

## Vitamin C Supplements for Guinea Pigs

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### The Small Mammals Health Series

For the biologic machinery of the body to work correctly, vitamin C is required. Most animals can manufacture vitamin C in their bodies and do not require vitamin C in the diet. Guinea pigs, humans, and other primates share a gene mutation that makes production of vitamin C impossible. For this reason, these animals require a dietary source of vitamin C.

Guinea pigs who do not receive enough vitamin C in their diet can suffer from vitamin C deficiency (commonly known as scurvy in humans). Affected guinea pigs may have a rough hair coat, lack of appetite, dental pain, delayed wound healing, lameness, and an inability to fend off infections. Guinea pigs with a slight vitamin C deficiency may show no visible signs of disease; however, their immune system may be compromised leading to decreased ability to fight off other illnesses

The amount of vitamin C required by adult guinea pigs is about 20-25 mg/day and up to 30-40 mg/ day for pregnant guinea pigs. Guinea pig pellets are fortified with vitamin C. However, because vitamin C is a water-soluble vitamin it loses its potency over time and guinea pig pellets usually have a shelf life of 90 days after the manufacturing date. After this time, the value of the vitamin C can diminish greatly. Many pet guinea pigs have been diagnosed with a vitamin C deficiency even though they were on a good quality guinea pig pellet. Timothy and other hays should be the foundation of any guinea pig diet. Herbivores require this source of food for good digestion, good movement of food through their system and for dental health maintenance. Unfortunately, the vitamin C content of grasses, grass hays, and legume hays like alfalfa is very low. So how do we get this important nutrient into our pets?



### Supplements

Some sources still recommend putting vitamin C in the drinking water either by grinding up tablets and dissolving them or by using vitamin C syrup. However, this is not the most effective way of supplementation due to several problems. The most serious problem is that vitamin C supplements in the water change its taste, and the guinea pig may not drink enough water to get adequate amounts. When this happens, not only do guinea pigs not get enough vitamin C, but they may not drink enough water leading to mild to moderate dehydration. Chronic dehydration may lead to other medical problems such as urinary tract disease. Another issue with vitamin C supplementation of the water involves the stability of the vitamin. Vitamin C is degraded quickly in light, heat, and moisture. Most water bottles are clear so they let in light. It is estimated that after about 8 hours, the amount of active vitamin C in the water is only 20% of the original amount added. For these reasons, adding vitamin C to guinea pig's drinking water is not recommended.

The best way to supplement vitamin C is either through vitamin C tablets or liquids given directly to the guinea pig or through the fresh foods they eat. Abbott and Proctor and Gamble make flavored vitamin C liquids for children. Abbott's product (Cecon) is considered by the company to be stable for 3 years from the date of manufacture (1). Proctor and Gamble states that Vicks C drops is stable for 2 years from date of manufacture (1). Other companies have flavored tablets that are listed on the label as being good for about 2 years from date of manufacture (e.g. Kirkman Labs). Oxbow company makes a vitamin C tablet (GTN-50C) for guinea pigs. These tablets are flavored and accepted by many pets as treats. Each tablet contains 50 mg of encapsulated vitamin C. Oxbow states the vitamin C is stable for 1 year from the date of manufacture<sup>1</sup>. Always be sure to check the expiration date of the product used and do not use past that date.

When using preparations of vitamin C rather than fresh foods, it is important to be sure your pet accepts the treats. Experimenting with different flavors will help you see what your guinea pig enjoys. The tablets can be given by hand if accepted or crushed and sprinkled on a special green (moistened) they like. The liquids can either be given by dropper or syringe (if accepted easily). If you have to fight to get your pet to take the liquid, try something else. Try different methods of feeding different supplements and see what works for you. A trial of a week for each method will give you a good idea what will work and what will not.

### Fresh Foods Rich in Vitamin C



Probably the best and perhaps the healthiest way for your guinea pig to get a proper amount of vitamin C per day is through feeding fresh foods that are rich in vitamin C. The foods mentioned below are not only rich in vitamin C but also in a variety of other vitamins and trace minerals. In addition, chewing on these foods is good for the teeth and allows for variety in their diet. A varied diet can be mentally stimulating and is actually an environmental enrichment.

