



Review Article

www.ijrap.net

(ISSN Online:2229-3566, ISSN Print:2277-4343)



ROLE OF HONEY IN NOCTURNAL COUGH IN PAEDIATRIC PATIENTS: A CRITICAL REVIEW

Rakesh Kumar Nagar ^{1*}, Nisha Kumari Ojha ²

¹ Associate Professor, Department of Balrog, National Institute of Ayurveda (Deemed to be University), Jaipur, Rajasthan, India

² Associate Professor and HOD, Department of Balrog, National Institute of Ayurveda (Deemed to be University), Jaipur, Rajasthan, India

Received on: 01/05/22 Accepted on: 13/06/22

*Corresponding author

E-mail: drknagar@gmail.com

DOI: 10.7897/2277-4343.1304103

ABSTRACT

Acute respiratory infections (A.R.I.s) remain the leading cause of childhood morbidity and mortality in India, causing an estimated 4 million pneumonia and 1 million fatalities annually. Except during the neonatal period, A.R.I.s are the primary cause of illness and death in children under five, with an average of three to six episodes per year. The most prevalent, unpleasant, and early warning sign of A.R.I.s is cough. Cough caused by URTIs or cough without preceding infection causes parental worry in early childhood and is a primary cause of outpatient visits. Cough can impact one's quality of life, cause anxiety, and disrupt children's sleep; therefore, parents frequently seek a rapid remedy for their children. Since antiquity, honey and its numerous remedies have been used to treat coughs effectively. Honey is also essential to paediatric treatment in the Ayurveda medical system. Honey is said to cure various diseases and is recommended in multiple situations as the primary medicine as anupana, sahapana, and on occasion. To support the child's entire physical and cognitive development, Ayurveda encouraged the use of honey in the 'lehana' form, along with ghee (clarified butter oil), other herbal medicines, and Suvarna bhasma. When used to treat a night-time cough, honey gives significant symptomatic relief regarding cough severity, episode length, and insomnia. Honey's mucolytic, anti-inflammatory, and bronchodilator qualities provide comfort from nocturnal coughing, and multiple clinical research has shown that honey is more helpful in lowering cough frequency, intensity, and the impact of cough on sleep.

Keywords: Honey, Acute respiratory infections, Cough, Mucolytic, Bronchodilator

INTRODUCTION

Childhood might be referred to as the most extraordinary growth and development period. This period's physical and neurological development directly impacts the development of future existence. Many children are unable to attain their full potential due to inadequate nutrition, poor food sources, environmental pollution and contaminants, poverty, frequent illnesses, Inadequate housing, indoor air pollution (including parental smoking), overcrowding, sociocultural values, antibiotic abuse and misuse, and a lack of essential health services.¹

Children are more susceptible to various infections, which may hamper their growth and development. Acute respiratory infections (A.R.I.s) are the most significant worldwide cause of sickness and death among children under five. Globally, over 1.3 million children under five die annually from acute respiratory infections.² A.R.I.s continue to be the primary cause of childhood morbidity and mortality in India, accounting for an estimated 4 million cases of pneumonia and 1 million deaths annually.³

Acute respiratory infections (A.R.I.s) are categorized as upper respiratory tract infections (URIs) and lower respiratory tract infections (L.R.I.s). The upper respiratory tract includes the airways from the nostrils to the larynx, paranasal sinuses, and the middle ear. The lower respiratory tract consists of the airways that extend from the trachea and bronchi to the bronchioles and alveoli.

Except during the neonatal period, A.R.I.s are indeed the leading causes of sickness and death in children under five, with an

average of three to six episodes each year, regardless of where they live or their economic status.⁴ In the context of ARIAs, the most prevalent infectious illnesses are upper respiratory tract infections (URIs). These include rhinitis (the common cold), sinusitis, ear infections, acute pharyngitis or tonsillopharyngitis, epiglottitis, and laryngitis. Recurrent ear infections and pharyngitis may result in more serious problems, such as deafness and acute rheumatic fever. Although most URIs are self-limiting, the consequences are more significant than the infections themselves. To prevent problems, we must identify them early and administer the appropriate treatment and care.

