

SUPPLEMENTARY MATERIAL

***Interdonato* lemon from Nizza di Sicilia (Italy): chemical composition of hexane extract of lemon peel and histochemical investigation.**

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Abstract:

Considering that the determination of authenticity and of the geographical origin of food is a very challenging issue, in the present paper we studied by means of histological and histochemical analyses the famous Sicilian lemon known as “*Interdonato* Lemon of Messina PGI”. Since the PGI *Interdonato* lemon of Messina possesses high organoleptic properties, the composition of the hexane extract of lemon peel was determined by HRGC and HRGC-MS analyses and compared with that of lemon of different cultivars. The results obtained are informative of the oils quality and explain the variation of the lemon essential oil composition. Given the fundamental economic implications of any fraud, the aim of this study was to determine a fingerprint able to evaluate the authentication of the geographic origin in such way to prevent frauds in national and international market.

Keywords: lemon citrus, HRGC-MS, essential oil, food science, histochemical analyses.

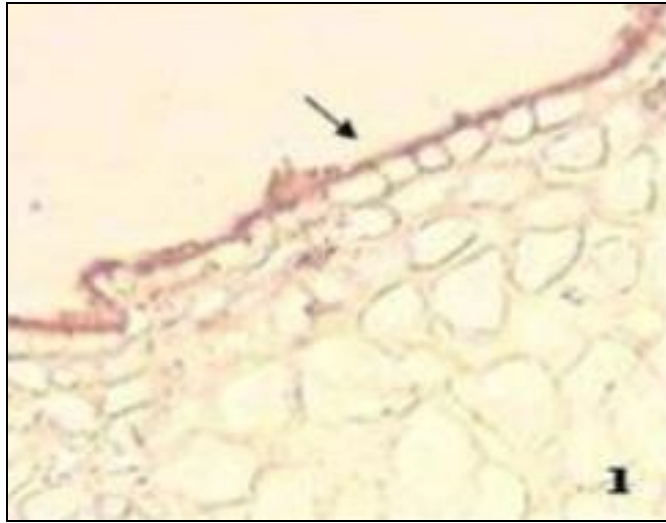


Figure S1.1. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected with cryostat. Yellow lemon, cuticle highlighted by Sudan IV (→), 40x.

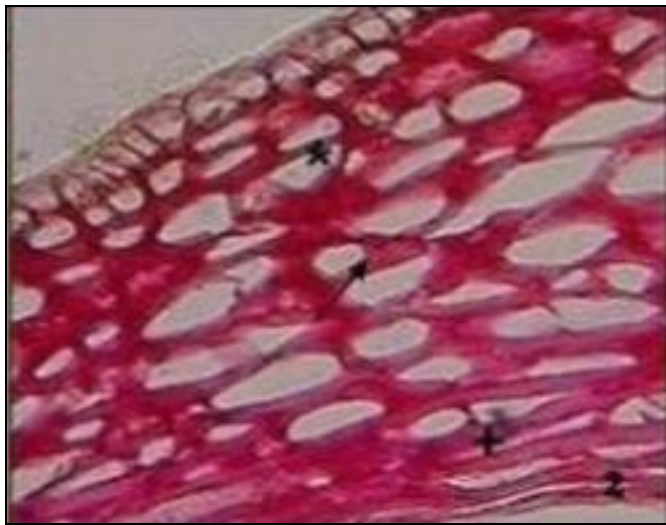


Figure S1.2. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected with cryostat. Green lemon, collenchyma (*) and parenchyma (→), glandular epithelium (+), pectic walls, positive to Red Ruthenium, 40x

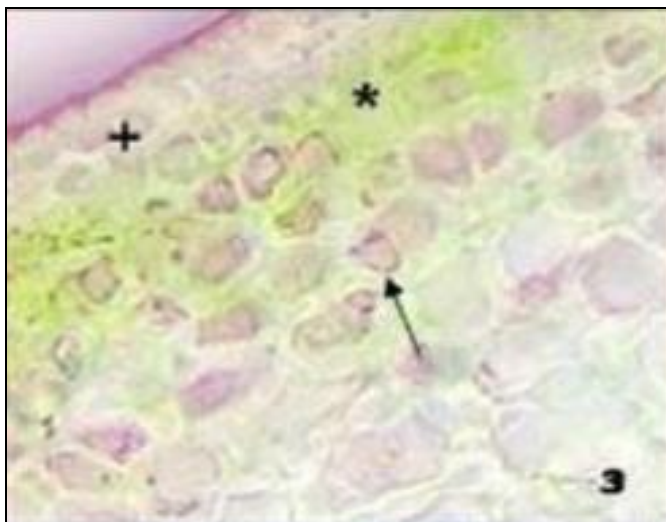


Figure S1.3. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected manually. Flavedo, terpenes highlighted by Schiff's reagent, chlorophyllian collenchyma (+) and parenchyma (*), 40x.

