



# VITAL NEW CZECH HOP VARIETY

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In 2008 new variety Vital was registered in Czech Republic. Its name is derived from high contents of biologically active compounds from the group of prenylated flavonoids – xanthohumol and desmethyloxanthohumol (DMX). Vital originated from hybrid progenies with majority proportion of Agnus cultivar. Genetically belongs to the group of high-alpha hops with Euroamerican origin. The crossing of parental components was realised in 1996. Selection from the file of seedlings was done on the basis of high contents of alpha and beta acids. Characteristic trait of Vital variety is a long vegetation period at the range of 135-143 days. Harvest maturity comes in the middle of September in climate conditions of Saaz growing region. The plant has sizable regular cylindrical shape. Fruit-bearing laterals are 65-75 cm long. The bine is of green colour. Its diameter on full-grown plant is 8-9 mm. Variety Vital was bred by Hop Research Institute CO., Ltd. in Žatec. Agrotechnical parameters were verified within the scope of research project FR-TI/012 with financial support of Czech Ministry of Industry and Trade.

## BASIC CHARACTERISTICS

Vital contains 12–16 % w. of alpha acids, cohumulone ratio is in the interval of 22–26 % rel. Contents of beta acids are in the range of 7–9 % hm and, colupulone ratio in the interval of 45–48 % rel. The smell of hops is pronounced spicy. Hop oils content is 1.5–2.5 % w. Majority component of hop oil is myrcene (40–60 % rel). Contents of other important sesquiterpens  $\beta$ -caryophyllene,  $\alpha$ -humulene,  $\beta$ -farnesene and selinenes are typical for the variety. While caryophyllene content is in usual interval of 5–8 % rel, low content of  $\alpha$ -humulene (2–5 % rel) is very rare. The presence of  $\beta$ -farnesene in the amount of 1–3 % rel. is interesting. High content of selinenes in the range of 10–17 % rel. is very high. Mutual contents of  $\alpha$ -humulene,  $\beta$ -farnesene and selinenes are typical for Vital variety and can be used as an important varietal chemotaxonomy trait. Vital contains 2.5–3.5 % of total polyphenols and 0.70–1.00 % of xanthohumol. Unique property of the variety is very high content of desmethyloxanthohumol. Its amount in green cones is up to 0.40–0.60 % w. Part of the content is lost in the course of drying, therefore only 0.25  $\pm$  0.40 % is found in dry product. It is the amount, which is two times higher at least in comparison with other Czech and foreign hop varieties. High content of prenylflavonoids provides possibilities of utilisation of Vital in other branches of food industry (food supplements) and pharmacy. In breweries it is used in the form of pellets and CO<sub>2</sub>-extracts. In brewing trials and beer tasting contests Vital showed good influence on beer taste and smell.

## CONE STRUCTURE

Hop cone is of a narrow egg shape. Covering bracts are tightly snugged to the central axis of cone. Therefore low losses occur at the crop harvest due to shattering or damage of cones. Mean size of green cones is 35 mm and average weight is 0.80 g.

## AROMA

The smell of hops is pronounced spicy.

## RESISTANCE OF DISEASES

Vital is medium susceptible to downy mildew (*Pseudoperonospora humuli*) and tolerant to powdery mildew (*Podosphaera macularis*).

## RIPENING TIME

– 135-143 days

## YIELD

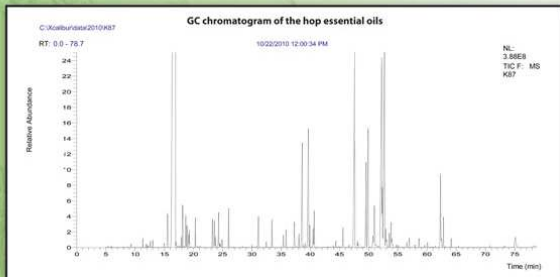
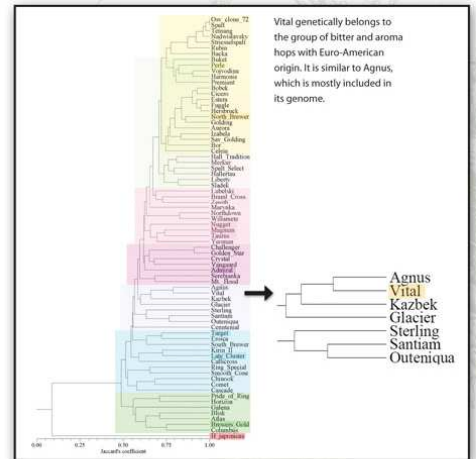
– 1.8 – 2.5 t/ha

