



UNIVERSITÀ
DEGLI STUDI
FIRENZE

Dipartimento di
Chimica "Ugo Schiff"



CHIMICA ORGANICA – SINTESI ORGANICA

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Progetti e Argomenti di Ricerca

- **Sintesi di nuove strutture organiche** contenenti calcogeni (**zolfo, selenio, tellurio**) come **building blocks** per l'ottenimento di nuovi materiali/coloranti
- polifunZIONALIZZATI
 - studio delle **caratteristiche chimico fisiche**
 - valutazione della **stabilità**
 - studio delle **proprietà antiossidanti**
- Studio di nuovi **additivi** sintetici ad attività **protettiva/antiossidante** potenzialmente utilizzabili per incrementare la **stabilità di materiali** sottoposti ad agenti di danno ➔ **Decomposizione idrolitica e ossidativa** delle cere
- Studio dei **meccanismi, comprensione e modellizzazione** delle reazioni di **degradazione di materiali organici**
- Valutazione degli **effetti di sostituzioni isosteriche** mirate sulle **proprietà chimico fisiche e sulla stabilità di materiali e coloranti organici**

Laboratorio e strumenti



- Cappe chimiche di aspirazione



- GC MS



- Risonanza Magnetica Nucleare (NMR)



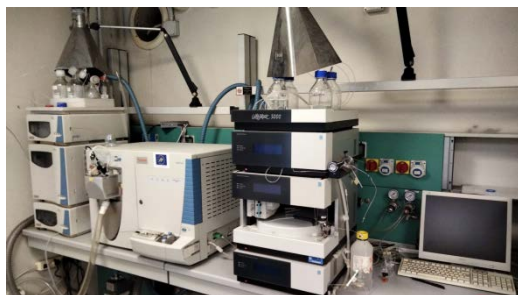
Laboratorio e strumenti



- Laboratorio



- Spettroscopia di Risonanza Magnetica Nucleare (NMR)



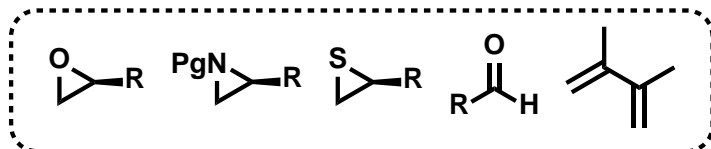
- (Cromatografia Liquida) LC-MS



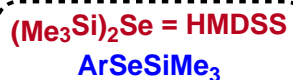
- Spettroscopia Infrarossa (IR)

