



# Formulate evaluate nutraceuticals chewable gummies using curcumin active ingredient

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## Abstract:

Turmeric, a spice that has long been recognized for its medicinal properties, has received interest from both the medical/scientific world and from culinary enthusiasts, as it is the major source of the polyphenol curcumin. It aids in the management of oxidative and inflammatory conditions, metabolic syndrome, arthritis, anxiety, and hyperlipidemia. It may also help in the management of exercise- induced inflammation and muscle soreness, thus enhancing recovery and performance in active people. In addition, a relatively low dose of the complex can provide health benefits for people that do not have diagnosed health conditions. Ingesting curcumin by itself does not lead to the associated health benefits due to its poor bioavailability, which appears to be primarily due to poor absorption, rapid metabolism, and rapid elimination. Gummies or soft chew supplements rank on 2<sup>nd</sup> place in the most commonly used form by consumers. Not only do they taste good, but with the nutritional adding they help maintain a healthy immune system and protect your organism. The purpose of this review is to provide a brief overview of Curcumin.

## Introduction

Bioactive compounds are extra-nutritional constituents that are found in small quantities in foods providing health benefits beyond the basic nutritional value of the product [1]. They are being intensively studied to evaluate their effects on health, and bioactive compounds appear to have beneficial physiological, behavioral, and immunological effects.

To date, numerous bioactive compounds have been discovered. These compounds vary widely in chemical structure and function and are grouped accordingly. Some examples of bioactive compounds are carotenoids, flavonoids, carnitine, choline, coenzyme Q, dithiolthiones, phytosterols, phytoestrogens, glucosinolates, polyphenols, and taurine. Since vitamins and minerals elicit pharmacological effects, they can be categorized as bioactive compounds as well.

Bioactive compounds may naturally be found in various foods. Most of the bioactive compounds have antioxidant, anticarcinogenic, antiinflammatory, and antimicrobial properties. Therefore, many epidemiologic studies report that some of them also have protective effects on cardiovascular diseases.

Phenolic compounds, including their subcategory flavonoids, are present in almost all plants and have been found extensively in cereals, legumes, nuts, olive oil, tea, red wine, vegetables, and fruits. They mostly have antioxidant properties and some studies demonstrated favorable effects on cardiovascular diseases risk factors .

Various phytoestrogens are present not only in soy, but also in flaxseed oil, whole grains, fruits, and vegetables. Besides their antioxidant properties, their similarities with estrogen at a molecular level allow them to mimic .Since carotenoids are efficient free radical scavengers, they are one of the most potent antioxidant compounds . They are found in most fruits and vegetables, especially apricots, carrots, mangoes, tomatoes, and pumpkins.

The glucosinolates are natural components of many pungent plants such as mustard, cabbage, and horseradish. Since they induce Phase I and Phase II enzymes, inhibiting the enzyme activation, they are under investigation for mitigating cancer .

Vitamins are vital nutrients that an organism requires in limited amounts. They cannot be synthesized by human body and must be obtained through diet. They have diverse functions and biological effects on health. Besides their regulatory and catalytic activities in the body, some of them, such as vitamin E and vitamin C, are also functioning as antioxidants .

Although bioactive compounds are naturally present in various foods, they are being used as an additive and a processing aid as well. Bioactive compounds are generally added to foods or food products for the enhancement of their health promoting properties. It is a fact that, carotenoids, anthocyanins, and curcumin are the most commonly known coloring bioactive compounds. They are being added to some food products for the purpose of coloring. To prevent oxidation, ascorbic acid is one of the widely used food additive. The most obvious application of cinnamaldehyde and vanillin is as flavoring in sweet foods, chewing gums, and beverages.

Curcumin is a photochemical derived from turmeric, which is a perennial herb belonging to the Zingiberaceae family. Colloquially, turmeric is referred to as the “golden spice” because of its unique golden yellow color and earthy pungent flavor . In the south and southeast Asian countries, turmeric has been used as a spice and pigment in food preparations



for thousands of years. In addition, it has been widely used as an herbal medicine due to its perceived therapeutic benefits. Chemically, there are three major polyphenol substances that belong to the “curcuminoid” family: Curcumin (diferuloylmethane), demethoxycurcumin, and bisdemethoxycurcumin

## Methods

☑ **PROFESSIONAL FORMULATION:** Provides 250 mg of turmeric (containing curcumin, turmeric’s key component) along with 12 mg of ginger extract and 100 mcg of black pepper extract for optimal results.

☑ **QUALITY MANUFACTURING:** We maintain adherence to superior standards and our products are crafted with only safe, high-quality natural ingredients.

## Evaluation test for curcumin

### Hardness test

For testing Curcumin harness hardness tester can be used . Chewable gummy are less harder than tablet or more harder than capsules they are chewed in oral cavity . There are two types of hardness testers used to check hardness of chewable gummies .The hardness of chewable gummies should be such that they withstand the rigors of manufacturing, packaging, shipping, and distribution, as well as be easily chewed by the intended patient population. Hardness is generally measured as the force needed to break the tablet in a specific plane. Public standards exist to ensure consistent measurement of the tablet hardness . Tablet hardness may be measured and expressed in a variety of units.<sup>13</sup> Applications submitted to FDA should use the same unit of measure in reporting testing results and specifications.