Cough is the most common, irritating, and early warning sign of ARI. Although the cough is considered a sign of a pathological respiratory condition or, in some cases, a complication of another systemic pathological condition, in physiology, the cough is a normal protective mechanism,⁵ in addition to a way for the respiratory system to eliminate excess secretions and foreign materials.⁶ A bacterial or viral infection can cause pathological Cough, the presence of an irritant or allergen, or both.⁷ Acute Respiratory infections can affect the upper or lower respiratory tract, and the cough results might be productive or non-productive for sputum. A cough that does not produce phlegm is typically called a "dry" cough. Usually, children with dry cough have low airway secretions.

A cough can either be acute or chronic. The chronic cough persists for almost three weeks.⁸ A frequent sign of an upper respiratory tract infection is an acute cough.⁹ Most URI-related coughs are caused by viral infections.¹⁰ In early childhood, cough related to URTIs or cough without previous infection is a cause

of parental anxiety and a leading cause of outpatient visits.¹¹ Cough can impact the quality of life, induce anxiety, and disrupt the sleep of children and their parents.¹² Because of these things, parents and caregivers of children often look for a quick cure for cough. There are many over-the-counter cough medicines, and each has a different mix of drugs that work differently. These drugs may include dextromethorphan hydrobromide, phenylephrine hydrochloride, chlorpheniramine maleate, and methylparaben.¹³

Honey and its various remedies have effectively been used to treat cough since antiquity. Globally, folk medicine employs honey as an effective cure for cough. In the Ayurvedic medical system, honey is also essential for paediatric treatment. It is used as a *sahapana* (vehicle) or a mixing substance to make children's medicine more palatable. Honey is employed in paediatric medicine not just because it is a natural sweetener but also because it possesses the 'yogavahi quality'. Honey is believed to cure many diseases and is advised in various situations as the principal remedy as *anupana*, *sahapana*, and on occasion.

Honey with lukewarm water,
Honey and lemon juice mix in warm water,
Honey and ginger juice mix together
Honey and holy basil juice

Some common remedies are used to relieve cough; honey mixed with lukewarm water has long been thought to be the most excellent treatment for nocturnal irritative cough. This method, which involves using honey to treat a night-time cough, provides significant symptomatic alleviation regarding cough severity, episode, and sleeplessness.

Honey is also recommended by the World Health Organization (W.H.O.) as a viable treatment for cough in children with upper respiratory tract infections since it is symptomatic, affordable, popular, and safe. According to studies, honey has been shown to have antioxidant, antibacterial, antifungal, antiviral, anti-inflammatory, and anticancer activities and immunomodulatory capabilities.^{14,15}

From the beginning, honey has been used as a natural sweetener and complete food. The use of honey is indicated as the first food of life in Ayurveda, along with ghee (clarified butter oil) to provide complete nutrition. Along with the mother's milk, it is also indicated in the 'lehana' form along with ghee, various herbal medicines¹⁶ and *Suvarna bhasma* (incinerated gold, i.e., gold nanoparticles) to promote the child's overall physical and cognitive development.^{17,18}

Honey is a natural sweet substance composed of flower nectar that bees collect, process, store, and leave to develop and mature in the honeycomb. According to biomedical science, honey produced from *Apis mellifera* is the best.¹⁹ Honey, a famous traditional cuisine, has long been used for its ethno-therapeutic properties. The medicinal characteristics, flavour, texture, colour, and aroma of honey differ according to its geographical origin and the plant variety from which it was obtained.