Organosulfur, organoselenium, organotellurium compounds

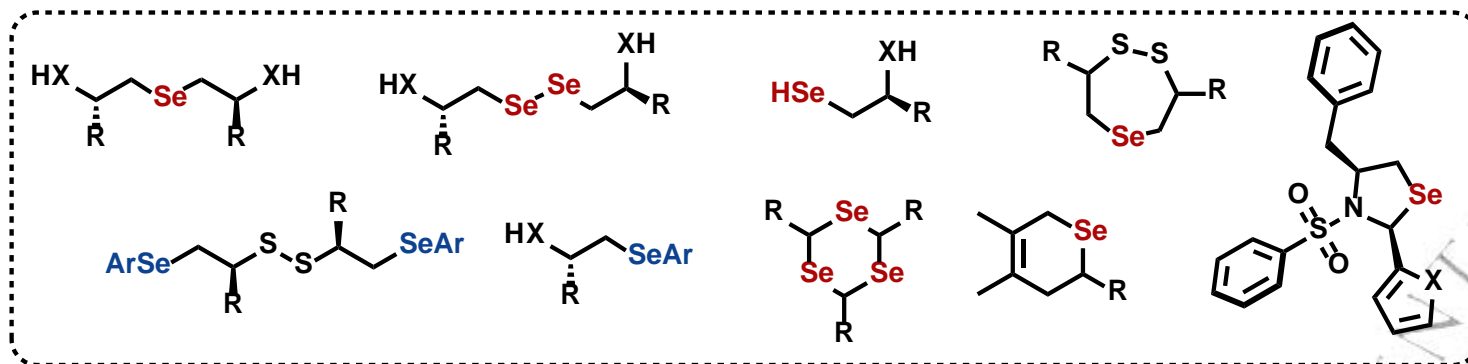
Small molecules precursors



Selenosilanes

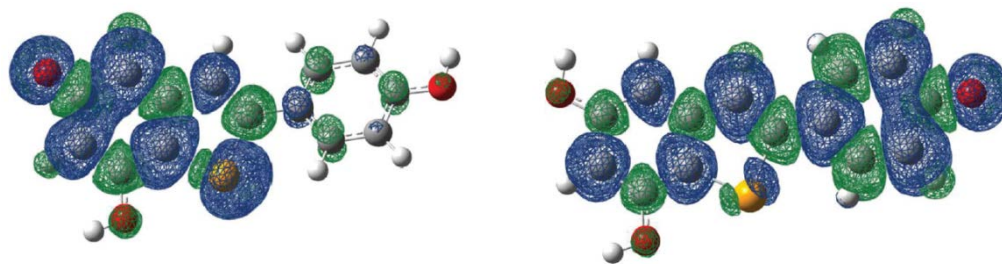
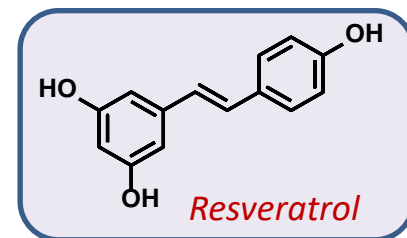
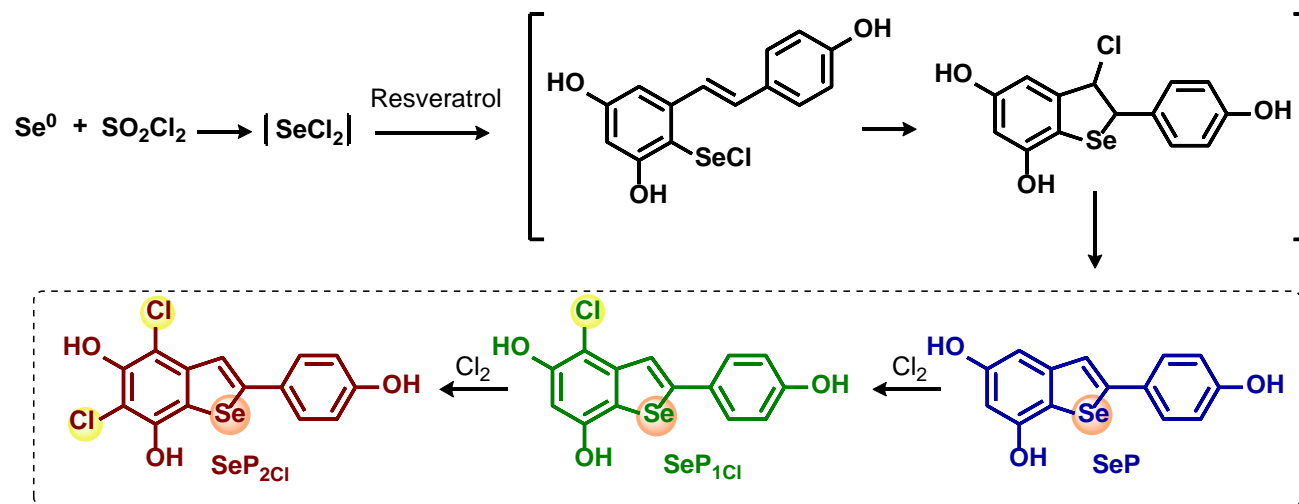


Selenium-containing building blocks



Chem Commun, **2006**, 4881; *Het. Chem.*, **2014**, 25, 678-683; *Eur. J. Org. Chem.*, **2015**, 357-369; *Bioorg. Med. Chem.*, **2017**, 25, 2518-2523; *Adv. Synth. Catal.*, **2018**, 360, 3367-3375; *New J. Chem.*, **2019**, 43, 11451-11468; *Adv. Synth. Catal.*, **2021**, 363, 5360-5385

