Letters to Editor

Is flavor component in dental product therapeutic?

Madam,

Dental and oral care products are available in different flavors. Though flavoring is a marketing strategy for luring consumers, its components does have benefit on oral/dental tissues. Thus, it is necessary for the dental health team to advice the right flavor of products, which are palatable and equally therapeutic. This article discusses the principal types, modes of activity, benefits, and the possible allergic reactions of flavors.

The flavor compositions find application in a wide range of consumer products, particularly oral care consumer products such as toothpastes, mouthwashes, chewing gum, confectionery, dental floss, dissolvable mouth films, breath sprays, and breath-freshening tablets as well as therapeutic dental product like restorative materials, impression materials, isolators, wedges, etc. Flavors are very important in consumer acceptance, as its component principally impresses the taste and smell senses. The U.S. Code of Federal Regulations describes a 'natural flavorant' as "theconstituents derived from a spice, fruit, vegetable, edible yeast, herb, bark, bud, root, leaf or any other edible portions of a plant, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose primary function is flavoring rather than nutritional"

Types of flavoring

There are three principal types of flavorings which are as follows:

- Natural flavoring substances are obtained in their natural state from plant or animal raw materials, or by their physical, microbiological or enzymatic processes.
- Nature identical flavoring substance are synthesized, but is chemically identical to a substance found in nature.
- Artificial flavor, are synthesized and are not identified in any natural products.

Flavors are complex mixtures of many sensorially active components which can be volatile (odorous or aromatic substances) or non-volatile (flavoring substances). Volatile aromatic substances can be perceived by human beings both orthonasally and retronasally. However, non-volatile flavoring substances interact with the flavor receptors on the tongue to give gustatory impressions like sweet, sour, bitter, salty, or umami, often responsible for trigeminal stimuli, such as pungent, cooling, burning or pricking perceptions.

These flavoring agents have a great importance in the industry of drugs, especially in camouflaging with the medicines by their indispensable flavors. Thus, they are also called as "masking agents" or "bitter blockers". The principal flavors used in the dental products are peppermint, spearmint, and wintergreen modified with other essential oils of anise, clove, caraway, pimento, eucalyptus, citrus, menthol, nutmeg, thymeor cinnamon. The following Table 1 describes the chemical composition of flavors and its odor.

Modes of activity

It is a well known fact that dental flavors provide taste benefits and freshen breath mainly by sensorial masking primarily by mechanochemical cleaning or by antimicrobial active systems by inhibiting bacterial volatile sulfide compound production. It is also postulated that flavonoids and the related compounds have therapeutic benefits, i.e., anti-inflammatory, antifungal, bacteriostatic, anti-thrombotic, anti-oxidant, and sometimes immunostimulant action.[1] Flavors "cleanses the palate," that means, flavors are strong enough to override or remove all food aftertaste, incompatible with most of the food, therefore makes further eating revolting and unappetizing and also they are not appetizing itself, so do not make to continue eating more of flavor. Also, flavor compositions can reduce or prevent dental cavities, by inhibiting the

Table 1: Chemical composition of flavors and its odor

Chemical	Odor
Diacetyl	Buttery
Isoamyl acetate	Banana
Benzaldehyde	Bitter almond
Cinnamic aldehyde	Cinnamon
Ethyl propionate	Fruity
Methyl salicylate	Wintergreen
Limonene	Orange
Ethyl- (E, Z)-2,4- decadienoate	Pear
Allyl hexanoate	Pineapple
Ethyl maltol	Sugar, Cotton candy
Ethylvanillin	Vanilla

production of acid by microorganisms in the oral cavity. In particular, they are capable of inhibiting the production of lactic acid from glucose by the bacterium *Streptococcus mutans* present in the oral cavity[2] through the following three modes.

1. Flavor materials (or flavor compositions) may act by direct (overt antimicrobial) killing of oral cavity bacteria, e.g., by more than 10fold.
2. They may inhibit acid generation whilst maintaining a microbial cell viability of at least 70%.
3. They may inhibit acid generation at a concentration below the minimum inhibitory concentration (MIC). The MIC is the minimum amount of a concentration of flavor/flavor material at which no bacterial growth is observed. Generally, the lower the MIC of a compound for a bacterium, the more effective the compound will be at inhibiting bacterial growth.

The third mode is preferred, since the bacterial production of acid; in particular *Streptococcus mutans* can be reduced or eliminated without significantly disturbing the oral cavity's natural microflora and providing anti-caries benefit, at a concentration below the MIC. Besides, it has also been found that the combination of xylitol and a flavor composition can produce a synergistic effect in reducing the production of acid by *Streptococcus mutans* than xylitol and flavor composition alone.[3]

Allergic reactions

However, the professional has to be very cautious while choosing the flavor, as the allergic reactions can be precipitated in the form of rashes, eczema, hives, dermatitis,[4] asthma, migraine, heart palpitations, or irritability. These allergic reactions are rather dose size dependent than flavor type. In such sensitive patients, fruity, mint, herbal, or spicy flavors are preferred.

CONCLUSION

Thus, along with the conventional ingredients like fluoride, zinc salts, pyrophosphates, etc., in dental consumer and therapeutic products, the flavor component would have dual benefit in enhancing consumer acceptance as well as therapeutically reducing and/or preventing dental caries incidences.

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