In Ayurvedic medicine, honey is called *Madhu* and is categorized into eight categories based on the species of bee that collects it, as detailed in Ayurvedic scriptures.²⁰

Honey's physio-chemical composition consists of approximately 200 components. Honey is composed primarily of fructose and glucose but also contains fructooligosaccharides²¹ and many amino acids, vitamins, minerals, and enzymes.²² The composition of honey varies depending on the plants on which the bee feeds. However, almost all-natural honey contains flavonoids (such as

apigenin, pinocembrin, kaempferol, quercetin, galangin, chrysin, and hesperetin), phenolic acids (such as ellagic, caffeic, p-coumaric and ferulic acids), ascorbic acid, tocopherols, catalase (C.A.T.), superoxide dismutase (S.O.D.), reduced glutathione (G.S.H.), Millard reaction products and peptides. Most of those compound works together to provide a synergistic antioxidant effect.^{23,24}

Data collection method

Ayurvedic texts, the databases Google Scholar, PubMed, Medline, AYUSH Research Portal, and Digital Helpline for Ayurveda Research Articles (DHARA), and studies available on Research Gate, were used to search for the relevant literature and research papers. The terms "honey in cough", "honey in paediatric acute cough", "honey in nocturnal cough", or "mucolytic properties of honey" were used in electronic data searches. The review included in-vitro and in-vivo analysis, experimental trials, and clinical studies investigating honey's claimed therapeutic potential in cough. Only English-language research articles were considered.

DISCUSSION

Honey is widely used in Ayurveda and cultural practices as a cough remedy and has potential clinical effects. These results are still to be proven on scientific parameters. Therefore, in the contemporary sciences, numerous clinical studies have been conducted, and various review articles are also available to support the fact that honey works as a good expectorant in night-time coughs and acute coughs in the paediatric age group.

Paul *et al.*, in 2007, 103 children with URTI-associated cough participated in a double-blind, randomized, controlled trial comparing the effects of a nocturnal dosage of buckwheat honey, honey-flavoured dextromethorphan, and no therapy for cough and sleep quality. Parents were given a 7-point Likert scale questionnaire before, one day, and two days after the intervention. The study indicated that all groups improved, with the honey group experiencing the most significant cough severity and frequency reduction, followed by the dextromethorphan and the control groups. In the honey group, children's and parental sleep improved the most. However, there was no substantial difference in the effectiveness of honey and dextromethorphan.²⁵

Shadkam *et al.* 2010, in a randomized controlled trial, 160 children younger than five years with a URTI with cough were placed into four groups. The first group received a single dosage of 2.5 ml of honey before bed, the second group received a single dose of dextromethorphan, the third group received a single dose of diphenhydramine, and the fourth group received supportive therapy, including saline nasal drops and nebulizers. Before and after one day of the intervention, a subjective questionnaire was administered to the parents in the presence of a paediatrician to assess the cough result. The honey group demonstrated the greatest reduction in cough severity, frequency, and improvement in sleep quality in both children and their parents. Dextromethorphan and diphenhydramine were also identified as relievers, although they were less effective than honey.²⁶

Cohen *et al.*, in 2012, 300 children with URTIs and cough were assigned randomly in double-blind research. Each group received a different variety of honey (eucalyptus, citrus, and Labiatae honey), with one group receiving silan date extract (date syrup) as a placebo due to its comparable taste and texture to honey. A single dose of 10 g was administered before sleep. Before and two days after therapy, subjective questionnaires were presented to the parents, with cough frequency serving as the primary outcome

measure. The study indicated that all honey-treated groups consistently reported more significant cough symptom improvement than the placebo group. There were no notable variations across honey varieties.²⁷

Miceli *et al.*, 2015, in an open randomized study, 134 children with non-specific cough were randomized into two groups; participants in both groups were given 90 ml of cow milk mixed with 10 ml of wildflower honey, while the controls for each group were dextromethorphan and levodropropizine, two common over-the-counter cough suppressants. These were administered three nights before bedtime, after which the parents completed a 5-item subjective cough questionnaire. The study revealed a therapeutic success rate of 84 per cent across all groups, demonstrating that honey is at least as effective as dextromethorphan and levodropropizine.²⁸

Ayazi *et al.*, 2017, in a randomized clinical trial, 87 children were separated into three groups to compare two types of Iranian honey (Kimia and Shahde-Golhe, respectively) with a diphenhydramine-treated control group. A 7-point Likert scale questionnaire was administered to parents about cough severity and sleeping issues. All groups received a single dose of their assigned treatment before sleep for two days, after which the questionnaire was completed via telephone to the same parent. In the trial, all three groups demonstrated clinical relief; however, both honey groups were significantly more effective than diphenhydramine.²⁹

Cohen *et al.*, in 2017, Organized a single-blind, multi-centre Randomized controlled trial in which 150 children with acute,

uncomplicated URTIs were randomly assigned to one of two groups, and the efficacy of polysaccharide-resin honey (P.R.H.) cough syrup was compared to that of a carbo cysteine mucolytic cough syrup. Both groups got one dose on the night of enrolment, followed by three daily doses for three days. The subjective cough severity questionnaire (Likert scale) was administered to parents on the enrolment and each treatment day after that, with the study's primary endpoint concentrating on nocturnal cough score improvements during the first two nights. In the trial, both groups saw a reduction in cough severity, with the P.R.H. group experiencing a decrease of 5.16 0.85 (compared to 1.77 0.67 in the carbocysteine group; $p = 0.005$).³⁰

Honey undoubtedly alleviates cough symptoms to a greater degree than no treatment, diphenhydramine, and placebo but may have little to no effect compared to dextromethorphan. Honey likely decreases cough duration more effectively than placebo and salbutamol. There were no convincing arguments for or against the use of honey. There was no difference between the honey and control groups in the incidence of adverse events.³¹

A systematic study and meta-analysis determined that honey helps relieve URTI symptoms. Honey improved total symptom score, cough frequency, and overall cough intensity compared to standard therapy. Honey has been demonstrated to be superior to conventional treatment for upper respiratory tract infection symptoms.³²

Using honey could reduce the severity and frequency of cough, enhance the quality of sleep for both the patient and the parent, and has no known negative effects.³³

Table 1: Summary of the clinical studies included

Investigator	Sample Size	Design of study	Intervention	Primary outcome	Conclusion
Paul <i>et al.</i> , 2017	103 children	Double-blind RCT	A bedtime dose of buckwheat honey, honey-flavoured dextromethorphan, and no treatment groups	Focusing on cough symptoms, a 7-point Likert questionnaire was administered to parents one day before and two days after the intervention.	Dextromethorphan, honey, and no therapy reduced cough severity, frequency, and sleep disturbances. Honey and dextromethorphan were comparable in terms of their ability to alleviate symptoms.
Shakadam <i>et al.</i> , 2010	160 children	Unblinded RCT	A single bedtime 2.5 ml dose of Kafi-Abad honey, diphenhydramine, dextromethorphan, and supportive therapy groups	A subjective questionnaire was given to parents before and one day after treatment	The honey group experienced a significant reduction in cough severity and frequency and better sleep quality. Honey proved to be more effective than dextromethorphan and diphenhydramine.
Cohen <i>et al.</i> , 2012	300 children	Double-blind R.C.T.	Three varieties of honey, eucalyptus, citrus, and Labiatae, were compared to a group given 10g of silan date syrup at bedtime.	A subjective questionnaire was provided to parents before and two days following therapy focused on cough frequency.	Cough severity, frequency, and sleep quality improved significantly in the honey group.
Miceli <i>et al.</i> , 2015	134 children	Unblinded open RCT	A three-day regimen of honey (10 ml in 90 ml of cow's milk) vs dextromethorphan or levodropropizine was administered at bedtime.	A subjective questionnaire completed by parents on the improvement of cough before and three days following therapy	Honey was as effective as dextromethorphan and levodropropizine in relieving cough symptoms.
Ayazi <i>et al.</i> , 2017	87 children	Unblinded R.C.T.	Bedtime doses for two days of 2 types of honey, Kimia and Shahde Golhe, controlled with diphenhydramine	Before and two days after therapy, a 7-point Likert scale questionnaire was provided to parents regarding cough severity and sleeping difficulties.	Cough symptoms were significantly improved by honey compared to diphenhydramine in both forms.
Cohen <i>et al.</i> , 2017	150 children	Single blinded R.C.T.	Carbocysteine syrup against polysaccharide-resin (P.R.H.) cough syrup, one dosage on enrolment night followed by three daily doses for three days.	Subjective Likert questionnaire completed by parents to evaluate night cough score changes in the first two nights.	Cough symptoms improved in all groups; however, the P.R.H. group was more effective than the carbocysteine group in lowering nocturnal cough scores.