Many foods contain vitamin C. The foods that contain the highest levels of vitamin C per weight of food item are considered vitamin C-rich. However, to supplement a guinea pig with vitamin C, we must also consider the acceptability of the food item to the pig. Unlike children, we cannot make them stay at the dinner table until they have cleaned their plate. We also have to consider whether the vitamin C rich food item is appropriate for an herbivore like the guinea pig.

There are many Internet sites that report nutritional analysis of food items. Unfortunately, the vitamin C content reported varies between sites. This may be related to misinformation or to a failure to report how the analysis was done, the weight of the food item tested, the way the food was prepared (e.g. cooked, raw), and/or the part of the plant that was tested (e.g., leaves, flowers, stalks). For the purposes of this article, the authors depended on food analysis at two sites. The first



photo courtesy of Christy Cameron

site consulted was the [USDA's report on vitamin C content](#). For food items not analyzed raw by the USDA, we consulted a web site called [Nutrition Data](#). This web site correlated well with the USDA site on many food analyses and was deemed reliable.

Below you will find a table listing what the authors consider to be excellent (bold blue), good (bold green), fair (bold orange) and poor (bold red) choices for vitamin C supplementation in guinea pigs. In this chart, you will find the food item (first column) and the amount of that item needed to provide your pet with 25mg vitamin C per day (fourth column).

The authors debated about including the items considered a poor source of vitamin C in this article. However, many owners feed these items as treats. For this reason, we opted to make mention of some very poor choices of vitamin C sources. Since we started this list by perusing the USDA report for foods with no less than 30mg vitamin C per measure, if you do not see a food on this list, it is likely to be a very poor source of vitamin C. However, if there is any doubt, consult the web sites above and search for your food item. All foods mentioned are raw unless otherwise noted.

Please do not forget to feed your guinea pig hay, dark leafy greens and vitamin C. A balanced diet rich in vitamin C is the best thing you can provide for your pet.

Enjoy feeding vitamin C and enriching the diet and life of your pig!

(1)These figures regarding stability were obtained through contact with each company's technical service department.

