

# Jungbunzlauer

*From nature to ingredients®*



## CITROFOL®

The bio-based solution for polymers

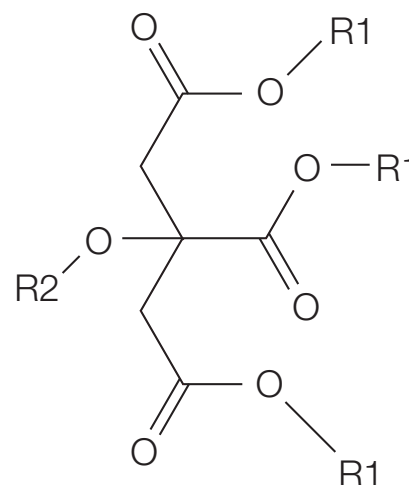
# CITROFOL®

## *The bio-based solution for polymers*

**CITROFOL® is the globally well-known brand for citrate esters produced by Jungbunzlauer. Worldwide, Jungbunzlauer is the largest producer of citric acid and citrate esters. Product innovation and continuous process improvements in our state-of-the-art plants result in unique high quality products.**

Citrate esters are biodegradable as well as compostable and exhibit an excellent toxicological and eco-toxicological profile. They are also versatile and have very good compatibility with numerous polymers and other plasticisers. They are particularly characterised by a high solvating and plasticising efficiency. Fast fusing, low migration and low volatility options are available according to technical requirements.

CITROFOL® esters are REACH registered and provide safe and environmentally friendly solutions. Therefore they are ideal for use in sensitive products like medical devices, food packaging or toys. Constantly advanced competitiveness to common plasticisers resulted in growing use in technical applications. Some of these applications include textile coatings, flooring, wall paper and artificial leather. Various polymeric systems, including PVC, cellulose derivatives as well as acrylics, polyurethanes, polyvinyl acetates, polylactic acids, polyhydroxy alkanoates and polyvinyl butyrals can be processed with CITROFOL®.



Brand	Chemical name	R1	R2	Synonym
CITROFOL® BI	Tributyl Citrate	Butyl	H	TBC
CITROFOL® BII	Tributyl O-acetylcitrate	Butyl	Acetyl	ATBC
CITROFOL® AHII	Tris (2-ethylhexyl) O-acetylcitrate	2-Ethylhexyl	Acetyl	ATEHC

## Performance – based on renewable raw materials

Jungbunzlauer develops citrate esters to meet the specifications of individual customers. The CITROFOL® range comprises clear, colourless and odourless liquids that are free of suspended solids or foreign matter. All of our citrate esters have low toxicity and are classified as non volatile (non-VOCs).

### CITROFOL® BI

CITROFOL® BI (Tributyl Citrate) is a plasticiser with excellent fast-fusing behaviour which helps improve mechanical properties during short curing cycles or at reduced temperatures.

Frequently used in:

- Floor polish
- Coatings
- Adhesives
- Flooring

### CITROFOL® AHII

CITROFOL® AHII (Tris (2-ethylhexyl) O-acetylcitrate) is an outstanding plasticiser for technical applications, especially where minimal or non-fogging characteristics are desired with low migration.

Frequently used in:

- Artificial leather
- Flooring
- Cable
- Automotive
- Various technical applications

### CITROFOL® BII

Our most versatile ester is CITROFOL® BII (Tributyl O-acetylcitrate); it is used as a safe alternative to plasticisers under scrutiny for sensitive applications. As such, it is a suitable citrate ester for traditional polymeric products and the newer bio-based plastics.

#### **Compostable plasticiser for a regenerative future**

CITROFOL® BII has been tested according to ASTM D 6400 and DIN EN 13432 and as a result the compostability of this additive could be proven.

Frequently used in:

- Toys
- Food packaging
- Medical devices
- Sealant & closures
- Printing inks





## Expertise – talent for individual answers

### CITROFOL® Systems – customised solutions

There is a clear trend towards voluntary replacement of petrochemical standard plasticisers for safety and environmental reasons.

