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CHESTNUT TANNIN PHYTOCOMPLEX TO CONTROL TOBACCO NEMATODES AND IMPROVE PLANT GROWTH

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CHESTNUT TANNIN PHYTOCOMPLEX

- ◎ (SWEET) CHESTNUT = *CASTANEA SATIVA*
- ◎ A PHYTOCOMPLEX IS THE COMBINATION OF ALL THE SUBSTANCES PRESENT IN A PLANT-BASED DRUG: TANNINS AND SO-CALLED “NON TANNINS”:
 - TANNINS: MOSTLY GALLOTANNINS, EPIGALLOCATECHINS & RELATED MOLECULES
 - NON TANNINS: ACIDS, SUGARS, SOLUBLE HEMICELLULOSE FRACTIONS, MINERALS, PROTEINS, ETC.





CHESTNUT TANNIN PHYTOCOMPLEX

- **HOT WATER EXTRACTED PHYTOCOMPLEX OF CHESTNUT WOOD, MEMBRANE-TECHNOLOGY CONCENTRATED (EU PATENT PENDING)**
- **ACID (pH 3) PHYTOCOMPLEX, HIGH IN HYDROLYSED TANNINS –MAINLY GALLOTANNINS, LIQUID (13%) & DRY FORMULATIONS (75%)**
- **ACTIVE AS SOIL/WATER ACIDIFIER, PHOSPHATE SOLUBILIZER & IRON COMPLEXING AGENT (2 EU + 1 ITALIAN PATENTS)**
- **CHARACTERIZED BY NEMASTAT ACTION & SUSPECTED FOR CONTROL OF SOME SOIL-BORNE DISEASES & IMPROVING MYCORRHIZAL INFECTION**



* commercial products of Nuova Rivart, Gruppo Mauro Saviola, Italy



RESEARCHES ON CHESTNUT TANNIN PHYTOCOMPLEX IN PROGRESS

- **STARTER FERTILIZATION: + EFFECT ON EARLY PLANT GROWTH (VEGETABLES, TOBACCO, CEREALS)**
- **IRON-COMPLEXING AGENT: ON TURF, STRAWBERRY & FRUIT TREE CROPS**
- **SALINITY CONTROL & ACIDIFYING AGENT: ON VEGETABLES (GREENHOUSE & FIELD), MEDIA & WATER**
- **NEMASTAT AGENT: ON CARROT, POTATO, STRAWBERRY, AND TOBACCO (PRELIMINARY STUDIES)**



STATE OF THE ART OF CHESTNUT TANNIN PHYTOCOMPLEX IN ITALY/EU

- ⦿ **AUTHORIZED AS A NITROGEN STABILIZER SINCE 2009**
- ⦿ **AUTHORIZED AS AN IRON COMPLEXING AGENT SINCE 2009**
- ⦿ **AUTHORIZATION PENDING (*TRIS STEP**) AS A NATURAL ACIDIFIER, SALINITY CONTROL AGENT, SOIL-ROOT MICROSITE MODIFIER WITH PLANT PROTECTIVE SIDE EFFECTS**

** TRIS PROCESS: EU CONFORMITY OF NATIONAL LEGISLATION*



RESEARCHES ON TOBACCO

- TO IMPROVE PLANT EARLY GROWTH IN THE FIELD
- TO INVESTIGATE ALTERNATIVES TO ORDINARY AGROCHEMICALS, TO BE READY IN CASE OF STOP TO THEIR AUTHORIZATION
- TO USE (AS MUCH AS POSSIBLE) LOCALLY PRODUCED INPUTS FOR A BETTER TOBACCO LCA (= LIFE CYCLE ASSESSMENT)
- TO AIM AT PRODUCING LOW RESIDUE LEAF



THE CONTEXT

- ◎ HIGH PRICES OF AGROCHEMICALS, BOTH FERTILIZERS AND CROP PROTECTANTS, HAVE ARISEN MANY QUESTIONS ABOUT THEIR ACTUAL COST-EFFICIENCY RATIO
- ◎ INCONSISTENT CONTROL IN CASE OF SEVERAL NEMATICIDES
- ◎ ALSO, SOME CROP PROTECTANTS HAVE UNDERGONE A REVISING PROCESS AND PRESENTLY ARE BENEFITING OF A “TEMPORARY AUTHORIZATION”



SOME EXAMPLES (ITALY)

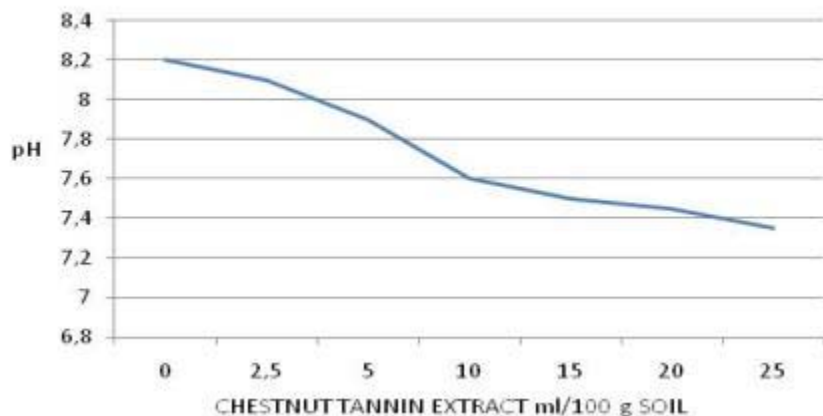
- TELONE DOW HAS BENEFITED OF REPEATED TEMPORARY AUTHORIZATION SINCE MARCH 2008.
MARKET SHARE: 70%.
COST (appl. incl.) : 800-1000 €/ha (465-580 US\$/A)
- NEMACUR BAYER, VIDATE (Oxamyl) DuPONT, NEMATHORIN* (Fosthiazate) SYNGENTA
MARKET SHARE: 29%.
COST (appl. incl.): 400-500 €/ha (233-290 US\$/A)
- ADANEMA SIPCAM (Azadirachtina)
MARKET SHARE: 1% -ORGANIC FARMING.
COST (appl. incl.): 250 €/ha (145 US\$/A)

* LABELED ONLY ON TOMATO & POTATO IN ITALY

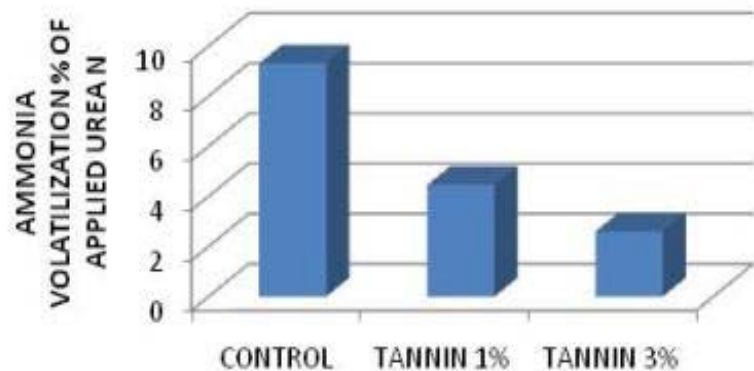
CHESTNUT TANNIN PHYTOCOMPLEX



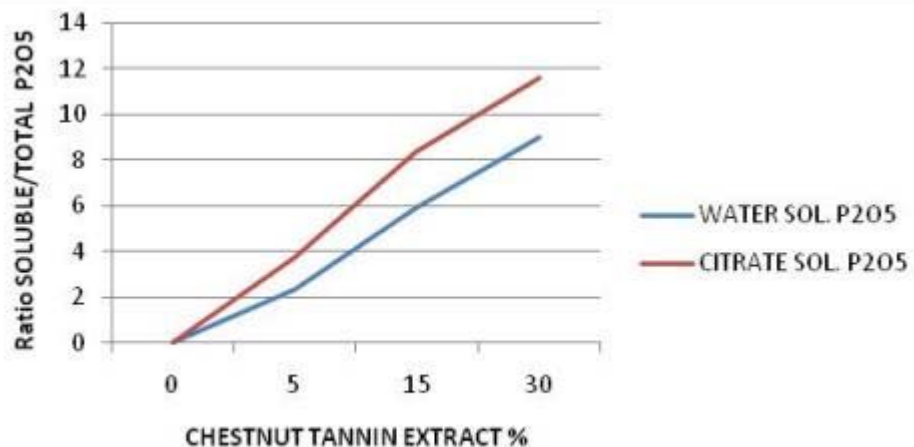
LAB TEST: EFFECT ON SOIL pH



LAB TEST: EFFECT ON AMMONIA VOLATILIZATION



LAB TEST: EFFECT ON P AVAILABILITY OF SOFT PHOSPHATE ROCK



* commercial products of
Nuova Rivart, Gruppo Mauro
Saviola, Italy

MICROIRRIGATED V.B. TOBACCO K326



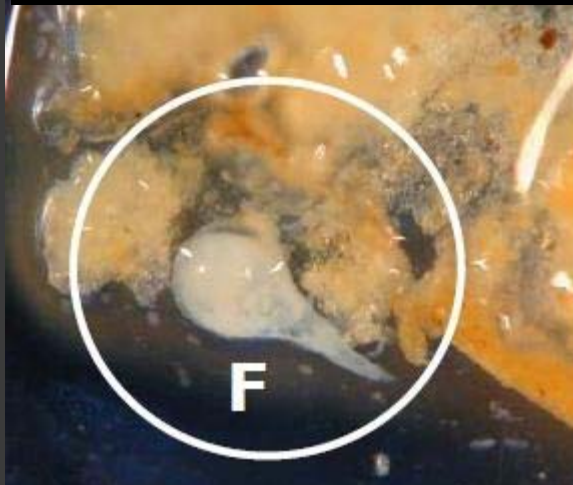
300 L/ha (13% TANNINS) in 3 FERTIGATION TREATMENTS,
40-50-60 DAT, CONCENTRATION: 30 L/m³ WATER

