

# JunFunori® and Water Based Media: A Comparative Investigation into Media Used to Inpaint Matte Surfaces

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## INTRODUCTION

### OUTLINE

- In inpainting acrylic matte surfaces, very few media give a satisfactory matching sheen, while still allowing for reversibility without damaging the original paint.
- Media used now include watercolour and Aquazol® 500.
- Some conservators have tried *funori*, a polysaccharide extracted from a seaweed (*Gloiopeltis furcata*).
- A purified form of *funori*, **JunFunori®**, has been developed by EMPA (Swiss Federal Laboratories for Materials Testing and Research) in collaboration with the Institute of Monument Conservation at the ETH Zurich and the Centre for Conservation of the Swiss National Museum.

### PURPOSE

- To compare the visual and chemical characteristics of **JunFunori®** with those of watercolour and Aquazol® 500, before and after accelerated aging.
- To estimate the potential of **JunFunori®** as an alternative medium for inpainting matte surfaces such as acrylics.

### SAMPLE CHARACTERISTICS

#### Water-soluble media:

##### JunFunori®

- Appearance of matte paint preserved when consolidating, with high stability

##### Aquazol® 500

- Excellent matteness
- Stability over time

##### Watercolours

- Excellent matteness
- Widely used as inpainting medium

##### Acrylic

- Matte surfaces difficult to match
- Solvent sensitive surfaces



JunFunori®

## EXPERIMENTAL

### SAMPLES PREPARATION

#### Samples

- 1% w/v in water **JunFunori®** with and without pigments (15% w/v)
- 17% w/v in water Aquazol® 500 with and without pigments (15% w/v)
- Watercolours from the tube
- Acrylics from the tube

#### Pigments

- Titanium white
- Ivory black
- French ultramarine
- Cadmium orange

#### Application

- Paint strips cast on glass slides in depression created by a perimeter of two layers of electrical tape.
- Scraper blade used to ensure uniform application.

#### Number of samples

- Three replicates of media with pigment and three replicates of media without pigment.



### ACCELERATED AGING

#### LIGHT AGING

Q-Sun Xenon Test Chamber (Q-Panel Lab Products)

- Air-cooled xenon arc lamp
- Window Q inner filter
- Irradiance: 1.1 Wm<sup>-2</sup> at 420 nm
- Black Panel Temperature: 63°C



Q-Sun Xenon Test Chamber

#### RELATIVE HUMIDITY AGING

Despatch Oven (LEA Series)

- 50% RH
- Temperature: 44°C



Despatch Oven (LEA Series)

## TEST METHOD AND PROCEDURE

### OPTICAL PROPERTIES AND EQUIPEMENT

- **Visual examination** : Incident light, Raking light
- **Colourimetric measurements** : Tristimulus Minolta Chroma Meter CR-300
- **Gloss measurements** : BYK Gardner GmbH Gloss Meter Micro-TRI-gloss

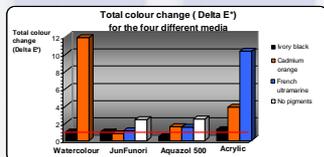
### CHEMICAL PROPERTIES AND EQUIPEMENT

- **Infrared spectra** : Nicolet Avatar 320 FTIR with Golden Gate Accessory
- **Reversibility** : Re-solubilisation test with distilled water

## RESULTS AND CONCLUSIONS

### COLOUR

- After aging, **JunFunori®** with pigments did not show any visible colour change.
- **JunFunori®** with no pigments, however, slightly yellowed over time.
- **JunFunori®** with pigments, in comparison to equivalent samples of watercolour, Aquazol® 500 and acrylic, was colour stable over time.



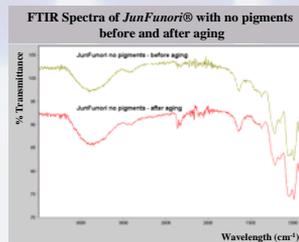
— A change in colour is visible when the difference is of 1.0

### SURFACE TEXTURE

- Before and after aging, **JunFunori®** was characterized by a matte and opaque film.
- Titanium white and cadmium orange, however, were difficult to wet and, therefore, the surface of **JunFunori®** with these pigments was neither smooth nor uniform.

### CHEMICAL STABILITY

- After aging, **JunFunori®** showed no chemical change.
- No significant changes or additional absorption bands after accelerated aging were recorded on the spectra.

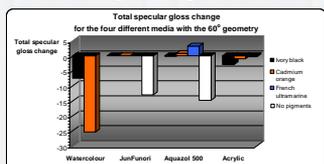


### REVERSIBILITY

- After aging, **JunFunori®** was easily reversible with distilled water.
- Only two double rubs were needed to re-solubilise **JunFunori®**, while Aquazol® 500 needed six double rubs and watercolour needed 15.

### GLOSS

- After aging, **JunFunori®** with pigments did not show any change in gloss.
- **JunFunori®** with no pigments, however, showed a visible decrease in gloss.
- **JunFunori®** with pigments, in comparison to equivalent samples of watercolour, Aquazol® 500 and acrylic, was gloss stable over time.



An increase in gloss is represented by a positive value, while a decrease in gloss is represented by a negative value

## CONCLUSION

After these different tests were carried out, **JunFunori®** appeared to have a great potential as an alternative medium for inpainting matte surfaces such as acrylics. **JunFunori®** showed good stability under these specific conditions, thereby offering new possibilities to conservators. **JunFunori®** with pigments in comparison to equivalent samples of watercolour, Aquazol® 500 and acrylic is very colour and gloss stable over time. **JunFunori®** can provide a very matte and opaque film that is easily reversible with distilled water; however, **JunFunori®** has difficulties wetting some pigments. Further studies should be conducted to get more specific knowledge on the use of white pigments such as titanium white and zinc white with **JunFunori®**.

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