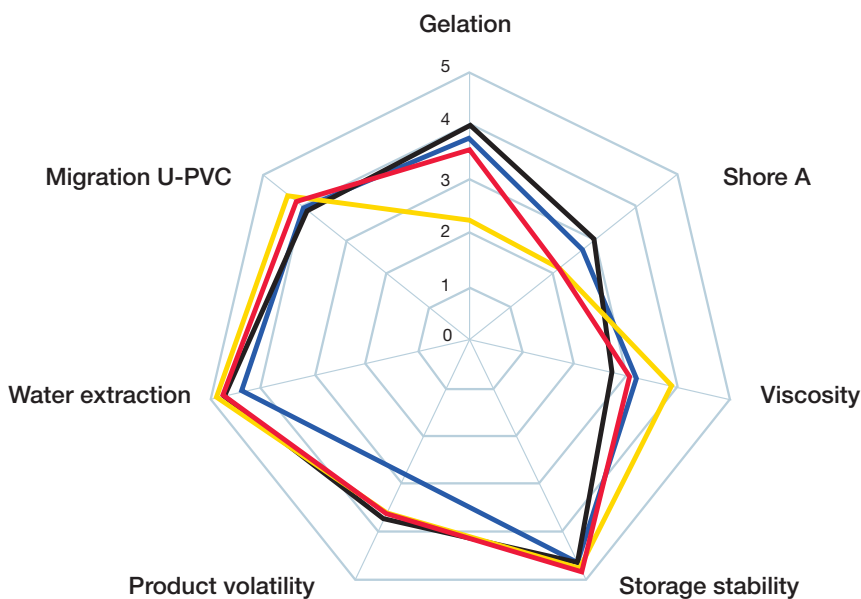
Jungbunzlauer has developed new citrate plasticiser systems with improved characteristics compared to single esters.

CITROFOL® Systems perfectly match the properties of petrochemical standard plasticisers and therefore can replace them without any compromise on processing or functionality of the end product.

The diagram below demonstrates, that CITROFOL® D100 delivers comparable

performance in the test formulation to standard or other non-phthalate plasticisers.

Our technical experts will assist all customers to select the CITROFOL® System which best suits their applications, processing and technical capabilities.



Component	Parts
S-PVC K-70	100
Plasticiser	50
CITROFOL® D100	
DINP	
DINCH	
DOTP	
Stabiliser Calcium-Zinc	2

- CITROFOL® D100
- DINP
- DINCH
- DOTP

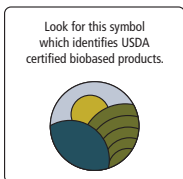
Scale 5 is the best / 1 is the worst

## Care – conscious about sustainability

Our environment and climate are endangered by pollution and the unbalanced use of resources. As the world population continues to grow, people are increasingly aware that we must work together to develop a social conscience and address these issues in order to use our resources appropriately. An important part of this belief is choosing business partners who support this vision.

Jungbunzlauer offers environmental, economic and social sustainability.

With the mission “From nature to ingredients®” the company commits itself to the security of man and the environment. Jungbunzlauer is a responsible and sustainable leader in naturally derived biodegradable ingredients. The USDA Certification of Jungbunzlauer products is important for all our customers seeking ingredients to formulate natural, bio-based products.



### Why to use CITROFOL®

CITROFOL® types offer diverse benefits as they are excellent primary bio-based plasticisers and reduce hardness of numerous polymers without influencing mechanical properties. They contribute the needed plasticity to the processing and improve the elasticity to the final product. Citrate esters are biodegradable within a short time without harming the soil, have risk assessment approvals and are classified as non-VOCs (volatile organic compounds). Additional possibilities for the application of CITROFOL® are as diluent, solvent or lubricant.



### More CITROFOL® products

In addition to the described CITROFOL® types in this brochure, Jungbunzlauer also manufactures ethyl ester varieties. These esters are mainly utilised in highly sensitive applications like food, flavour and fragrance, personal care and pharmaceutical.

Please contact Jungbunzlauer for more information.



# Jungbunzlauer Group

Jungbunzlauer is represented in all major markets. Our global network of sales companies and distributors covers more than 130 countries.

## North America

## Europe (incl. Russia, Africa and Middle East)



## Latin America

## Asia & Pacific

- SALES OFFICE
- PRODUCTION SITE

- PRODUCTION SITE / SALES OFFICE
- APPLICATION TECHNOLOGY CENTER

Jungbunzlauer is one of the world's leading producers of biodegradable ingredients of natural origin. The Swiss-based, international company's roots date back to 1867. Today, Jungbunzlauer specialises in citric acid, xanthan gum, gluconates, lactics, specialties, special salts and sweeteners for the food, beverage, pharmaceutical and cosmetic industry as well as for various other industrial applications.

Jungbunzlauer's products are manufactured utilising natural fermentation processes based on renewable raw materials.

All its products can be used, transported and disposed of in a secure and ecologically safe way. The Group operates manufacturing plants in Austria, Canada, France and Germany.

A worldwide network of sales companies and distributors with a thorough understanding of target markets and client requirements underlies Jungbunzlauer's strong market and customer focus. Committed to its rigorous quality standards, Jungbunzlauer guarantees for the excellence and sustainability of its products and services.

## Headquarters Jungbunzlauer Suisse AG

4002 Basel · Switzerland · Phone +41 61 295 51 00 · [headquarters@jungbunzlauer.com](mailto:headquarters@jungbunzlauer.com) · [www.jungbunzlauer.com](http://www.jungbunzlauer.com)

The information contained herein has been compiled carefully to the best of our knowledge. We do not accept any responsibility or liability for the information given in respect to described product. Our product has to be applied under full and own responsibility of the user, especially in respect to any patent rights of other and any law or government regulation.