

## BITTER FRACTION(S) IN PELLETS & ETHANOL EXTRACT (*TRE*<sup>NEW</sup>)

| TECHNICAL SUPPORT |

The commercial value of hops and hop products is particularly influenced by the content of  $\alpha$ -acids, the main source of the beer's bitter taste. In 2015 the additional contribution of hard resins was clearly demonstrated (1). It was shown that at least 20% of the hop derived beer bitter intensity was attributed to hard resins and about 75% to iso- $\alpha$  acids. The whole range of hard resin components is transferred into ethanol extract, therefore only this type of extract can be called "Total Resin Extract" (*TRE*).

To verify the practical impact of these findings, different hop products were tested in brewing trials (2). Single hopped lager beers were brewed in duplicate using either exclusively Pellets Type 90 (P90) or *TRE* at the begin of wort boiling. All hop products were made of Hallertau Taurus of the same crop year. The beers were evaluated by chemical and sensorial analysis.

The averaged analytical results of the beers are follows:

	P90	TRE
Bitter Units (BU)	19.5	17.8
Iso- $\alpha$ acids (mg/l)	18.9	18.3
$\alpha$ -acids (mg/l)	3.2	1.3
Original gravity (% w/w)	10.94	11.19
Alcohol (% vol.)	4.87	4.99
Final attenuation (%)	86.1	86.1
pH	4.52	4.68
Total polyphenols (mg/l)	118	98

The dosage of hop products was based on the same concentration of iso- $\alpha$  acids in beer and matched a very comparable level of bitterness, besides other typically measured parameters in beer.

The sensory evaluation was performed at two trained taste panels and both did not detect significant differences between the beers. The tasting was based on the so-called "Duo-Trio Test" (3). Additionally, the individual preference for each beer was asked, resulting in 60% of all tasters choosing the beer made with *TRE*.

This trial clearly demonstrated, that within the same variety pellets can be easily replaced by *TRE*. Both products contain the identical range of bitter substances (all soft and hard resins). **Going forward we decided to change the name of *Ethanol Extract* to *Total Resin Extract (TRE)***

Besides an excellent storage stability of 8 years, extracts generally offer the brewer reduced shipping and storage volumes, good yields and a very convenient handling.

(1) Dresel et al.. Sensomics Analysis of Key Bitter Compounds in the Hard Resin of Hops (*Humulus Lupulus* L.) and Their Contribution to the Bitter Profile of Pilsner-Type Beer. J. Agric. Food Chem.. 2015. 63. 3402 ff.

(2) Hopfen-Rundschau International 2016/2017 Dr. M. Biendl; S. Cocuzza; [https://www.hopsteiner.com/wp-content/uploads/2017/06/Hartharze\\_-\\_Hard\\_Resins\\_DE\\_EN\\_Dr.Biendl\\_S.Cocuzza\\_HRI\\_16\\_17\\_.pdf](https://www.hopsteiner.com/wp-content/uploads/2017/06/Hartharze_-_Hard_Resins_DE_EN_Dr.Biendl_S.Cocuzza_HRI_16_17_.pdf)

(3) MEBAK – Sensory Analysis; Method 3.1.2

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[Drinktec 2017](#)

Our booth at drinktec has become a popular meeting place of the International Brewing Industry. Again this year we will have information about new varieties, developments in variety breeding and the actual hop market. We also offer a multitude of new beers at our tasting booth and would be pleased to welcome you as our guest. This year's tasting is based on "Hop Performance 2017" and we are looking forward to your opinion.

Visit us at *drinktec, Hall B1 – Booth 129* and enjoy the "fascination of hops" with us.



  
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