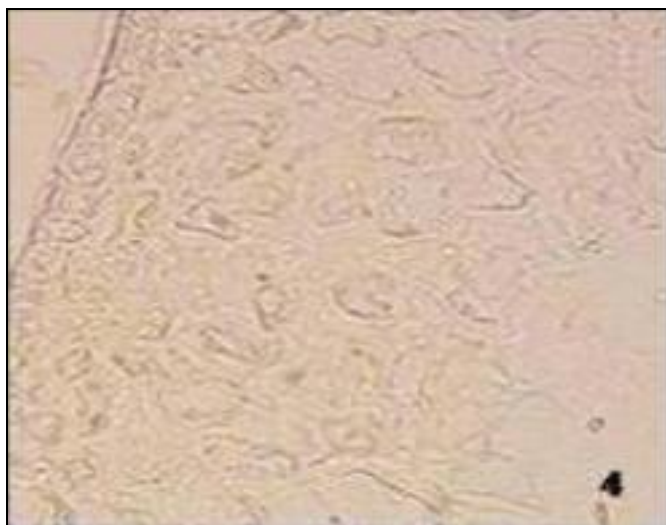


Figure S1.4. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected manually. Check to the Schiff's reagent, 40x.

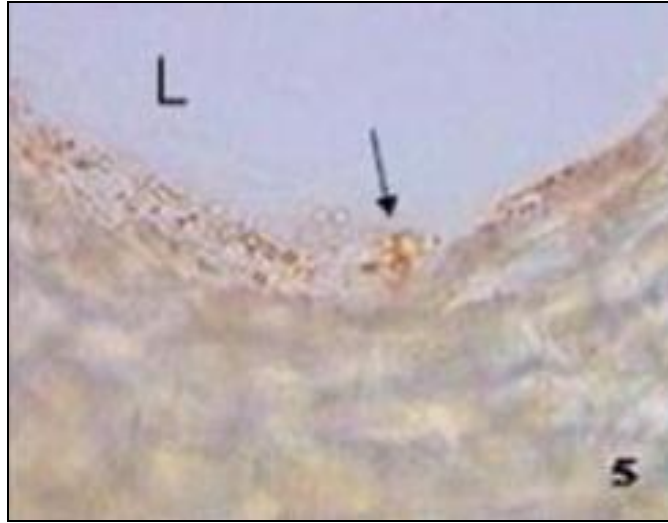


Figure S1.5. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected manually. Gland with innates positive to Sudan III, (→) glandular lumen (L). 40x.

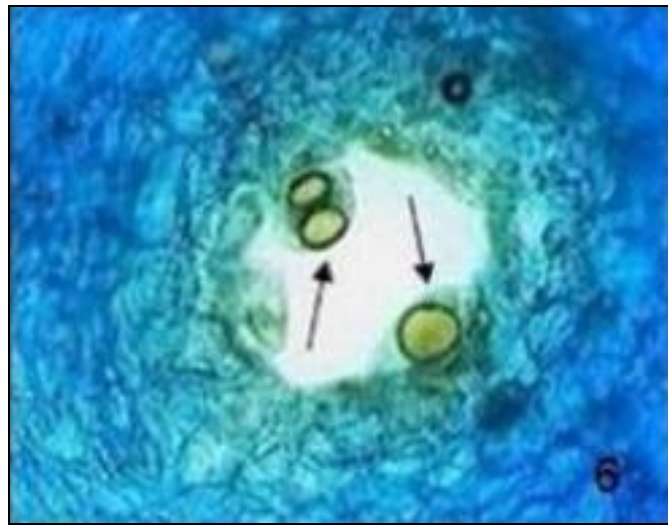


Figure S1.6. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected manually. Glandular lumen with lipidic innates, highlighted by Blue Nile (→), 40x.