Synthesis of benzoselenophenes from resveratrol

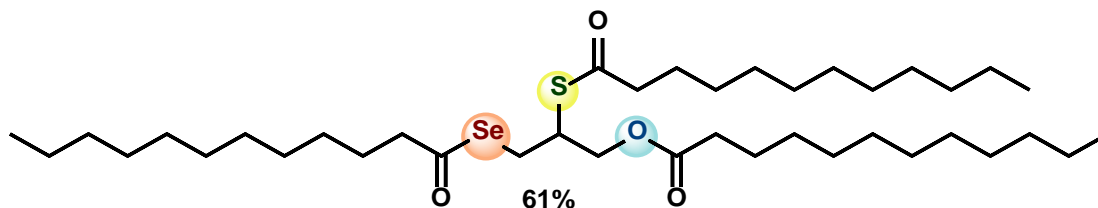
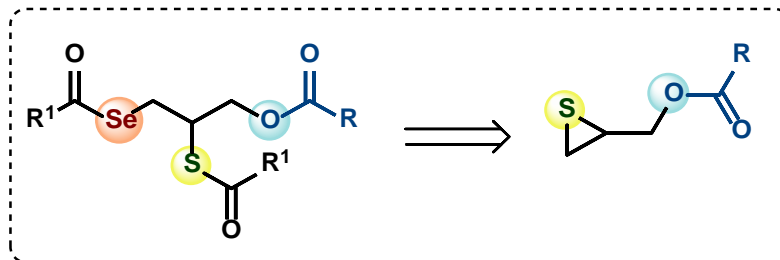
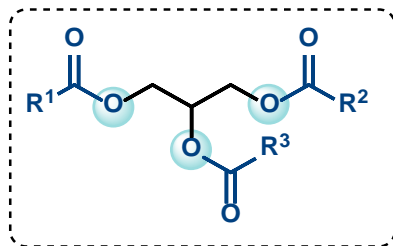


New antioxidant hybrids:

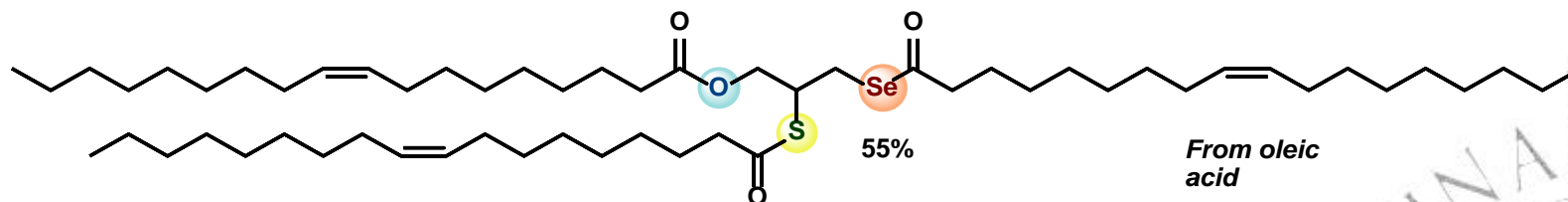
- 'Flat' materials
- Functionalisable systems
- Protection of materials