1. brass tester

2. Duro tester

### Size test

The size of gummies can be determined by using vernier caliper comparatively size of general tablets Chewable gummies are large in size. Its height was generally 10cm and length 10 cm.

### Weight variation test

Take 20 Chewable gummies and weight them one by one then decide total weight by 20 then weight of one chewable gummy was found. Also weight variability also found.

### Disintegration

The time required for a tablet to break up into small particles is its disintegration time. For chewable tablets, disintegration time should be short enough to prevent GI obstruction in the event a tablet is not completely chewed by the patient. Usually, the presence of the correct type and amount of a disintegrant facilitates rapid disintegration of the tablet. In vitro disintegration testing should be conducted using intact tablets in suitable medium using established disintegration equipment (such as USP Disintegration Apparatus) and methods.<sup>16</sup>

### C. Dissolution

Drug absorption from chewable tablets depends on the release of the drug substance(s) from the intact or the chewed tablets; therefore, in vitro dissolution testing of chewable tablets should follow the principles of dissolution testing of conventional IR tablets.<sup>17</sup> That is, the active pharmaceutical ingredient(s) of the chewable tablets should adequately dissolve out of the tablet.

For product characterization during development, in vitro dissolution testing should be conducted on intact tablets in at least four media, such as water, aqueous media at pH 1.2, buffered aqueous media at pH 4.5, and buffered aqueous media



at pH 6.8, with established dissolution methods using equipment such as USP Apparatus 1 (basket), USP Apparatus 2 (paddle), or USP Apparatus 3 (reciprocating cylinder).

#### pH test

Gummy 1. Blending a gummies into invariant paste. 2. Calibrating the pH cadence and conforming the sample temperature to room temperature before measuring the pH.

3. Irrigating the pH electrode with distilled water. 4. Immersing the electrode to the gummy paste and measuring the pH.

**Firmness-** “Figure 6 the most common way to measure firmness is resistance to contraction. Penetrometer is used to measuring the firmness.

**3. Softness-**The softness is contrary to stiffness that measuring by bending length. Softness may be considered as the contrary of firmness or hardness measured by consistence tests.

**4. Springiness** -Springiness is measuring, by the distance of the detected height during the alternate contraction divided by the original contraction distance.

#### D. Performance in Simulated Physiological Media

A sound understanding and assessment of the factors impacting the in vivo performance of drug products is needed during drug development. Utilizing in vitro methods that use simulated physiological media such as saliva and gastric fluids can provide an assessment of likely in vivo performance of oral dosage forms, particularly those made with poorly soluble drug substances.<sup>19,20,21,22</sup>

In particular, chewable tablets should be evaluated using dissolution media such as simulated fasted and fed state gastric and intestinal fluids with enzymes (biorelevant dissolution media). Hardness testing after brief exposure (30 seconds) to a small quantity (for example, 1 mL) of human simulated saliva may provide data that could be used to support the hardness specification.<sup>23</sup> In vitro testing in physiological media consistent with the targeted patient population characteristics may support further characterization of the drug product and its critical quality attributes.

#### Uses of Gummies:

1. Multivitamin gummies ameliorate the texture of skin, hair and nails fluently.
2. These gummies can indeed help to ameliorate energy situations and perform day to day tasks with complete energy.
3. Prevents acne, rich in citric acid, oranges help control acne, removes papules.
4. Controls skin ageing, fights against flights.
5. Antioxidant parcels, moisturises the skin.
6. Riboflavin prevent eye related diseases, migraine & elevated blood pressure.
7. Riboflavin is known to increase energy situations, boost functions of the vulnerable system and help maintain healthy hair, skin and nails.



### Some imp points

Curcumin is a photochemical derived from turmeric, which is a perennial herb belonging to the Zingiberaceae family. Colloquially, turmeric is referred to as the “golden spice” because of its unique golden yellow color and earthy pungent flavor. In the south and southeast Asian countries, turmeric has been used as a spice and pigment in food preparations for thousands of years. In addition, it has been widely used as an herbal medicine due to its perceived therapeutic benefits. Chemically, there are three major polyphenol substances that belong to the “curcuminoid” family: Curcumin (diferuloylmethane), demethoxycurcumin, and bisdemethoxycurcumin.

### Pharmacological activity:-

1. Antioxidant
2. Antimicrobial
3. Soothing
4. Antiinflammatory
5. Anticancer

### Factor affecting curcumin application

- Solubility
- ph

- Photodegradation
- alkaline degradation
- Bioavailability
- stability

### Role of ingredients

Chewing gums are formulated by mixing two phases: a) Single phase or discontinuous phase, i.e. gum base (water insoluble); b) Multiple phase or continuous phase, i.e. sweeteners and other ingredients (water soluble). These two phases are commonly mixed together at a ratio of 1:3. The particle size and quantity of granulated sugar added during chewing gum preparation are the key factors for the texture of the end product. Chewing gum compositions such as carbohydrates, solvents, chewing gum base affect the retro nasal aroma release (Sostmann, 2003). These affect its odorant characteristics and therefore it should be considered as future challenges in the manufacturing of chewing gums (Itobe et al., 2012). The concentration of flavoring agent added in the chewing gum is approximately 1% (Potineni and Peterson, 2008).

### Conclusion

By performing given experiment it is concluded that th

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