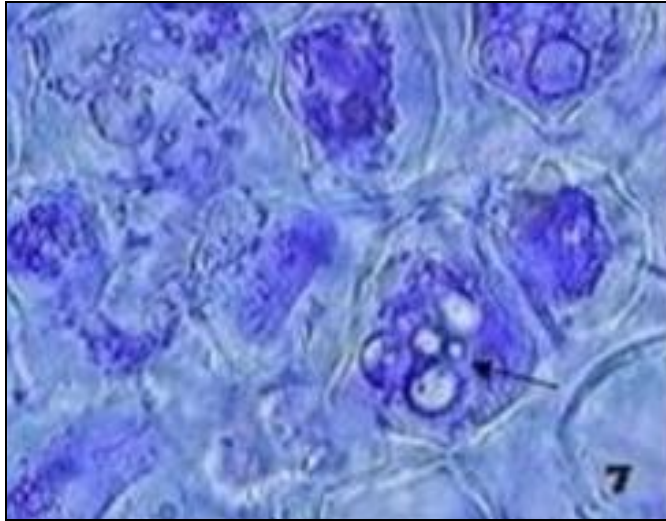


Figure S1.7. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected manually. Cells detected in various stages of differentiation with cytoplasmic inclusions (→) highlighted by Toluidine Blue, 40x.

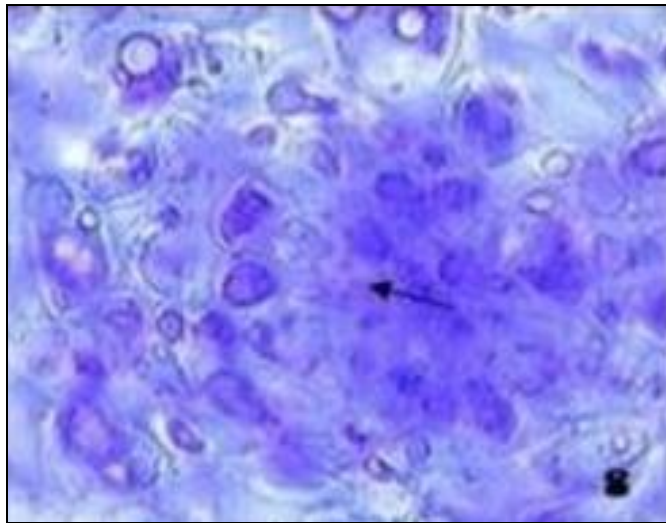


Figure S1.8. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected manually. Cells detected in various stages of differentiation with cytoplasmic inclusions (→) highlighted by Toluidine Blue, 40x.

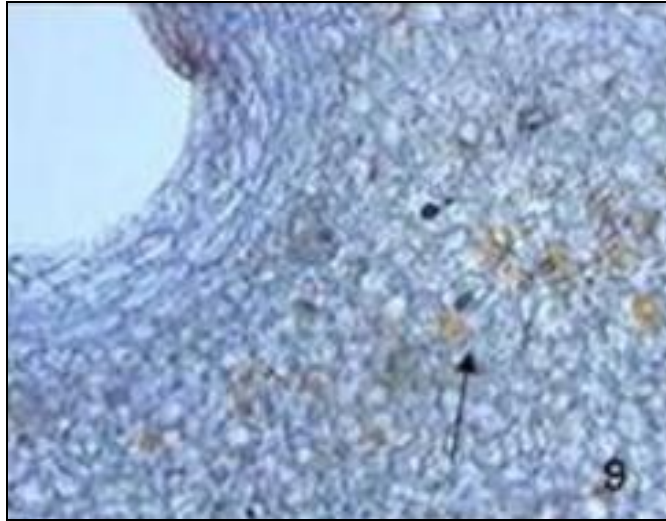


Figure S1.9. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv.* Interdonato: sample dissected manually. Flavedo, gland, parenchyma with oils, highlighted by Sudan III e IV (→), 10x.

