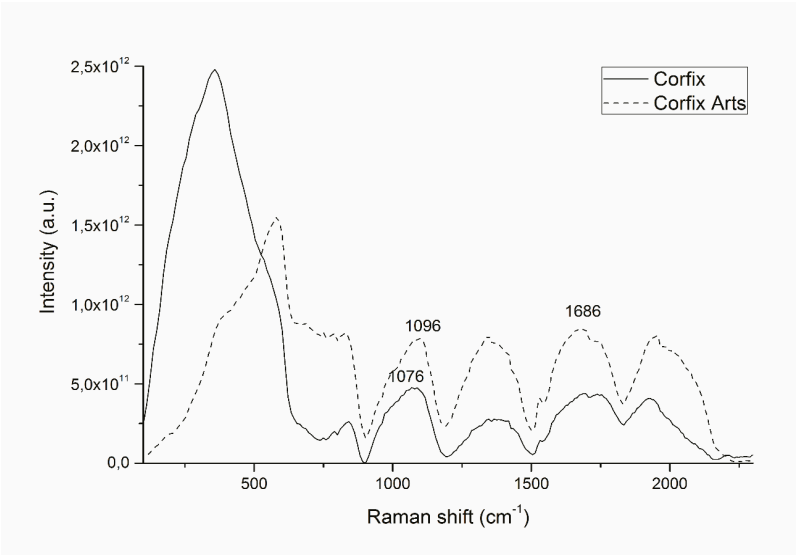

Fig. 3. Raman spectra of phthalo blue (BPc) Corfix and Corfix Arts (BRA)

The binding media present in phthalo acrylic paints are confirmed by Py-GC/MS technique. Figures 4 and 5 present the chromatogram of phthalo blue (BPc) and Prussian blue (BPr) samples. Peaks for PS are indicated by presence of styrene (S), alpha-methylstyrene (αS), styrene dimer (SS and D2) and trimer (SSS). Peaks for P(S/MA) are confirmed by methacrylate (M), styrene (S), a hybrid dimer (SM') and trimer (SSM and SMS). Chromatogram of P(S/MMA) differs mainly for the MMA monomer identification at 5 min in Winsor & Newton BPr sample. Characteristic peaks of P(nBA/MMA) sample are described elsewhere [1].

1

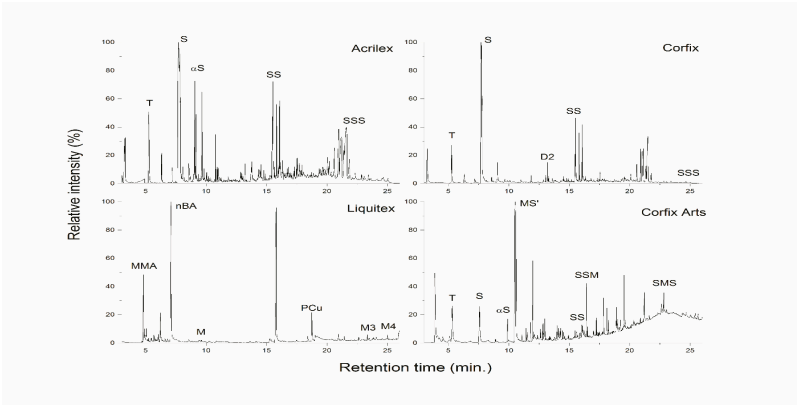

Fig. 4. Py-GC/MS spectra of phthalo blue (BPc) paints: Acrilex, Corfix, Corfix Arts (BRA) and Liquitex (USA)

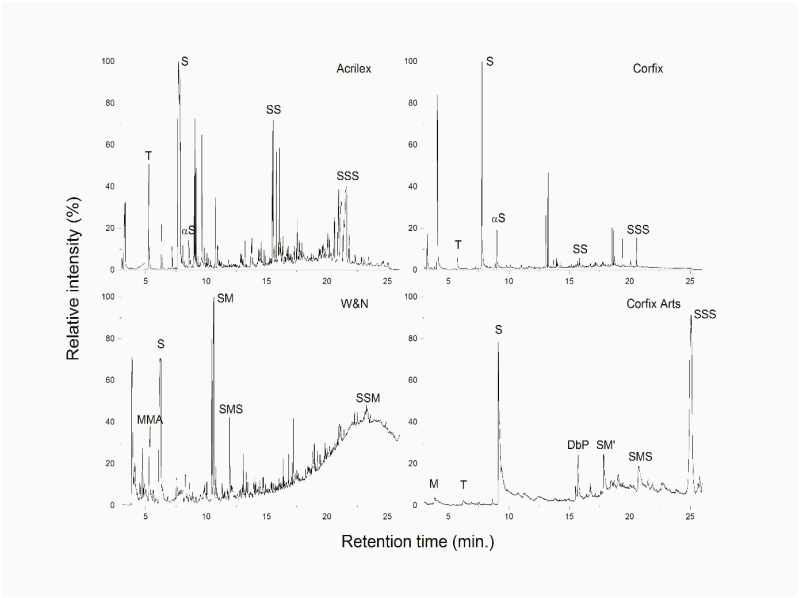

Fig. 5. Py-GC/MS spectra of Prussian blue (BPr) paints: Acrilex, Corfix, Corfix Arts (BRA)
and Winsor & Newton (GBR)

