

Pyrazines for Fragrances

Unique effects for signature

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Although pyrazines are applied mainly to flavors, some select materials make an excellent fit for fragrances. Just a minute dosage of such a pyrazine can give a very strong personality to a fragrance, influencing it and resulting in a completely different character for the composition. At a low cost, a very special creation and effect can be achieved. Some would find the small traces that create these changes very difficult to detect, even by GC/MS.

The concepts of odors for these pyrazines are: fresh, green, woody, ambery, oriental, musky, minty and herba-ceous. These odor characteristics and the chemical stability in high pH conditions make these excellent pyrazines highly suitable for fine perfumes, air-fresheners, soaps and detergents. Pyrazines have a high ϕ value^a, meaning high odor impact relative to their molecular weight.

T-1 contains a list of several pyrazines that can be used for fragrances.

Below is a demonstration formula using 2-methoxy-3-isobutylpyrazine (see **F-1**) for a petitgrain base.^b

Many pyrazines are natural, e.g. 3,5(6)-dimethyl-2-isobutylpyrazine, which was isolated from the skin and flesh of potato cultivars; however, pyrazines are generally prepared by the Gutknecht pyrazine synthesis (**F-2**),

INGREDIENT	PARTS
Methyl anthranilate	2
Clary sage oil	5
Caryophyllene	5
Nerol	8
Neryl acetate	10
Citronellol	15
Orange terpenes	25
Terpenyl acetate	30
Geraniol	40
α -Pinene	40
Geranyl acetate	60
Terpineol	100
Linalool	250
Linalyl acetate	400
2-Methoxy-3-isobutylpyrazine 1%	10

^a ϕ Value=[molecular mass x 1000]/threshold (ppm)

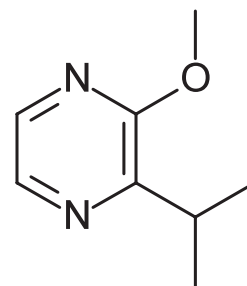
^bFrancis Bocris, Fragrances Creations



which is based on condensation between amine and carbonyl to yield a cyclic Schiff base, followed by oxidation to the aromatic ring.^{1,2}

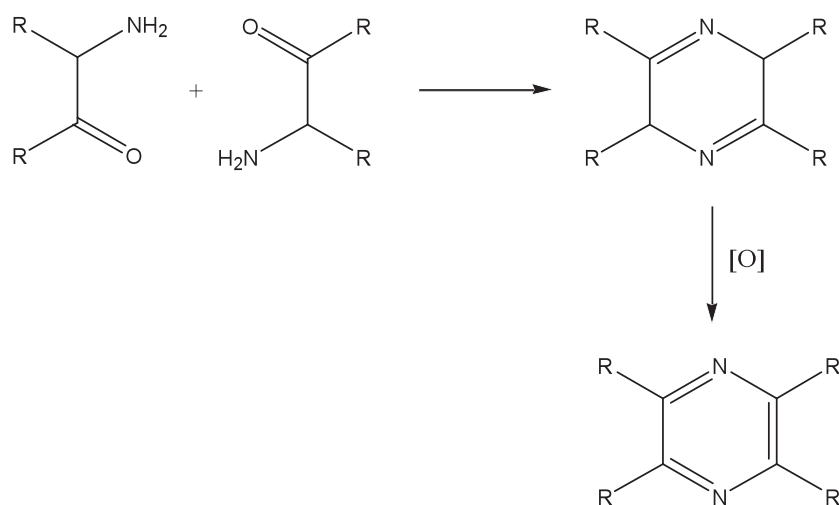
2-Methoxy-3-isopropylpyrazine; bell pepper pyrazine; CAS# 25773-40-4

F-1



Physical Data for 2-Methoxy-3-isopropylpyrazine

Appearance:	Almost colorless to slightly yellowish transparent liquid
Molecular weight:	152.18
Molecular formula:	$C_8H_{12}N_2O$
Refractive index n_D^{20} :	1.492—1.495
Specific gravity $D^{25/25}$:	1.011—1.016
Purity:	99% min.
Solubility:	Soluble in one part and more of 70% alcohol



Pyrazine	Olfactory characteristics* and applications	Structure
2-Methoxy-3-isopropylpyrazine	Possesses a strong green, bell pepper, earthy, vegetable-like odor. Applied as a trace component in green compounds for all purposes.	
2-Methoxy-3-n-propylpyrazine	Has a green odor, with a vegetable earthy connotation; green apple character. Applied as trace component in green compounds for all purposes.	
2-Methoxy-3-isobutylpyrazine	Strong green note, characteristic of green, vegetable, bell pepper, green pea odor. Applied in traces in green-floral compounds; e.g. petitgrain.	
2-Methoxy-3(6)-isobutylpyrazine	Earthy, galbanum, green, green pea, pepper odor. Applied in traces in green-floral compounds for all purposes.	

2-Methoxy-3-sec-butylpyrazine	<p>Strong green character, earthy, potato, carrot, musty, characteristic of galbanum and green peas.</p> <p>Applied as trace component of chypre-floral-animalic concept perfumes.</p>	
2-Methoxy-3-isopentylpyrazine	<p>Green, leafy, lavender at low levels.</p> <p>Applied as trace component in fougère concept perfumes.</p>	
2-Methoxy-3-isoheptylpyrazine	<p>Powerful sweet-greenish odor, with asparagus note.</p> <p>In trace amounts can intensify green, vegetable nuances. Also provides a sparkling lift on the top of floral accords; thanks to its green vibration, it enhances the natural and the prestigious part of the hyacinth and jonquil floralcy.</p>	
3,5(6)-Dimethyl-2-isobutylpyrazine	<p>Chocolatey, reminiscent of the warmth of cocoa. It is slightly musky, animalic, with patchouli, vetiver tones and a mentholic note. 3,5(6)-Dimethyl-2-isobutylpyrazine imparts a strong and natural, original and long-lasting effect.</p> <p>It is a beautiful material for women's and men's creations. This mixture boosts woody notes, chypre, oriental and fougère. It is also very useful in floral accords for providing depth and warmth. A rich chocolate building-block for oriental fragrances.</p>	

*Some information on organoleptic properties and uses are taken from the works of F. Bocris, Fragrances Creations, and from PMP 96 *Database of Perfumery Materials & Performance*, Boelens Aroma Chemicals Information Services, Netherlands.

References

1. MJ Oruna-Concha, SC Duckham and JM Ames, Comparison of volatile compounds isolated from the skin and flesh of four potato cultivars after baking. *J Agric Food Chem*, 49 (2001) 2414–2421
2. H Gutknecht, Mitteilungen Ueber Nitrosoäthylmethylketon. *Berichte der deutschen chemischen Gesellschaft*, 12(2) (1879) 2290–2292; 13, 1116 (1880); IJ Krems and PE Spoerri, *Chem Rev*, 40, 291 (1947) 290–358; YT Pratt, *Heterocyclic Compounds*, 6, 379, 385 (1957)

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