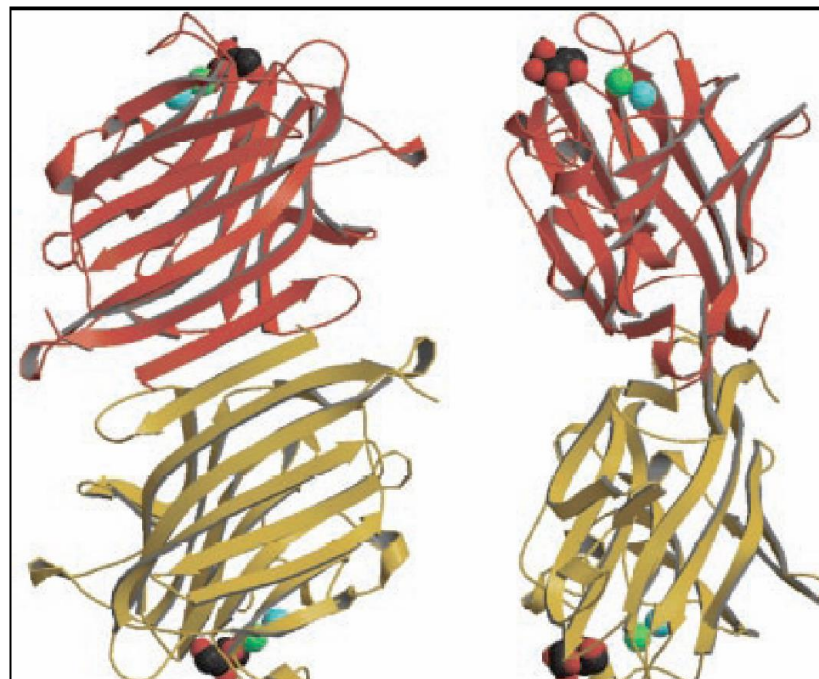
Flavonoids



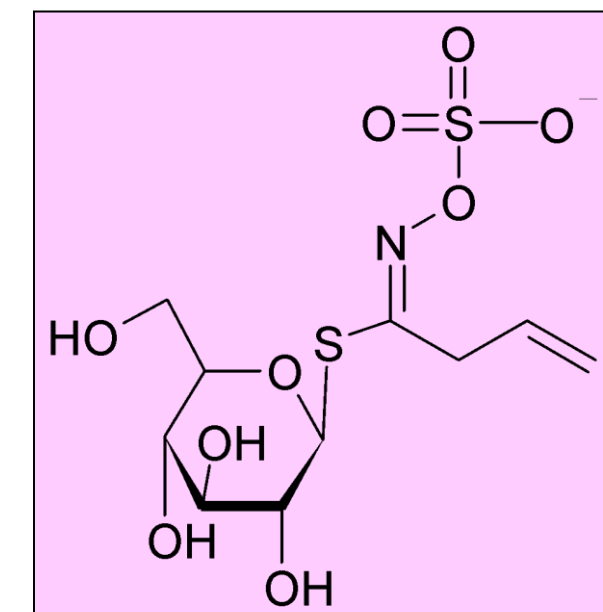
Terpenoids & essential oils



Tannins



Proteins, enzymes:
e.g. cysteine proteinases, lectins

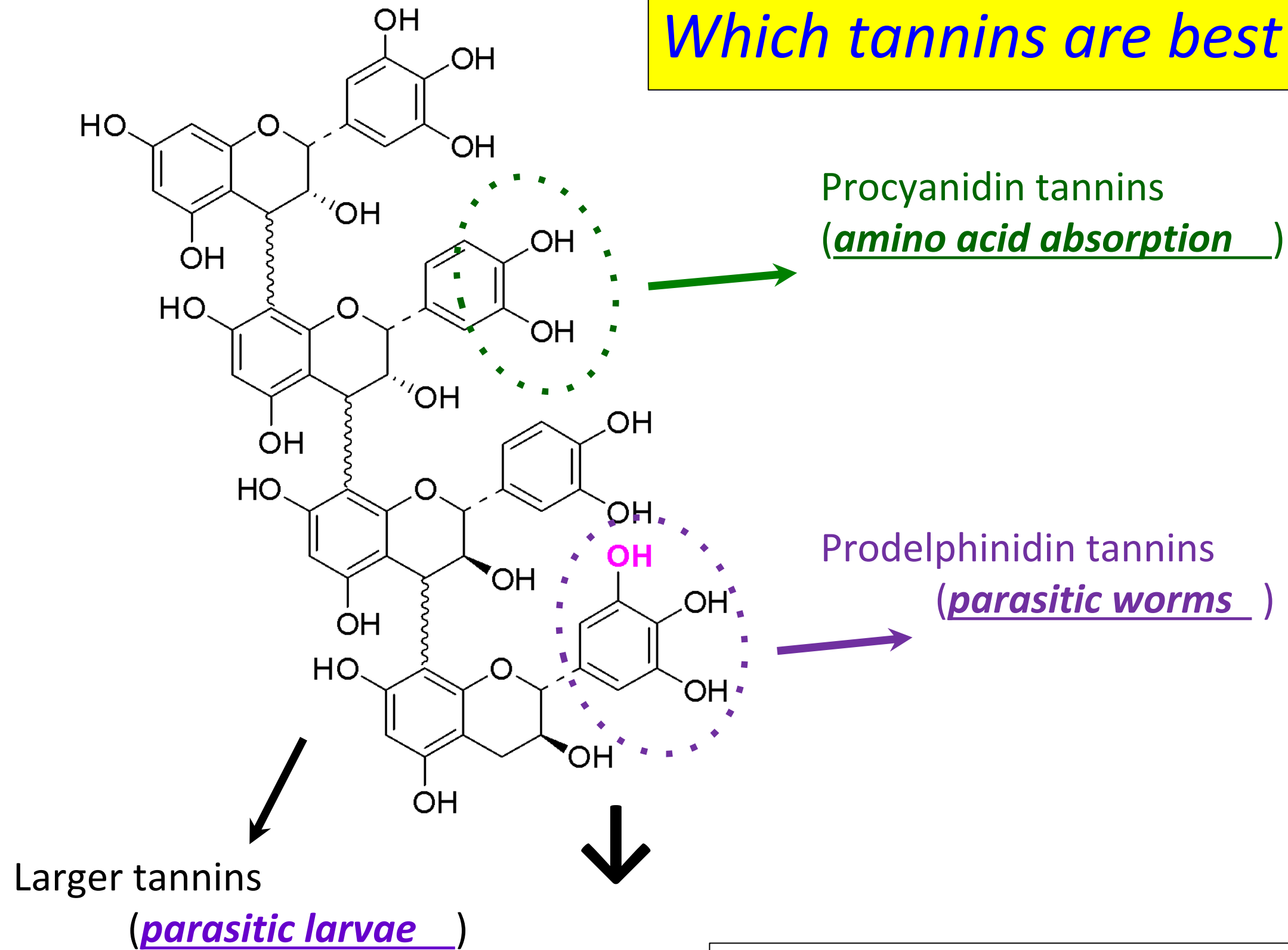


Glucosinolates

Bioactive ingredients = tannins



Which tannins are best for what?



Mueller-Harvey 2006; Waghorn 2008

The aim of our project was 3-fold:

1. to protect small ruminants' gut health & improving their productivity

1. to adapt sustainable environmentally friendly, low input farming (reduce chemical drugs use)

1. to recycle agro-industrial biowaste & upgrading them to functional animal feed







This will be achieved by producing our “SUPER FEED”

using locally produced agro-industrial waste/by-products containing bioactive compounds beneficial to the gut health

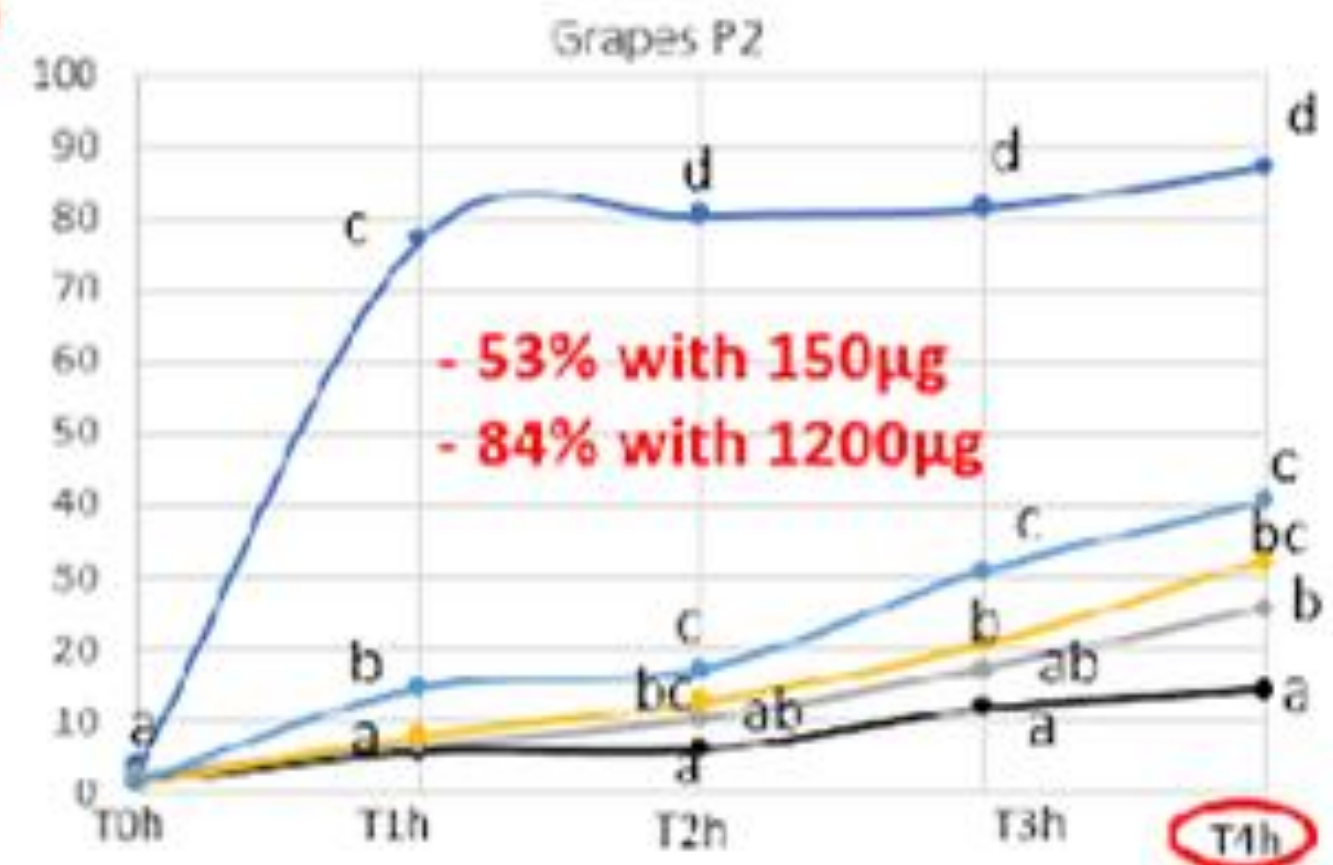
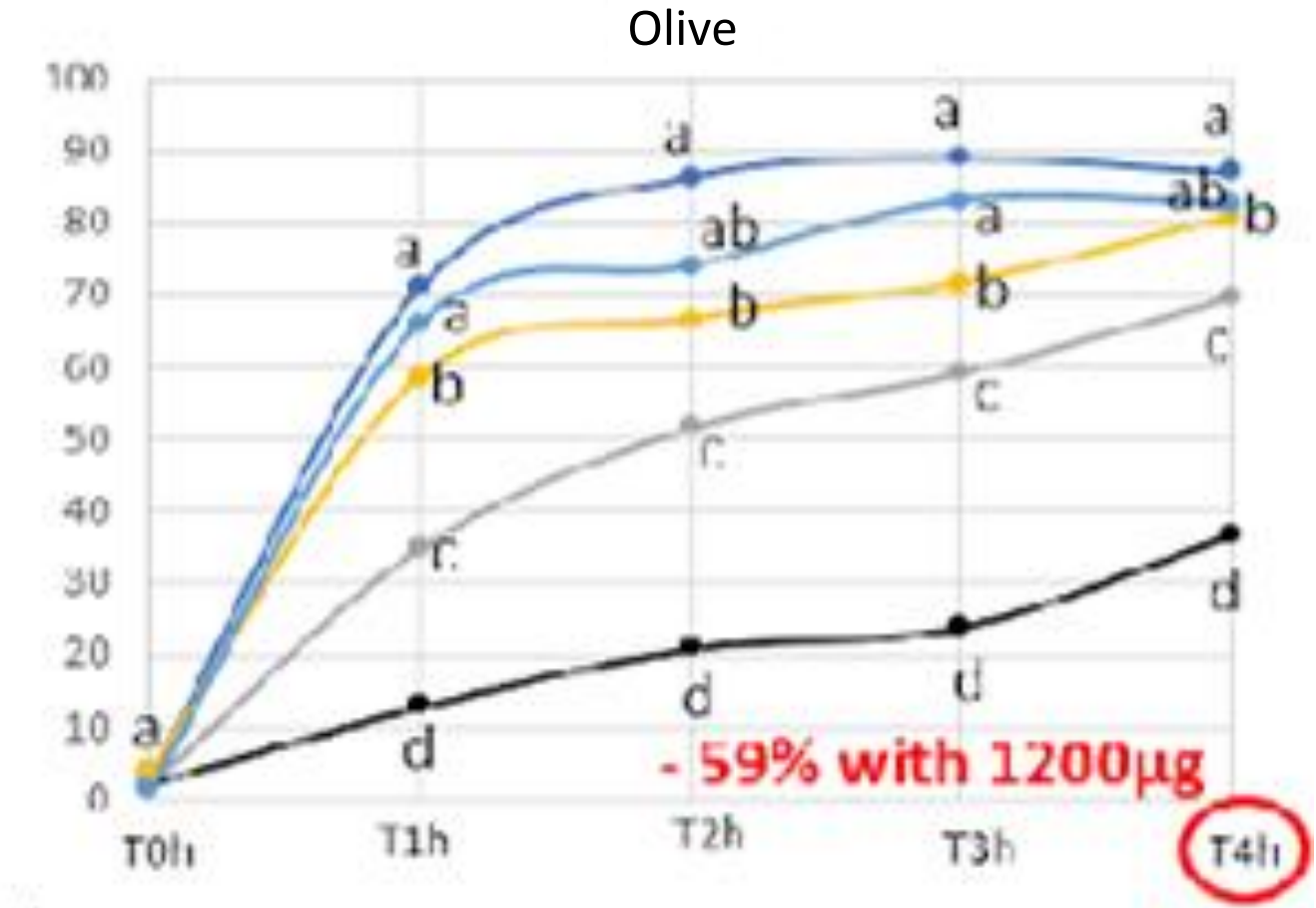
