

A STUDY ABOUT COMPOSITION AND QUALITY CONTROL OF ROYAL JELLY

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INTRODUCTION

Royal jelly is a natural substance and therefore it is subject to issues such as the quality of the product and the strength of the product. It is an expressive substance and there is a limited amount produced.

The gland of the nurse bees makes royal jelly. They synthesize it from bee pollen, propolis and other things, and produce it with their enzyme, and then they secrete it into the comb and give it to the queen bee.

Royal jelly is secreted by the hypo pharyngeal gland (sometimes called the brood food gland) of young worker (nurse) bees, to feed young larvae and the adult queen bee. Royal jelly is the sole source of nourishment for the queen bee throughout her long and productive life. Royal jelly is always fed directly to the queen or the larvae as it is secreted; it is not stored. This is why it has not been a traditional beekeeping product. The only situation in which harvesting becomes feasible is during queen rearing, when the larvae destined to become queen bees are supplied with an over – abundance of royal jelly. The queen larvae cannot consume the food as fast as it is provided and royal jelly accumulates in the queen cells. The exact definition of commercially available royal jelly is therefore related to the method of production: it is the food intended for queen bee larvae that are four to five days old.

Royal jelly can be sold in its fresh state, unprocessed except for being frozen or cooled, mixed with other products, or freeze – dried for further use in order preparation. The fresh production and sale can be handled by enterprises of all sizes since no special technology is required.

In its unprocessed form it can also be included directly in many food and dietary supplements, as well as medicine - like products or cosmetics . For larger industrial scale use royal jelly is preferred in its freeze – dried form because of easier handling and storing. Since the assumed benefits of royal jelly not been sufficiently proven, statements made in advertisements and on package labels should avoid suggestions which are not well – founded.

Chemical composition of royal jelly

Royal jelly falls into the category of health tonics. Among the known constituents are water, carbohydrates, lipids and proteins. Among these proteins are amino acids, including all eight essential amino acids of which the body cannot manufacture on its own and must come from dietary source.

It is extremely important to look at the nutritional profile of royal jelly so you can get an idea of its power and why it works.

Royal jelly is very high in protein. It is 12 - 15% protein by weight. It is also high in fatty acids. The most important kind of fatty acids it contains are hydroxy acids, which are necessary for the immune system. It is very also high in phospho - lipids that are needed for brain function. That is why researchers are finding royal jelly useful for Alzheimer's disease and Parkinson Disease. It is extremely high in RNA and DNA, which are also very important for brain function; RNA and DNA are the genetic materials. Royal jelly is high in acetylcholine (abbreviated ACh) and globulin; globulin is very important for boosting the immune system. There is no other good source of globulin in nutrition, other than royal jelly. Royal jelly is also extremely rich in B vitamins. It is the top of pantothenic acid (vitamin B5), bar none (**Ana Elisa F. Presato and all, 2004**). There is nothing richer. Pantothenic acid is needed to make cortisone. It is needed to make all the steroids in the adrenal glands. It is needed for ovarian hormones; it is needed for estrogen metabolism. Pantothenic acid is crucial for stimulating the production of immunoglobulins, the proteins that the white blood cells to protect us against viruses, bacteria, fungus and so forth.

Royal jelly is also high in a very special hydroxy acid (10 - hydroxy - 2 - decenoic acid abbreviation 10 - HDA). This acid is the natural indicator of the presence of royal jelly in products and also gives the authenticity of pure royal jelly; it is a freshness parameter. It is the active ingredient of royal jelly and this substance helps boost the immune system. 10 - HDA is a kind of special active substance which exists only in royal jelly in the nature. Since it has the function of anticancer, skin care and antibacterial effect etc., it can be added to health food or cosmetics as an active ingredient. The content of 10 - HDA in royal jelly is the international standard of the quality of royal jelly and it directly determines the price royal jelly on the international market. This fatty acid is of significant value in medical and health care domains.

Royal jelly is the only source of pure acetylcholine. It has antibacterial and antimicrobial properties and has been implicated as beneficial in a wide range of health conditions. It is associated with benefits to bronchial asthma, insomnia, and many skin problems. It is known to support the immune system and may be of benefit in liver, kidney, and pancreatic diseases as well as stomach ulcers and bone fractures.

Methods used for determination quality control of royal jelly

The quality control of royal jelly is determination 10 - HDA; it is considered the most important active principle in royal jelly. The concentration of 10 - HDA can be considered as an index of freshness and quality of the products and quality of the products that contain royal jelly serving as a parameter for its quality control (**Lucia Coelcho Pamplona and all, 2004; Antinelli Jean - Francois and all, 2003**).

The content of 10 - HDA is usually around 1,5% - 2,0% (**Garcia - Amoedo Luis Henrique, Ligia Bicudo de Almeida - Muradian, 2003, Garcia - Amoedo Luis Henrique, Ligia Bicudo de Almeida - Muradian, 2007**) for pure royal jelly.

A lot of researchers in the world published studies about the lipidic fraction of royal jelly using the method with High Performance Liquid Chromatography (HPLC). The High Performance Liquid Chromatography technique was used under the following conditions: the column used was a reversed phase column C₁₈ and an acetonitrile - tetrahydrofuran - water eluent system (**Genc Mahmut, Aslan Abdurrahman, 1999**).

BIBLIOGRAPHY

1. Ana Elisa F. Presato, Magda D.G. Rios, Ligia B. de Almeida – Muradian, 2004, Simultaneous High Performance Liquid Chromatographic analysis of vitamins B₁, B₂ and B₆ in royal jelly, J. Braz. Chem. Soc., Vol. 15, No. 1, 136 – 139
2. Antinelli Jean – Francois, Sarah Zeggane, Renee Davico, Catherine Rognone, Jean – Paul Faucon, Louisette Lizzani, 2003, Evaluation of (E) – 10 – hydroxydec – 2 – enoic acid as a freshness parameter for royal jelly, Food Chemistry 80, 85 – 89
3. Garcia – Amoedo Luis Henrique, Ligia Bicudo de Almeida – Muradian, 2003, Determination of trans – 10 – hydroxy – 2 – decenoic acid (10 - HDA) in royal jelly from Sao Paulo State, Brazil, Cienc. Tecnol. Aliment, Campinas, 23(Supl), 62 – 65
4. Garcia – Amoedo Luis Henrique, Ligia Bicudo de Almeida – Muradian, 2007, Physicochemical composition of pure and adulterated royal jelly, Quim. Nova, Vol. 30, No. 2, 257 – 259
5. Genc Mahmut, Aslan Abdurrahman, 1999, Determination of trans – 10 – hydroxy – 2 – decenoic acid content in pure royal jelly and royal jelly products by column liquid chromatography, Journal of Chromatography A, 839, 265 – 268
6. Lucia Coelcho Pamplona, Ricardo A.B. Azedo, Karla Cristina L.S. Oliveira, Luis Henrique Garcia – Amoedo, Ligia Bicudo de Almeida – Muradian, 2004, Physicochemical analyses indicated to the quality control of royal jelly with honey, Cienc. Tecnol. Aliment, Campinas, 24 (4), 608 – 612