Pigments and extenders

Figures 6 and 7 present SEM images (micrographs) of BPc and BPr samples, respectively. Results indicate that Corfix Arts is the only to resemble the composition of imported materials. Images of samples Acrilex and Corfix, for both paints, BPc and BPr, present lower ratio of particles either pigments or extenders.dfwrhfkslafkkhanyakras

dengan demi

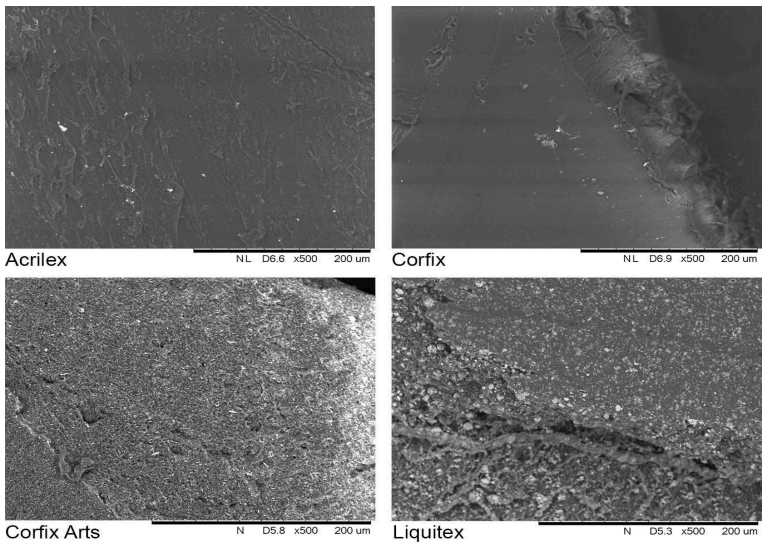

Fig. 6. Micrographs (200µm) of phthalo blue (BPc) paints: Acrilex, Corfix, Corfix Arts (BRA) and Liquitex (USA)

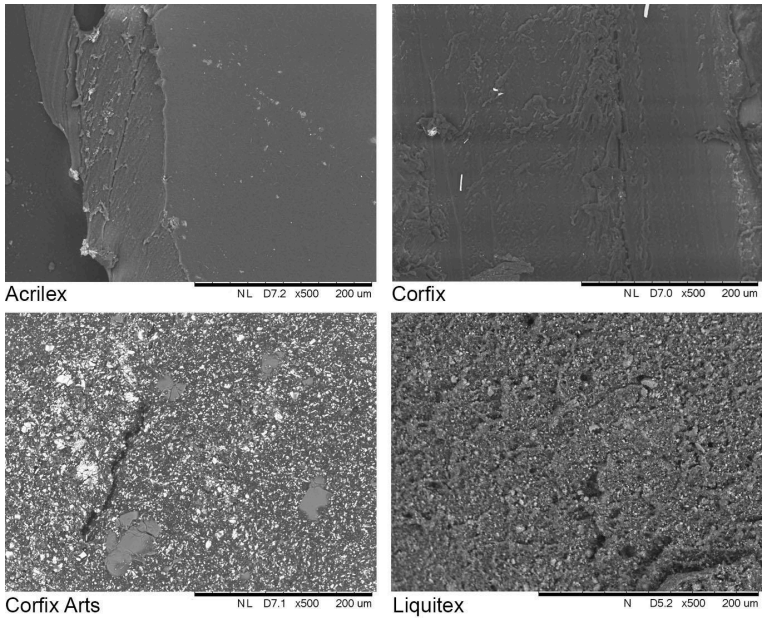

Fig. 7. Micrographs (200µm) of Prussian blue (BPr) paints: Acrilex, Corfix, Corfix Arts (BRA) and Winsor & Newton (GBR)

Phthalocyanine blue ($C_{32}H_{16}CuN_8$) is indicated by EDS (Table 1) by presence of copper in all four BPc samples. Prussian blue ($C_{18}Fe_7N_{18}$) is detected in BPr samples Acrilex, Corfix Arts and Winsor & Newton. Sample Corfix of Prussian blue is

composed of copper. Phthalocyanine blue pigment is also detected by Py-GC/MS in Liquitex sample (Fig. 4).

EDS elemental analysis (Table 1, Figs. 8 and 9) indicate that all samples present kaolinite ($Al_2Si_2O_5(OH)_4$) as filler, except for sample Bpr Acrilex, which contains talc ($Mg_3Si_4O_{10}(OH)_2$). FTIR analyses indicate the presence of these fillers with peaks at 1039cm^{-1} (νSi-O), 3750-3500cm^{-1} (νO-H) and 789-754cm^{-1} (νAl-Si-O).

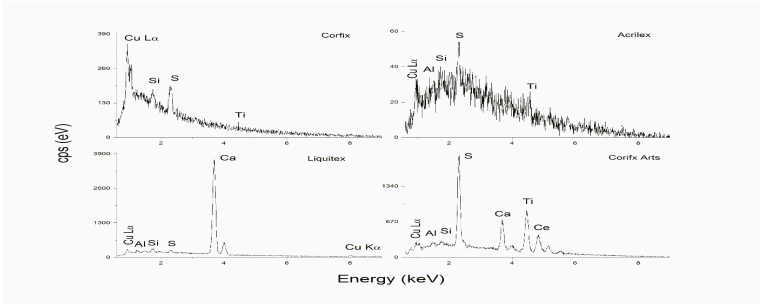

Fig. 8. EDS spectra of phthalo blue (BPc) paints: Acrilex Corfix, Corfix Arts (BRA) and Liquitex (USA)

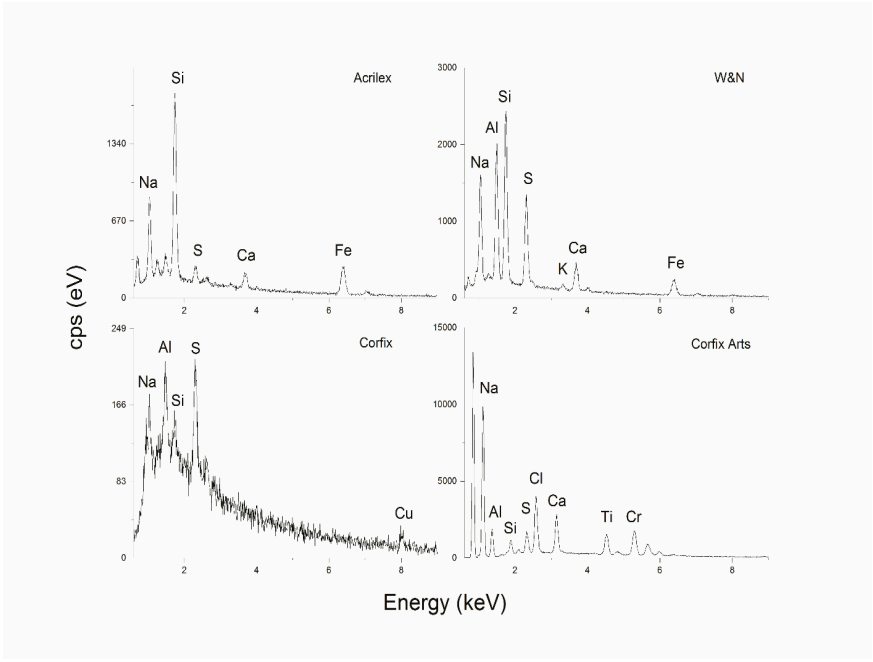

Fig. 9. EDS spectra of Prussian blue (BPr) paints: Acrilex Corfix, Corfix Arts (BRA) and Winsor & Newton (GBR)

Corfix Arts samples of both BPc and BPr paint present TiO_2 and cerium (Ce). Titanium dioxide is often used to moderate hue and saturation. Rare earth metals,

especially Ce, are known to enhance paint properties such as light fastness, chemical resistance and drying time [14].

IV. CONCLUSION

Chemical composition of artist paints commercialized in Brazil varies greatly. Therefore, a multi-component characterization requires multi-technique analyses. Advantages of each technique (FTIR, Raman, Py-GC/MS and SEM-EDS) were pointed out to present a broader knowledge of the paints used by Brazilian contemporary artists.

FTIR and Raman are, complimentary, able to rapidly identify the main binders, while Py-GC/MS provides further information of copolymers, even in minor concentration levels. SEM-EDS successfully identifies pigments and extenders.

Brazilian paints of *student* grade are composed of PS binding media and low pigment ratio, whereas the *professional* grade paint is composed of P(S/MA) binding media, higher pigment ratio and extenders such as TiO_2 and Ce.

Conservation concerns over the ageing processes of these paints will be addressed in future studies.

In conclusion, this initial study provides conservators, artists and conservation scientists information on the composition of artist paints manufactured in Brazil.

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