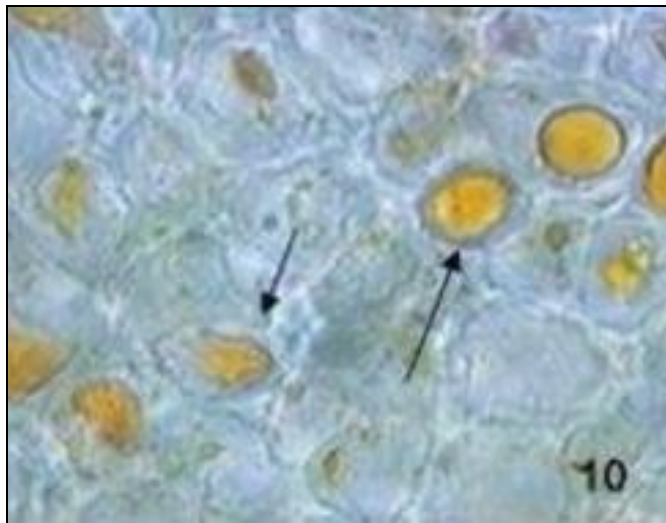


Figure S1.10. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv.* Interdonato: sample dissected manually. Detail of fig 1.9, lipids (→), 40x.

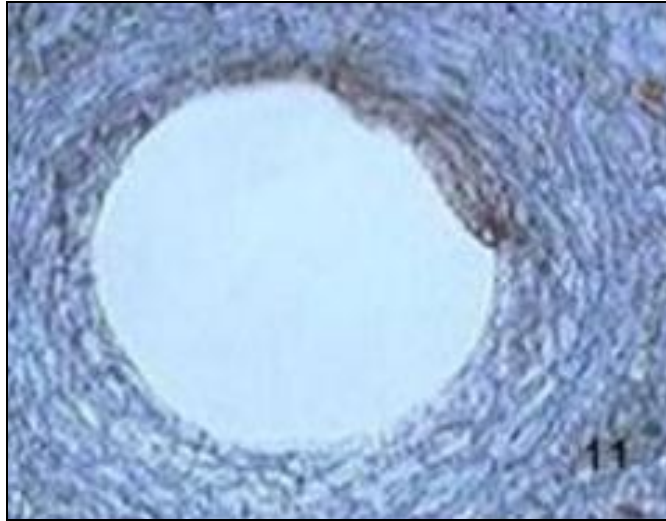


Figure S1.11. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv.* Interdonato: sample dissected manually. Gland, 10x.

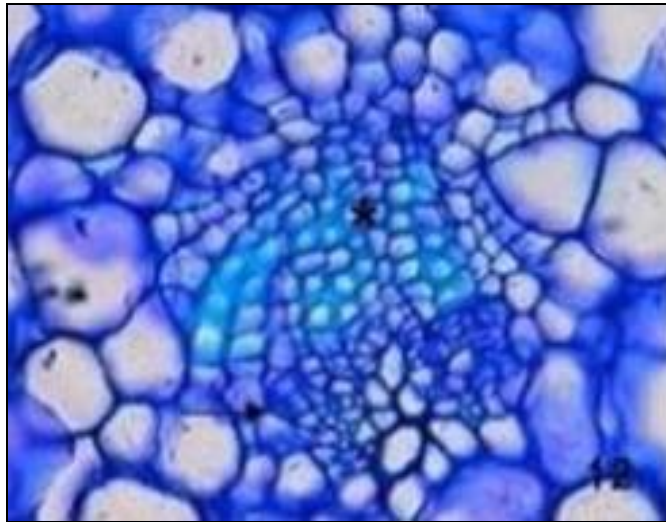


Figure S1.12. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv.* Interdonato: sample dissected in paraffin. Stainer Toluidine Blue. Vascular (*) and phloem elements (→), 40x.

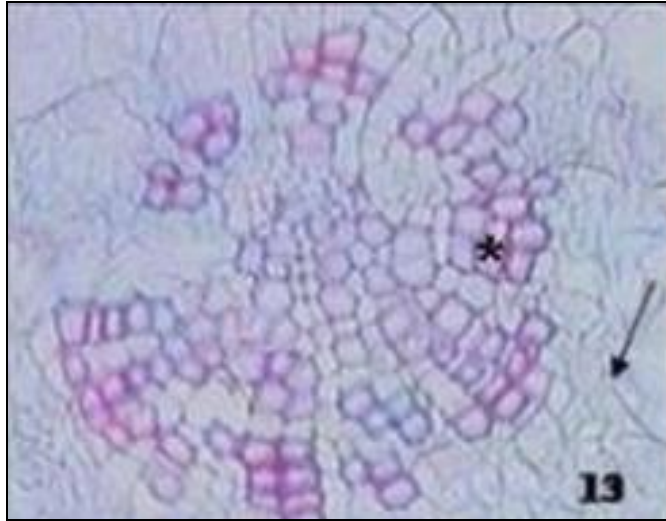


Figure S1.13. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected in paraffin. Stainer Safranin and Fast-Green. Vascular (*) and phloem elements (→), 40x.

