Description

High-quality figures raise a manuscript's chance of clear communication and timely publication; conversely, poor artwork is a frequent cause of resubmission requests and production delays. Journals routinely ask for higher-resolution replacements or different file types during production, and many publishers set minimum resolution and format rules to ensure reproducible print and online output.

This article explains:

- What each common file format (JPG, TIFF, EPS, PNG) is best used for
- How resolution and compression affect image quality
- Practical steps authors can follow to prepare submission-ready figures

Why Format Choice Matters

Image formats differ along two key dimensions:

1. Vector vs. raster
2. Lossy vs. lossless compression

Vector formats (e.g., EPS, PDF, SVG) store images as mathematical descriptions and scale without loss of quality. Raster formats (e.g., TIFF, JPG, PNG) store images as pixels and depend on resolution and dots per inch (dpi) at final print size.

Publishers convert submitted figures into production-ready PDFs and printing color spaces. Choosing the wrong format or compression level increases the risk of blurred labels, jagged lines, and replacement requests during production.

Key Concepts: Vector vs. Raster, Color Spaces, DPI, Compression

- **Vector images**
  Store shapes, lines, and fonts mathematically; resolution independent and ideal for charts, schematics, and chemical structures. Save as EPS or PDF with fonts embedded or text

converted to paths.
- **Raster images**
Store pixels; quality depends on pixel dimensions and dpi at final print size. Always verify dpi at the final output size.
- **Color spaces**
Most journals request RGB or grayscale at submission and convert to CMYK for print. PNG does not support CMYK natively, which can limit print workflows.
- **Compression**
Lossless compression (TIFF with LZW/ZIP, PNG) preserves all data. Lossy compression (JPEG) discards data and can damage fine lines and text.

When to Use TIFF

TIFF is the preferred standard for high-quality raster figures in scholarly publishing.

Use TIFF for:

- Photographs (micrographs, gels)
- Images with complex tonal variation

Best practices:

- Save uncompressed or with lossless LZW or ZIP compression
- Ensure required dpi at final print size
- Check that annotations and labels remain sharp

Many journals explicitly request TIFF for halftone and combination artwork.

When to Use JPG (JPEG)

JPEG is optimized for continuous-tone photographs and produces smaller file sizes.

Use JPEG:

- Only for photographic images where minor artifacts are acceptable

Avoid JPEG for:

- Graphs
- Line drawings
- Images containing text or sharp edges

If using JPEG:

- Save at the highest quality setting
- Avoid repeated open–save cycles
- Keep an uncompressed TIFF or raw original as backup

When to Use EPS (and Other Vector Formats)

EPS (and increasingly PDF or SVG) is ideal for:

- Diagrams
- Charts
- Maps
- Line illustrations

Advantages:

- Scales without quality loss
- Resolution independent for vector elements

Key requirements:

- Embed or outline fonts
- Ensure any embedded raster images meet dpi requirements
- Retain editable source files (.ai, .cdr, ChemDraw)

Many publishers now prefer PDF for submission, but EPS remains widely accepted.

When to Use PNG

PNG is a lossless raster format commonly used for:

- Web figures
- Screenshots
- Graphics requiring transparency

Advantages:

- Preserves sharp edges better than JPEG
- Lossless compression

Limitations:

- RGB-only (no native CMYK support)
- Not always ideal for print-focused submissions

For print:

- Prefer TIFF for raster images
- Prefer EPS/PDF for vector images

Resolution Guidelines: What Journals Typically Require

Publisher-backed baseline requirements:

- Color and grayscale photographs (halftones): ?300 dpi
- Combination artwork: 600–900 dpi
- Line art and monochrome figures: 1,000–1,200 dpi

Always create figures at final print size and verify dpi using:

pixels = inches × dpi

Upscaling low-resolution images cannot restore lost detail.

Compression and File-Size Considerations

- Use lossless compression for TIFF (LZW or ZIP)
- Use PNG for lossless web images
- Use JPEG only when necessary and at maximum quality
- Avoid repeated JPEG saves
- Follow journal file-size limits when specified

Practical Export and Submission Tips

- Create figures at final print size; downscaling preserves quality better than upscaling
- Retain editable originals (Illustrator, PowerPoint, ChemDraw, raw instrument files)
- Embed fonts or convert text to outlines in vector files
- Flatten layers and save high-resolution TIFFs for raster images
- Use standard fonts (Arial, Helvetica, Times New Roman) and ensure readability
- Upload figures as separate files unless instructed otherwise

Common Mistakes and How to Avoid Them

Common issues include:

- Submitting screen-resolution images (72–96 ppi)
- Saving charts as JPEGs
- Inconsistent resolution across multi-panel figures

Prevention tips:

- Check figures at 100% of final size
- Follow journal author guidelines
- Use clear file naming (e.g., Fig1_TIFF.tif)
- Place captions in the manuscript file unless instructed otherwise

Action Checklist Before Submission

- Confirm journal-specific format and dpi requirements
- Save vectors as EPS or PDF with embedded fonts
- Save raster images as TIFF with lossless compression
- Retain original source files and edit history
- Verify legibility, line thickness, and color accessibility

Conclusion

Choosing the appropriate format—vector (EPS/PDF) for diagrams and raster (TIFF for print photos, PNG for lossless web images, JPEG only when file size is critical)—and ensuring correct dpi and compression significantly reduces production delays.

Authors who follow publisher guidance, retain source files, and check figures at final size minimize resubmission risk. For hands-on assistance, professional artwork-editing or publication-support services can help ensure figures meet journal specifications. Enago's Artwork Editing and Publication Support services assist with dpi checks, color space conversion, font embedding, and submission-ready formatting.

Category

1. Reporting Research

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