CHARACTER	CONTROL	TANNINS
CURED LEAF YIELDS kg/ha	2880	2960
LEAF TEST: TOTAL N %	3.25	2.98 *
NICOTINE %	2.49	2.46
REDUCING SUGARS %	12.15	14.77 **
TOTAL P %	0.33	0.39 *
TOTAL K %	2.20	2.38 *
QUALITY	6.58	7.83 **

* = commercial product of Nuova Rivart, Gruppo Mauro Saviola, Italy

CHESTNUT TANNIN PHYTOCOMPLEX AS A NEMASTAT AGENT

FEMALE OF
Meloidogyne javanica



PLANT ROOTS WITH
Meloidogyne attack



A MAJOR PROBLEM IN VEGETABLES & TOBACCO: ROOT KNOT NEMATODE IS SPREADING AND THERE ARE FEWER PERMITTED AGROCHEMICALS FOR ITS CONTROL

TANNIN PHYTOCOMPLEX, AT RATES EQUAL OR GREATER THAN 1.28 g/L, HAS NEMASTAT CONTROL ON MELOIDOGYNE SPP. COMPARABLE TO FENAMIPHOS AT 0.005 g/L (LAB & GREENHOUSE TESTS ON CARROTS, TOMATOES, POTATO)

FIELD RESEARCH ON CARROTS

2009 FIELD TRIALS AT MACCARESE, ROME, ITALY



* commercial product of Nuova Rivart, Gruppo Mauro Saviola, Italy

FIELD RESEARCH ON CARROTS



TELONE

CONTROL



TANNINS



FIELD TESTS ON VB TOBACCO



- IN 2004 FIELD TESTS WITH AZADIRACTINE + CHESTNUT TANNIN PHYTOCOMPLEX ON MICROIRRIGATED TOBACCO → FIRST POSITIVE INDICATIONS
- IN 2005-2007: LAB & GREENHOUSE TESTS → ASSESSED NEMASTAT EFFECT
- IN 2008-2009 PHYTOCOMPLEX (250 L/ha) IN MICROIRRIGATION, ALSO COMBINED WITH A PRE-PLANT LIQUID TREATMENT (1000 L/ha) → FAIR TO GOOD CONTROL (WHEN NEMATODES WERE PRESENT: NOT IN 2009)

CONCLUSIONS (1)

- CHESTNUT TANNIN PHYTOCOMPLEX PROVED TO EFFICIENTLY* CONTROL ROOT KNOT NEMATODE ON FIELD CARROTS & OTHER VEG CROPS (POTATO & TOMATO) AT RATES OF 250 (PP)+250 (PostP) L/ha **(=26.5+26.5 G/A)**
- ALSO A REMARKABLE FAVORABLE EFFECT ON PLANT GROWTH & BETA-CAROTENE PLANT CONCENTRATION WAS ACHIEVED AT THESE RATES, BUT INCREASING + EFFECTS ON GROWTH WERE FOUND UNTIL 500(PP) + 250(PostP) **(=53+26.5 G/A)**.
- COSTS OF THE PRODUCT AT THESE TESTED RATES RANGE BETWEEN 260-390 €/ha **(=160-240 US\$/A)**

* EQUAL TO AN ORDINARY TELONE TREATMENT

CONCLUSIONS (2)

- ◎ SHOULD CHESTNUT TANNIN PHYTOCOMPLEX BE FOUND CONSISTENTLY EFFECTIVE ALSO ON TOBACCO ROOT KNOT NEMATODES IN THE FIELD, A CROP “HARD” CHEMICAL INPUT COULD BE AVOIDED (=LESS RESIDUES)
- ◎ WE ARE PRESENTLY INVESTIGATING INNOVATIVE FORMULATIONS & STANDARDIZED FRACTIONS OF CHESTNUT TANNIN PHYTOCOMPLEX, TO HAVE MORE CONSISTENT, LONG-LASTING EFFECTS (CROP NUTRITION & PROTECTION) AT LOWER RATES

FINAL REMARK

- **PRESENTLY, AGROCHEMICALS (FERTILIZERS & CROP PROTECTANTS) ARE STILL ESSENTIAL FOR A SUSTAINABLE TOBACCO CROP PRODUCTION, BUT SOME WISE USES OF SELECTED BIOLOGICAL INPUTS MAY HELP ... ALSO FOR GAP & CORPORATE SOCIAL RESPONSIBILITY**

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- NUOVA RIVART, GRUPPO MAURO SAVIOLA, Viadana (Mantova) Italy



Thank You