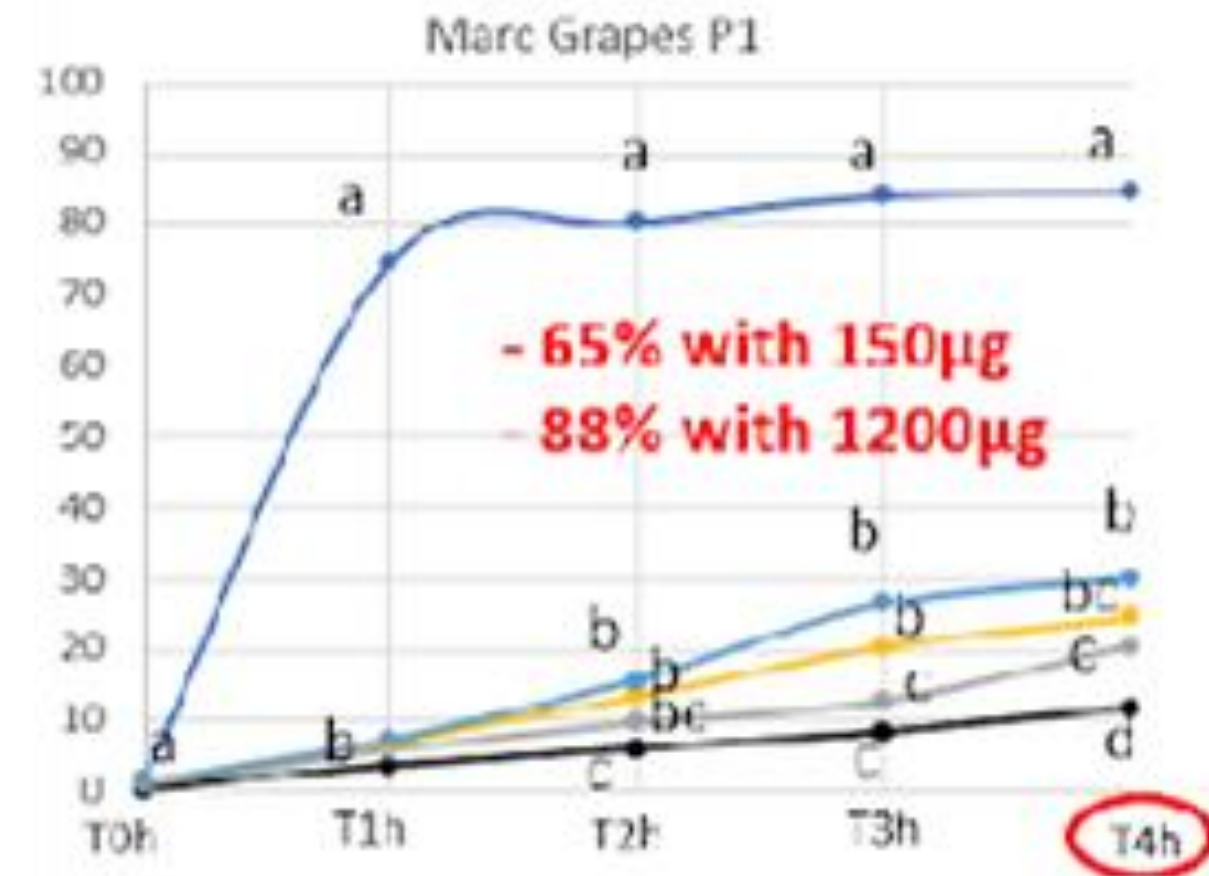
***in vitro* anthelmintic effect of
extracts of plants' material.**

**Chemical components of the
phenolics group within the
extracts**

***In vitro* studies**

Results_EXCYSTATION_coccidia

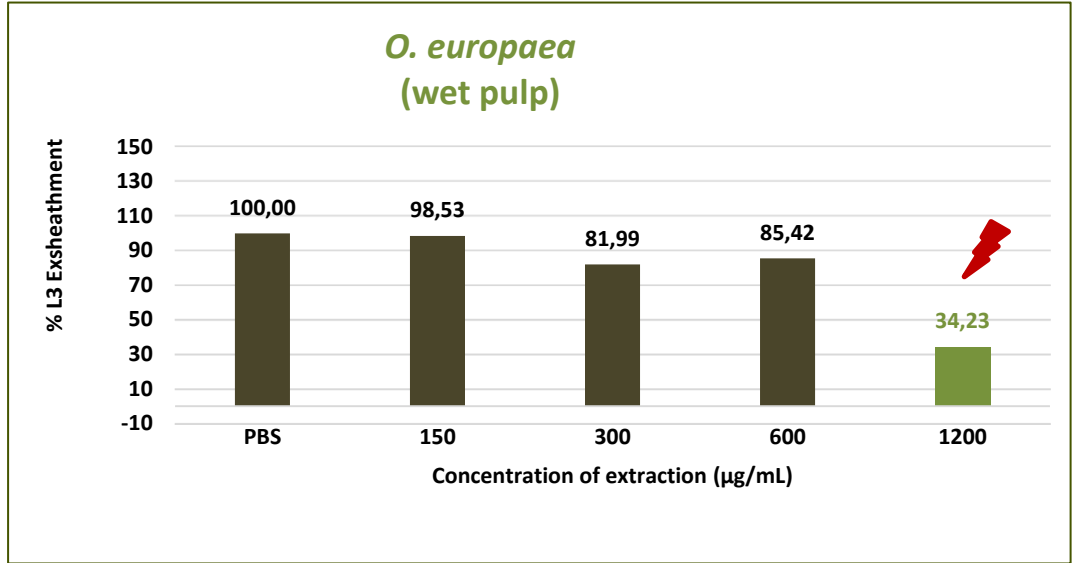
—●— PBS
 —●— 1200
 —●— 600
 —●— 300
 —●— 150