## AGRONOMICS

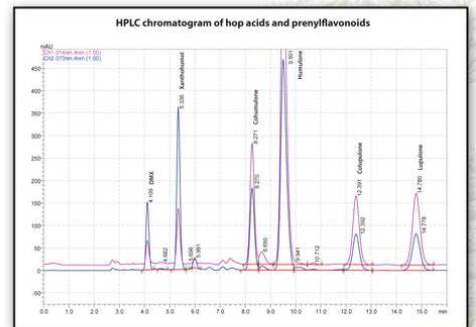
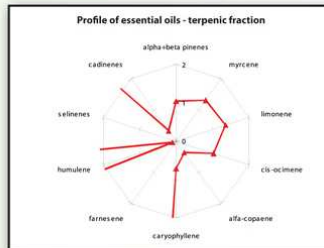
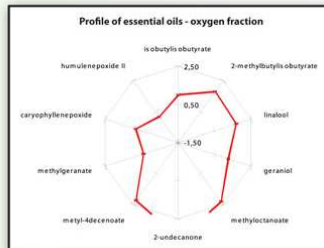
Hop cutting is recommended to carry out at the first decade of April. Numer of shoots growing from rootstock is average (15–20). Recommended number of trained bines – 3 per vine, optimal spacing 300 x 120 cm. The period of technological ripeness is appr. 7–10 days long.



HOP RESINS		
total resins	% w	25 – 30
alpha acids	% w	12 – 16
beta acids	% w	6 – 10
alpha/beta ratio	–	1.6 – 2.1
cohumulone	% rel.	21 – 26
colupulone	% rel.	45 – 50
HOP POLYPHENOLS		
total polyphenols	% w	2.5 – 3.5
xanthohumol	% rel.	0.70 – 1.00
desmethyloxanthohumol	% rel.	0.25 – 0.40
ESSENTIAL OILS		
total oil	% w.	1.5 – 2.5
isobutyrisobutyrate	% rel.	0.10 – 0.20
myrcene	% rel.	45 – 60
2-methylbutylisobutyrate	% rel.	0.60 – 1.20
linalool	% rel.	6 – 10
geraniol	% rel.	1.6 – 2.1
2-undecanone	% rel.	1.6 – 2.1
methyl-4-decanoate	% rel.	21 – 26
$\beta$ -caryophyllene	% rel.	5 – 8
$\beta$ -farnesene	% rel.	1 – 3
$\alpha$ -humulene	% rel.	2 – 5
$\alpha$ + $\beta$ -selinenes	% rel.	10 – 17
$\gamma$ + $\delta$ -cadinenes	% rel.	0.60 – 0.80



11.37	isobutyrisobutyrate	18.61	methylgeranate	31.06	2-decanone	39.92	methyl-4-decanoate	49.81	$\beta$ -farnesene	53.60	$\alpha$ -cadinene
12.60	$\alpha$ -pinene	19.10	limonene	33.39	methylnonanoate	40.45	methylgeranate	50.25	$\alpha$ -humulene	53.94	$\delta$ -cadinene
15.53	$\beta$ -pinene	23.59	2-nonanone	35.28	geraniol	44.38	$\alpha$ -copaene	52.28	$\beta$ -selinene	57.91	caryophyllenoxide
16.56	myrcene	24.28	linalool	38.48	2-undecanone	47.60	$\beta$ -caryophyllene	52.54	2-selinene	59.67	humuleneoxide B
18.12	2-methylbutylisobutyrate	26.00	methylcyclohexane	39.55	methyl-4-decanoate	48.24	trans- $\alpha$ -bergamotene	52.74	$\alpha$ -selinene	64.14	2-pentadecanone



## ACKNOWLEDGEMENT

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