

Product Name	Cooling agent ws-3
Product Properties	<p>Chemical Name: N-Ethyl-2-(isopropyl)-5-methylcyclohexanecarboxamide</p> <p>CAS No.: 39711-79-0</p> <p>MF: C₁₃H₂₅NO</p> <p>MW: 211.35</p> <p>Appearance: White crystal powder</p> <p>Odor: Mild cooling, slight menthol odor (almost odorless)</p> <p>Detection Method: HPLC</p> <p>Purity: ≥99%</p> <p>Melting Point: 87°C-102°C</p> <p>Flash Point: >100°C</p> <p>Specific Rotation: -49° ~ -54°</p> <p>Water Solubility: Insoluble</p> <p>FEMA: 3455</p> <p>EINECS No.: 254-599-0</p> <p>Shelf Life: 2 years</p>
Product Description	<p>WS 3 is an agonist of TRPM8 receptor with EC50 value of 3.7 μM [1].</p> <p>Transient receptor potential cation channel subfamily M member 8 (TRPM8) is a Ca²⁺- and Na⁺-permeable ion channel and is activated by cooling agents and cold temperatures. TRPM8 belongs to TRP family and is expressed in sensory neurons.</p> <p>WS 3 is an agonist of TRPM8 receptor and a cooling agent. In HEK293 cells expressed recombinant mouse TRPM8, WS 3 (30 μM) increased [Ca²⁺]_i. WS 3 exhibited potency with EC50 value of 3.7 μM and induced 86% efficacy of the maximal response to icilin, the most potent agonist [1]. In HEK cells stably expressing either hTRPM8 or hTRPA1, WS 3 activated hTRPM8 and hTRPA1 with EC50 values of 2.2 and 120.6 μM, respectively. WS 3 was efficacious in eliciting cooling sensation [2].</p> <p>References:</p> <p>[1]. Behrendt HJ, Germann T, Gillen C, et al. Characterization of the mouse cold-menthol receptor TRPM8 and vanilloid receptor type-1 VR1 using a fluorometric imaging plate reader (FLIPR) assay. <i>Br J Pharmacol</i>, 2004, 141(4): 737-745.</p> <p>[2]. Klein AH, Iodi Carstens M, McCluskey TS, et al. Novel menthol-derived cooling compounds activate primary and second-order trigeminal sensory neurons and modulate lingual thermosensitivity. <i>Chem Senses</i>, 2011, 36(7): 649-658.</p>
Advantages	<p>Food Grade Cooling Agent ws-3 For Cigarette/Filter Tip/Tobacco/Oral Product</p> <ol style="list-style-type: none"> 1. There is a high cooling effect without other unpleasant feelings such as bitterness, burning, stinging or tingling sensations and can bring more stimulative, fresh and aromatic sensory to the entire mouth and throat. 2. Cooling agent ws-3 can solve the difficulty of developing new products with bad sensation. 3. When used with other flavors, it enhances the effects of the flavors. It also can be used with other cooling agents. 4. Cooling agent ws-3 is water-solubility is no more than 0.1%, it's better than

	traditional cooling agents, so it can act on taste bud more wallop and has long cooling effect.
Product Functions	<ol style="list-style-type: none"> 1. Continuous and long lasting cooling and refreshing effect, having no hot, harsh and stinging sensation of Menthol and/or Peppermint. 2. Heat-Resistance: Heating under 200°C will not reduce the cooling effect, suitable to use on baking and other high temperature heating process. 3. Its cooling intensity can maintain 15-30 minutes, enriching the refreshing of product and having no burning pain, stabbing and numbness, it's cooler than traditional Menthol products. 4. Low dosage: 30-100 mg/kg dosage will give good cooling effect. 5. Excellent compatibility with other flavors, it can enhance the effect of the flavors. It also can be combined using with other cooling agents.
Product Applications	<ol style="list-style-type: none"> 1. Daily use products: Toothpaste, oral products, Air Freshener, skin cream, shaving cream, shampoo, sunscreen, shower cream. 2. Food products: Confectionery products, chocolate, dairy produce, beer, distilled spirit, beverage, chewing Gum. 3. Medicine: Linctus, diminish inflammation ointment, dyspepsia, antipruritic, liniment, oral cavity acesodyne, heatstroke pill. 4. Others: Cigarette, filter tip and other tobacco, it also can be used for driving insects.
Usage	<ol style="list-style-type: none"> 1. Soluble in Ethanol/PG firstly, then adding water solution. 2. Or dissolved in flavors firstly, then added into your products. 3. Mixed with dementholized peppermint oil can increase the fragrance signally.