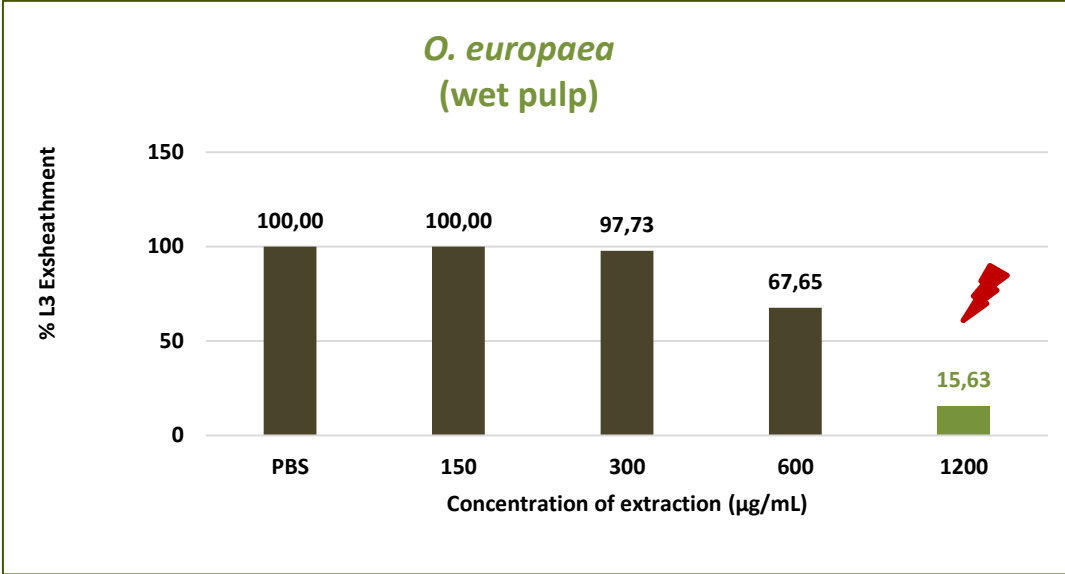
Results_EXSEATHMENT_GIN

olive

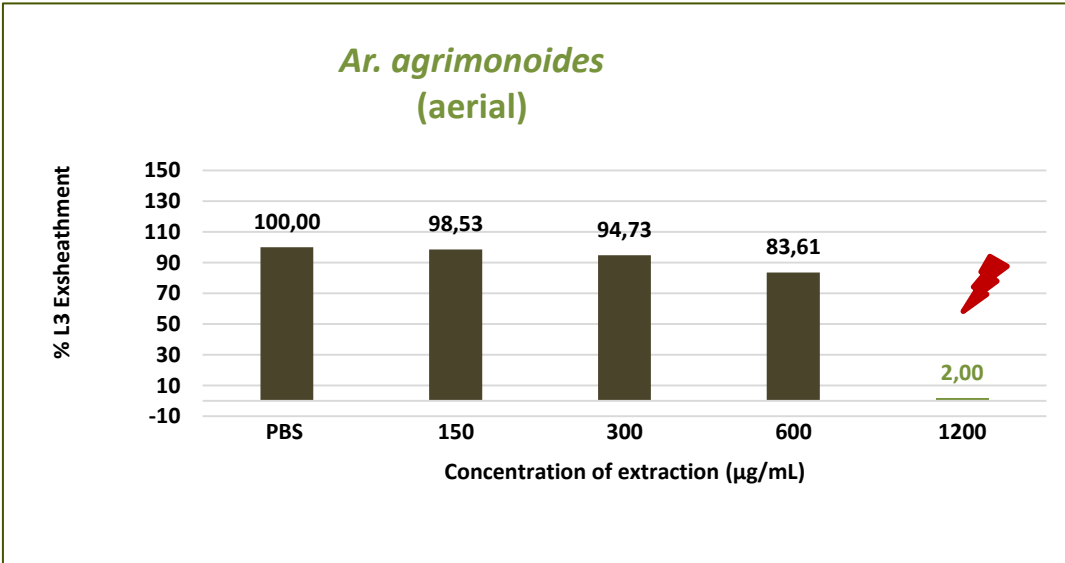
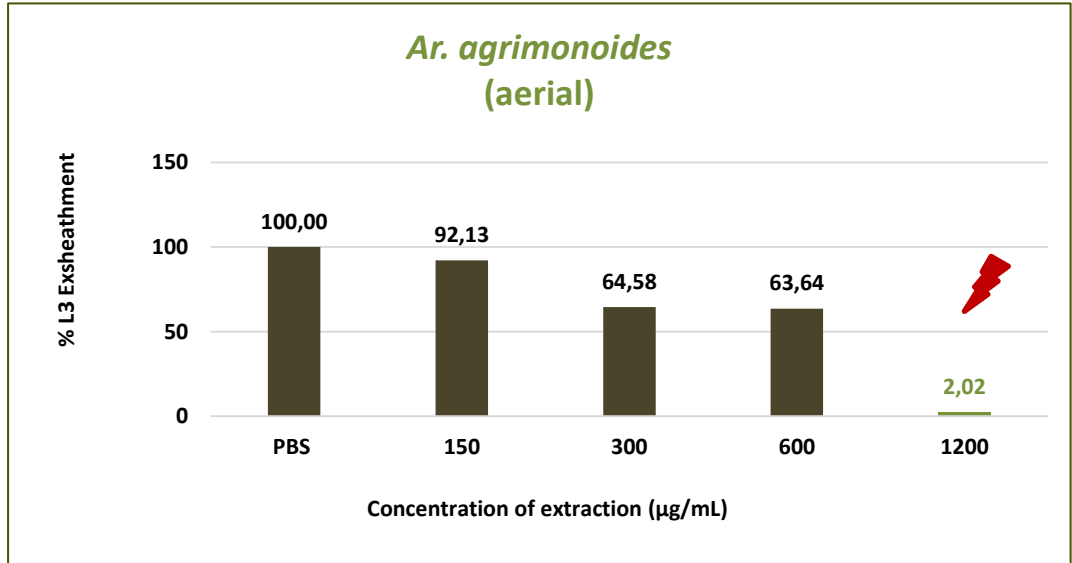
H. contortus