| <b>Vitamin C content of selected foods and their appropriateness for guinea pig diets</b> |                                 |  |  |
|---|---------------------------------|--|--|
| <b>Food Item</b>  | <b>Weight or Volume of Food</b> | <b>Vitamin C in weight or volume of food</b> | <b>Amount needed to provide 25mg/day</b> |
| <b>Guava</b>  | 1 cup = 165mg                   | 377mg  | 1.1 tbsp                                 |
| <b>Red Peppers</b>  | 1 cup chopped = 149g            | 190mg  | 2.1 tbsp chopped                         |
| <b>Kale</b>   | 1 cup chopped = 67g             | 80.4mg                                       | 5 tbsp (1/3 cup)                         |
| <b>Tendergreen</b>  | 1 cup chopped = 150g            | 195mg  | 2.1 tbsp chopped                         |
| <b>Parsley</b>  | 1 cup = 60g                     | 79.8mg                                       | 5 tbsp (1/3 cup)                         |
| <b>Broccoli</b>   | 1 cup chopped = 91g             | 81.2mg                                       | 5 tbsp (1/3 cup)                         |
| <b>Broccoli flowerets</b>   | 1 cup = 71g                     | 66.2mg                                       | 6 tbsp (between 1/3 and 1/2 cup)         |
| <b>Broccoli leaves</b>  | 1 oz = 28g                      | 26.1 mg                                      | 2 tbsp                                   |
| <b>Broccoli stalks</b>  | 1 oz = 28g                      | 26.1 mg                                      | 2 tbsp                                   |
| <b>Lambsquarterm</b>  | 1 oz = 28g                      | 22.4mg                                       | 2.2 tbsp                                 |
| <b>Cauliflower</b>  | 1 floweret = 13g                | 6.0mg  | About 4 flowerets                        |
| <b>Strawberry</b>   | Avg berry = 18g                 | 10.6mg                                       | About 2.5 average berries                |
| <b>Kiwi</b>   | 1 cup = 17 g                    | 164mg  | 2.4 tbsp                                 |
| <b>Green pepper</b>   | 1 cup chopped = 149g            | 120mg  | 3.4 tbsp chopped                         |
| <b>Mustard greens</b>   | 1 cup = 56g                     | 39.2mg                                       | 1/2-3/4 cup                              |
| <b>Cooked broccoli</b>  | 1 cup = 156g                    | 101.2mg                                      | cup                                      |
| <b>Cooked Brussels sprouts</b>  | 1 cup = 156g                    | 96.7mg                                       | Just over cup                            |
| <b>Kohlrabi</b>   | 1 cup = 135g                    | 89.1mg                                       | Just over 1/2 cup                        |
| <b>Papaya</b>   | 1 cup = 140g                    | 86.5mg                                       | Just under 1/3 cup                       |
| <b>Snap peas</b>  | 1 cup = 98g                     | 58.8mg                                       | Just under 1/2 cup                       |
| <b>Turnip greens</b>  | 1 cup = 55g                     | 39.5mg                                       | Just under 1/2 cup                       |
| <b>Red cabbage</b>  | 1 cup = 70g                     | 39.9mg                                       | Just under 1/2 cup                       |
| <b>Orange</b>   | Avg orange = 131g               | 69.7mg                                       | Between 1/4 and 1/2 avg orange           |
| <b>Cooked kale</b>  | 1 cup cooked = 130g             | 53.3 mg                                      | About 1/2 cup                            |
| <b>Peas</b>   | 1 cup = 58mg                    | 58mg   | About 1/2 cup                            |
| <b>Clementines</b>  | Avg Clementine = 74g            | 36.1mg                                       | Almost 1/2 average Clementine            |
| <b>Cantaloupe</b>   | 1 cup balls = 177g              | 65mg   | Between 1/4 and 1/2 cup of melon balls   |
| <b>Pineapple</b>  | 1 cup chunks = 165g             | 78.9mg                                       | 1/3 cup of chunks                        |
| <b>Dill weed</b>  | 5 sprigs = 1g                   | 0.9mg  | 154 sprigs                               |
| <b>Dried tarragon</b>   | 1 oz = 28g                      | 14mg   | About 4 tbsp                             |
| <b>Dried basil</b>  | 1 oz = 28g                      | 17.1mg                                       | About 3 tbsp                             |
| <b>Dried oregano</b>  | 1 oz = 28g                      | 14mg   | About 4 tbsp                             |
| <b>Lemon</b>  | Avg lemon = 58g                 | 30.7mg                                       | 80% of average lemon                     |
| <b>Dried cilantro</b>   | 1 tbsp = 2g                     | 9.9mg  | 2.5 tbsp                                 |
| <b>Chinese cabbage (pak choi or bak choi)</b>   | 1 cup shredded = 70.0g          | 31.5mg                                       | Over 1/2 cup                             |
| <b>Beet greens</b>  | 1 cup = 38g                     | 11.4mg                                       | Over 2 cups                              |
| <b>Starfruit (carambola)</b>  | Avg fruit = 91g                 | 31.3mg                                       | Over 1/2 of an average starfruit         |
| <b>Collard greens</b>   | 1 cup = 36g                     | 12.7mg                                       | 2 cups                                   |
| <b>Watercress</b>   | 1 cup chopped = 34g             | 14.6mg                                       | About 1 and 1/2 cups                     |
| <b>Grapefruit</b>   | Avg fruit = 120g                | 38.5mg                                       | Just under grapefruit                    |

**Blue**= excellent choice for supplementing guinea pig diet

**Green**= good choice for supplementing guinea pig diet

**Orange**= fair choice for supplementing guinea pig diet

**Red**= poor choice for supplementing guinea pig diet

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