Org. Biol. Chem. **2015**, 13, 5757–5764

Synthesis of selenated and sulfurated analogues of triacyl glycerols

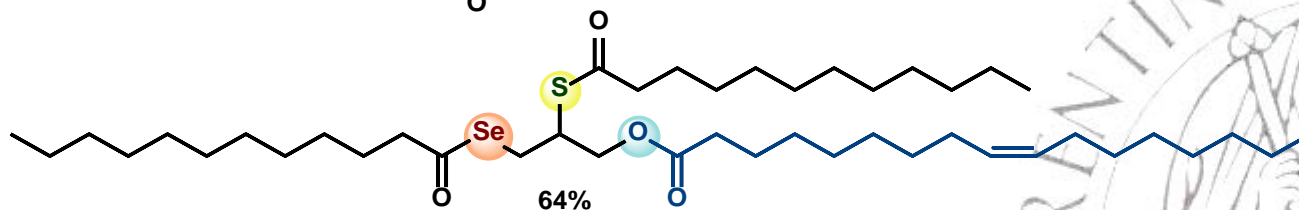


From lauric acid



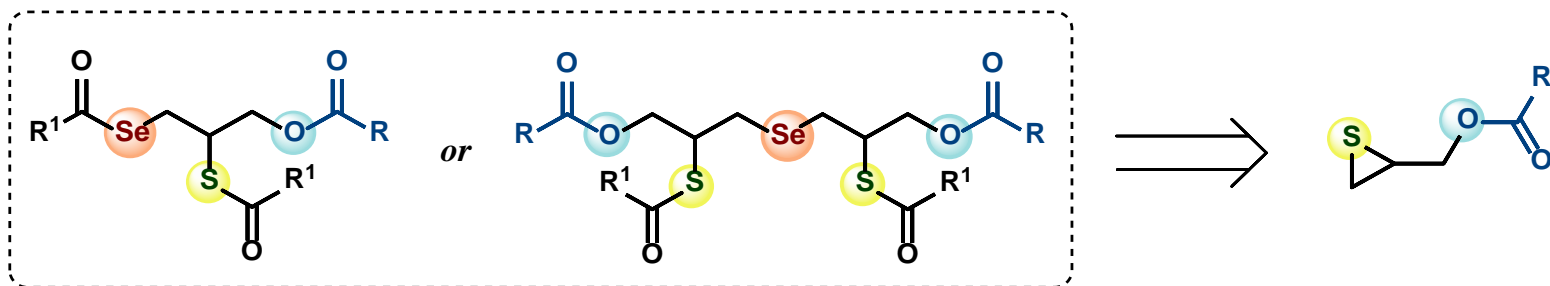
From oleic acid

From lauric and oleic acids

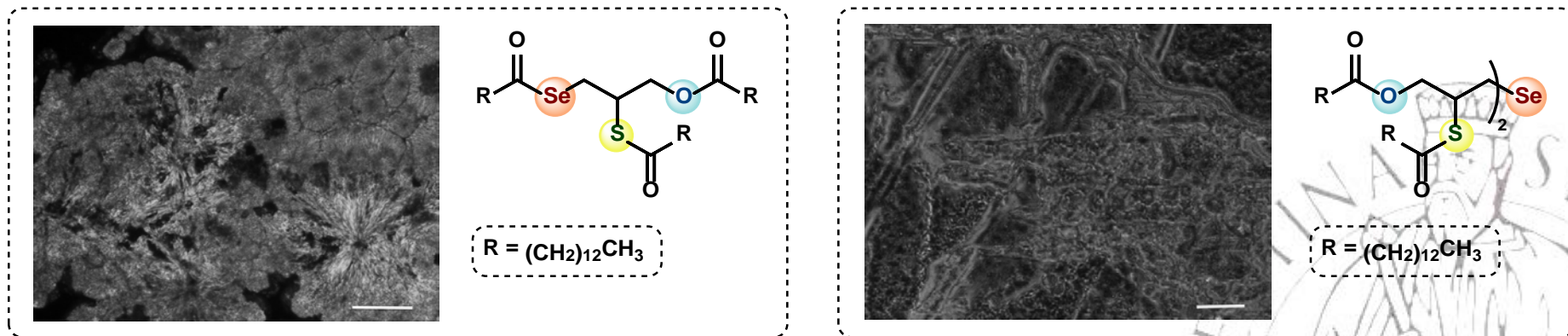


Chem. Eur. J., 2020, 26, 2719-2725

Synthesis of selenated and sulfated analogues of triacyl glycerols

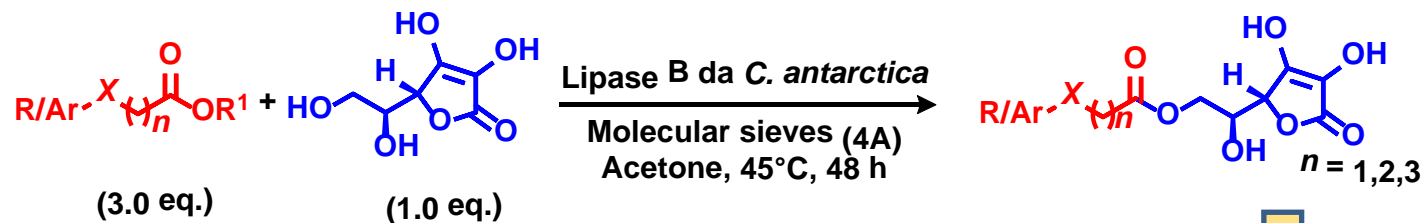


Polarized optical microscopy studies



Chem. Eur. J., **2020**, 26, 2719-2725

Synthesis of chalcogen-containing L-ascorbic acid derivatives



$X = \text{S, Se, Te}$

Powerful water-soluble antioxidant

Catalytic antioxidant properties of Chalcogens

New antioxidant hybrids:

- New materials;
- Enhanced antiox. Activity;
- Protection of materials;
- New adhesive, sealants, coatings...?
- New physicochemical properties;
- Film, nanostructures...

Chem. Commun., 2019, 42, 6077-6083



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