Tr. colubriformis



grape

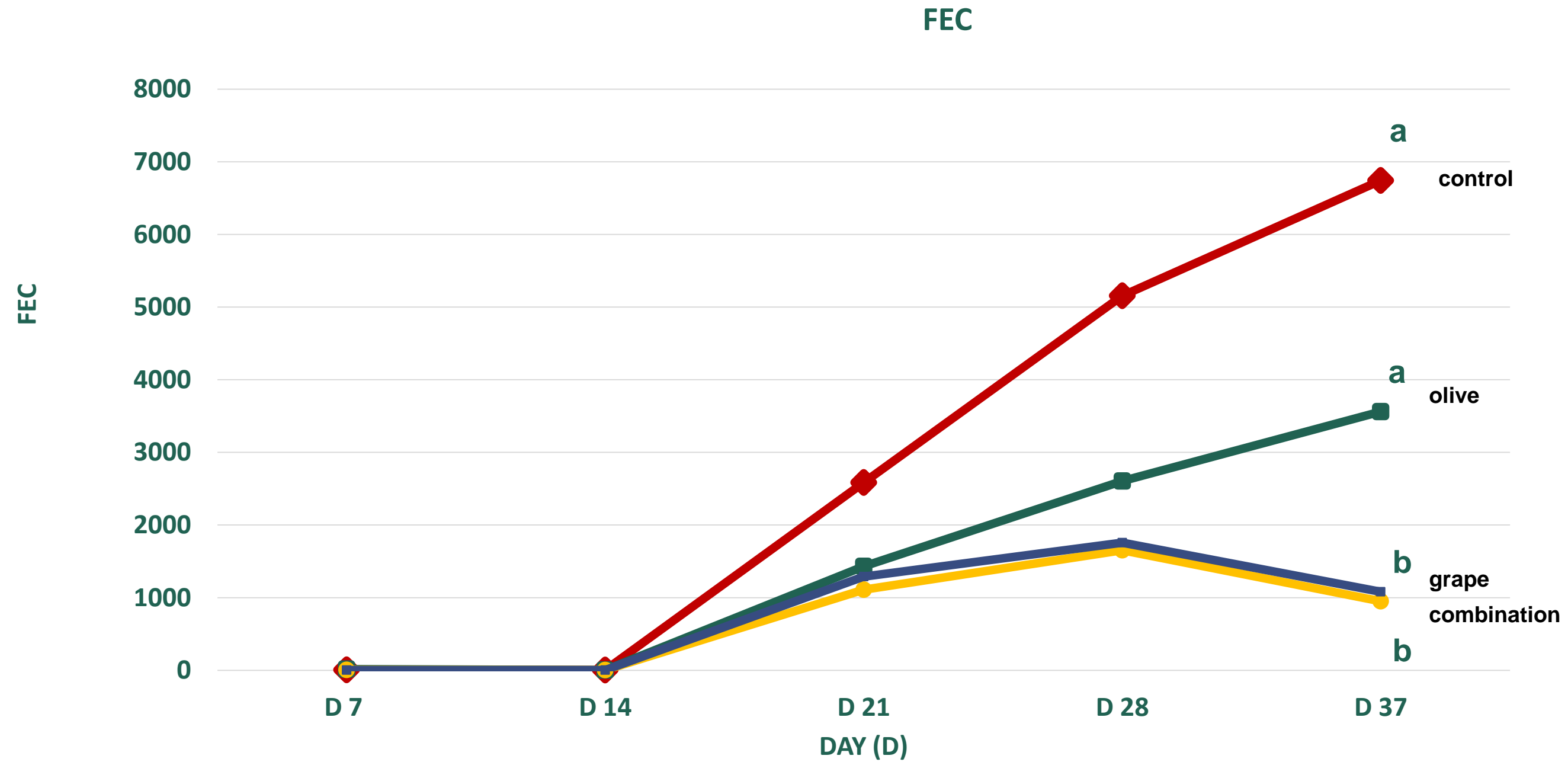


A photograph of a flock of sheep in a field. In the foreground, several sheep are visible, some standing and some lying down. A large, dense green bush dominates the middle ground. In the background, there are rolling hills under a clear sky. The text "In vivo studies" is overlaid in white, italicized font, with a white horizontal line underneath it.

In vivo studies

RESULTS

FAECAL EGG COUNTS _gastrointestinal nematodes



More
measurements

Chemical analyses

Digestibility

Refusals

So far

They do show an antiparasitic efficacy

They are suitable to be added in animal ration

They show hi nutritional value

They are well accepted by the animals

HOW MUCH TANINS ARE REQUESTED IN THE DIET ?

1 How much depend on the Method of measurement !

2 There is a threshold requested but

the concentration depends also on the quality of tannins

3 The effects can depend on the combination

[C] x Time of distribution

**HOW TO USE
TANNINS IN THE
DIFFERENT SYSTEMS
OF SMALL RUMINANT
PRODUCTION?**

1 All year long as a feed complement ?

2 Repeated «cure» of tannin containing by-products/waste

4 At a strategic time in regard of the epidemiology of parasites

(e.g. Periparturient rise)

Thank you for your attention



Ευρωπαϊκή Ένωση
Ευρωπαϊκό Ταμείο
Περιφερειακής Ανάπτυξης



Επιχειρησιακό Πρόγραμμα
ΚΡΗΤΗ 2014 - 2020

Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



ΕΣΠΑ
2014-2020
ανάπτυξη - εργασία - αλληλεγγύη