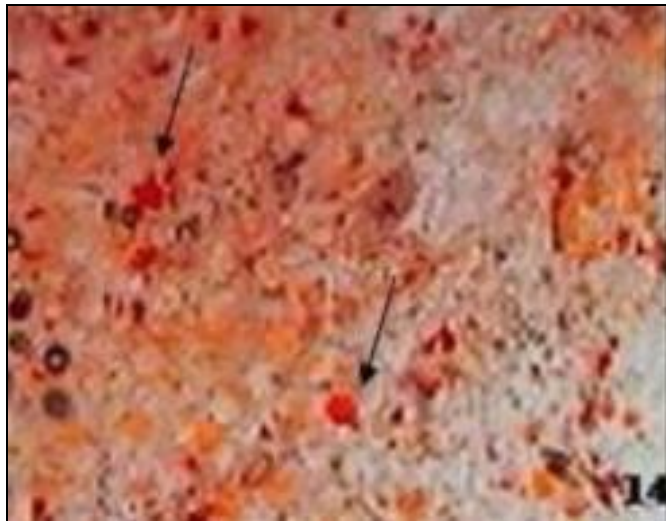


Figure S1.14. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv. Interdonato*: sample dissected manually. Yellow lemon. Parenchyma with essential oils, Nadi's test (→), 10x.

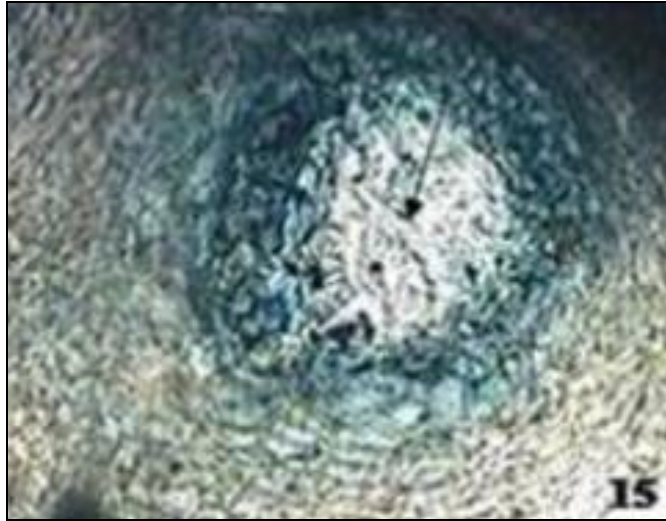


Figure S1.15. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv.* Interdonato: sample dissected manually. Gland with lipidic innates (→). Stainer Sudan Black B, 40x.

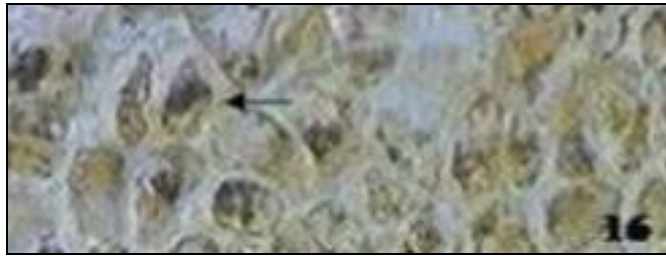


Figure S1.16. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv.* Interdonato: sample dissected manually. Green lemon. Starch. (→). Stainer Lugol, 40x.

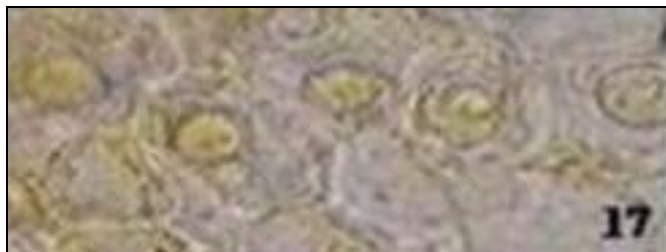


Figure S1.17. Histochemical characterization of epicarp and mesocarp of *Citrus lemon L. cv.* Interdonato: sample dissected manually. Parenchymal cells with innates (→), check, 40x.



Figure S2. Production areas of “*Limone Interdonato PGI Messina Jonica*”: