

# Royal Jelly

## Short Description

Royal Jelly is a secretion of the Honey Bee and is fed to all larvae in the colony for their first few days as an egg. It is the exclusive food for the queen bee and contains the essential protein required to develop a new queen from a fertilized egg that would otherwise become a worker bee.

## Source

Royal Jelly is secreted from glands in the hypopharynx on the sides of bee's heads. It is not related to pollen or honey, nor the blossoms bees visit.

## Harvesting

Royal Jelly is harvested by humans by stimulating colonies with movable frame hives to produce queen bees. Royal jelly is collected from each individual queen cell when the queen larvae are about four days old. It is collected from queen cells because these are the only cells in which large amounts are deposited; when royal jelly is fed to worker larvae, it is fed directly to them, and they consume it as it is produced, while the cells of queen larvae are "stocked" with royal jelly much faster than the larvae can consume it. Therefore, only in queen cells is the harvest of royal jelly practical. A well-managed hive during a season of 5–6 months can produce approximately 500g of royal jelly.

## Hive Use

Royal Jelly is fed to all larvae in the colony, regardless of sex or caste, for their first few days as an egg. When a new queen is desired, the workers will feed eggs copious amounts of royal jelly in specially constructed queen cells. A single protein named *Royalactin* appears to be the contributing factor in royal jelly that causes the bees to develop into queens<sup>1</sup>. This physiological change in the bee is one of the most striking examples of phenotypic polymorphism (two or more clearly different forms of a species with the same genome).

## Human Use

Royal Jelly can be taken orally as a dietary supplement or applied topically to the skin.

## Forms

100% pure and natural royal jelly is about 60% water and will therefore spoil at room temperature and must be kept frozen. This natural form can be dehydrated into a powder through a freeze-drying process called lyophilization or cryodesiccation. The powder is then encapsulated and taken orally. Rice powder is used as a flowing agent in the encapsulation process to ensure the royal jelly powder easily flows into capsules and does not reabsorb moisture. Royal jelly can also be blended with honey and consumed orally as you would regular honey. However, keep in mind that royal jelly is heat sensitive, so be careful not to overheat and damage the beneficial proteins and enzymes. Both fresh frozen royal jelly and lyophilized powder are used in the production of our *Royal Honey* that contains 10% royal jelly in a creamed clover honey. The honey acts a preservative and desiccant, as well as a sweetener to help offset the rather bitter and sour taste of pure royal jelly. 1 teaspoon of royal honey is equivalent to 677mg of fresh royal jelly or approximately  $1 \frac{1}{3}$  of a capsule. (See equation 1)

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<sup>1</sup> Kamakura, M. (2011). Royalactin induces queen differentiation in honeybees. *Nature*, 473(7348), 478-483.

Equation 1:

$$\text{Density of Honey} \cong \frac{1.42g}{ml} \quad 1 \text{ tsp} \cong 4.93ml \quad 1 \text{ tsp of honey} \cong 4.93 * 1.42 = 7.0006g$$
$$7.0006g (1 \text{ tsp}) \text{ Royal Honey} * 9.667\% \frac{\text{Royal Jelly}}{\text{Royal Honey}} \cong \frac{677mg \text{ of Royal Jelly}}{1 \text{ tsp of Royal Honey}}$$

### Storage

Fresh frozen royal jelly can be kept refrigerated for up to 6 months or frozen for 1-3 years.

Royal Jelly capsules can be stored at room temperature for up to 3 years and will be marked with a best before date.

Royal Honey can be stored at room temperature for up to 2 years; however, refrigeration is recommended to maximize shelf life beyond 2 years.

All forms of royal jelly should be kept out of direct sunlight and excessive heat.

### Medicinal Uses

Royal Jelly is consumed as a dietary supplement for its nutritional qualities as well as a wide range of health benefits, some more substantiated than others. As a dietary supplement, it contributes 12.5% protein, including many amino acids, vitamins B5, B6, and C, as well as a significant number of antioxidants. An organic compound only found in royal jelly, named *Royal Jelly Acid* or 10-HDA, is considered to be the determining factor of quality in royal jelly and has the most substantial claims attributed to it, such as the antibiotic and antitumor properties<sup>2,3</sup>. Preliminary studies on 10-HDA suggest neuroprotective and/or neurotrophic activity in mice brains via the stimulation of GDNF (glial cell line-derived neurotrophic factor) production<sup>4</sup>. The estrogenic effect of royal jelly has been observed both in *in vitro* and *in vivo* studies, with the most substantiated claims being relief of PMS and menopausal symptoms in women<sup>5</sup>, as well as stimulating collagen production<sup>6</sup>. Royal Jelly has also been shown to improve lipoprotein metabolism in humans and subsequently reduce total serum cholesterol levels<sup>7</sup>. Preliminary studies also indicate that royal jelly could aid in fertility, bone strength<sup>8</sup>, and immunomodulation<sup>9</sup>.

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<sup>2</sup> Blum, M. S., Novak, A. F., & Taber, S. (1959). 10-hydroxy-Δ<sup>2</sup>-decenoic acid, an antibiotic found in royal jelly. *Science*, 130(3373), 452-453.

<sup>3</sup> Townsend, G. F., MORGAN, J. F., & HAZLETT, B. (1959). Activity of 10-hydroxydecenoic acid from royal jelly against experimental leukaemia and ascitic tumours.

<sup>4</sup> Hashimoto, M., Kanda, M., Ikeno, K., HAYASHI, Y., NAKAMURA, T., OGAWA, Y., ... & FURUKAWA, S. (2005). Oral administration of royal jelly facilitates mRNA expression of glial cell line-derived neurotrophic factor and neurofilament H in the hippocampus of the adult mouse brain. *Bioscience, biotechnology, and biochemistry*, 69(4), 800-805.

<sup>5</sup> Mishima, S., Suzuki, K. M., Isohama, Y., Kuratsu, N., Araki, Y., Inoue, M., & Miyata, T. (2005). Royal jelly has estrogenic effects *in vitro* and *in vivo*. *Journal of ethnopharmacology*, 101(1), 215-220.

<sup>6</sup> Park, H. M., Cho, M. H., Cho, Y., & Kim, S. Y. (2012). Royal jelly increases collagen production in rat skin after ovariectomy. *Journal of medicinal food*, 15(6), 568-575.

<sup>7</sup> Vittek, J. (1995). Effect of royal jelly on serum lipids in experimental animals and humans with atherosclerosis. *Experientia*, 51(9-10), 927-935.

<sup>8</sup> Hidaka, S., Okamoto, Y., Uchiyama, S., Nakatsuma, A., Hashimoto, K., Ohnishi, T., & Yamaguchi, M. (2006). Royal jelly prevents osteoporosis in rats: beneficial effects in ovariectomy model and in bone tissue culture model. *Evidence-based complementary and alternative medicine*, 3(3), 339-348.

<sup>9</sup> Šver, L., Oršolić, N., Tadić, Z., Njari, B., Valpotic, I., & Bašić, I. (1996). A royal jelly as a new potential immunomodulator in rats and mice. *Comparative immunology, microbiology and infectious diseases*, 19(1), 31-38.

## Precautions

Royal Jelly can cause potentially life-threatening allergic reactions in some people. Those with asthma are at an increased risk of having an allergic reaction to royal jelly and should use the most caution. Keep in mind however, that individuals not allergic to royal jelly could see relief in their hypersensitivity symptoms.

There is not enough reliable information about the safety of using royal jelly if you are pregnant or breast-feeding. Stay on the safe side and avoid use.

Due to the estrogenic affects of royal jelly, it should not be given to children before the completion of puberty (20 year of age to be safe). Unnatural levels of estrogen at an early age can accelerate puberty and even prematurely halt growth hormones, leading to a condition known as child precocious puberty.

Royal jelly might increase the effects of warfarin (Coumadin). Taking royal jelly with warfarin (Coumadin) might result in an increased chance of bruising or bleeding.

## References

- Blum, M. S., Novak, A. F., & Taber, S. (1959). 10-hydroxy- $\Delta^2$ -decenoic acid, an antibiotic found in royal jelly. *Science*, 130(3373), 452-453.
- Broadhurst, C. L. (2005). *User's Guide to Propolis, Royal Jelly, Honey, and Bee Pollen: Learn how to Use" bee Foods' to Enhance Your Health and Immunity*. Basic Health Publications, Incorporated.
- Guo, H., Saiga, A., Sato, M., Miyazawa, I., Shibata, M., Takahata, Y., & Morimatsu, F. (2007). Royal jelly supplementation improves lipoprotein metabolism in humans. *Journal of nutritional science and vitaminology*, 53(4), 345-348.
- Graham, J. M. (1992). *The hive and the honey bee*. Dadant & Sons.
- Kamakura, M. (2011). Royalactin induces queen differentiation in honeybees. *Nature*, 473(7348), 478-483.
- Krell, R. (1996). *Value-added products from beekeeping (No. 124)*. Food & Agriculture Organization.
- Leung, R., Ho, A., Chan, J., Choy, D., & Lai, C. K. W. (1997). Royal jelly consumption and hypersensitivity in the community. *Clinical & Experimental Allergy*, 27(3), 333-336.
- Thien, F. C. K., Leung, R., Baldo, B. A., WEINBR, J., Plomley, R., & Czarny, D. (1996). Asthma and anaphylaxis induced by royal jelly. *Clinical & Experimental Allergy*, 26(2), 216-222.
- Townsend, G. F., MORGAN, J. F., & HAZLETT, B. (1959). Activity of 10-hydroxydecenoic acid from royal jelly against experimental leukaemia and ascitic tumours.
- Vittek, J. (1995). Effect of royal jelly on serum lipids in experimental animals and humans with atherosclerosis. *Experientia*, 51(9-10), 927-935.