All the research mentioned above demonstrates and validates the potential benefit of using honey as an effective expectorant in cases of acute cough or nocturnal cough, as well as honey's excellent safety profile.

During A.R.I.s, the lung airways get inflamed and generate excessive mucus. This leads to congestion, shortness of breath, and wet cough due to lung and throat obstructions. Honey has abundant sugar, which stimulates the salivary glands to create more saliva. This saliva combines with the thick, irritant phlegm, liquefies it so it can be easily expelled, and lubricates the airways. To relieve dyspnoea, honey can reduce inflammation in the bronchial passages, resulting in bronchodilation. Along with mucolytic and bronchodilation, honey also acts as an anti-infective substance with a high amount of sugar to inhibit the growth of microorganisms, a low pH (3.2-4.5), and acidic nature from inhibiting microbial growth, and the presence of hydrogen peroxide produced by glucose oxidase, the most vital antibacterial factor. In addition, organic acids, volatile compounds, propolis, beeswax, lysozyme, pollen, and nectar are essential chemical components that impart antibacterial properties to honey.³⁴

The phenolic components of honey are primarily responsible for its positive effects. Honey protects the body by scavenging reactive species, avoiding lipid peroxidation, enhancing enzymatic and non-enzymatic antioxidant mechanisms, and stimulating/inhibiting pro-inflammatory signals.³⁵ Honey's antioxidant, antimutagenic, anti-inflammatory, immunoregulatory, and estrogenic qualities also help prevent various ailments.³⁶

CONCLUSION

In conclusion, several randomized controlled trials show that honey has therapeutic benefits for cough. Honey is more beneficial in lowering cough frequency, intensity, and the effects of cough on sleep when administered for one day. Honey is probably more effective at reducing cough frequency. These are the results of small studies. We believe more high-quality, large-scale randomized controlled trials investigating the effectiveness of honey in treating acute cough in children are needed. Randomized controlled studies must include dosage, extended treatment periods, participant follow-up, and other critical secondary outcomes relevant to caregivers, such as intervention cost and children's quality of life.

REFERENCES

- Goel K, Ahmad S, Agarwal G, Goel P, Kumar V. A cross-sectional study on the prevalence of acute respiratory infections (A.R.I.) in under-five children of Meerut district, India. *J Community Med Health Educ.* 2012;2:176. DOI: 10.4172/2161-0711.1000176
- Organization WH, UNICEF. Ending preventable child deaths from pneumonia and diarrhea by 2025: the integrated global action plan for pneumonia and diarrhea (GAPPD). 2013
- Government of India, "Health Status Indicators in National Health Profile," 2009.
- Monto AS, Ullman BM. Acute Respiratory Illness in an American Community: The Tecumseh Study. *Journal of the American Medical Association.* 1974;227(2):164-69.
- Landau LI. Acute and chronic cough. *Pediatric Respiratory Reviews* 2006;7(1):64-7.
- Cuestas G, Rodríguez V, Doormann F, Bellia Munzón P, Bellia Munzón G. Foreign body in the esophagus as a cause of respiratory symptoms in children. *Clinical cases. Archivos Argentinos de Pediatría* 2017;115(2): e126-30. DOI: 10.5546/aap. 2017.e126
- Ma TT, Zhuang Y1, Gong HY, Yii AC, Wang XY, Shi HZ. Predictive value of respiratory symptoms for the diagnosis of pollen-induced seasonal asthma among children and adults in Inner Mongolia. *Therapeutics and Clinical Risk Management* 2017;4(13):967-74. DOI: 10.2147/TCRM.S138355
- Smith JA, Woodcock A. Chronic cough. *New England Journal of Medicine* 2016; 375:1544-51. DOI: 10.1056/NEJMcp1414215
- Derebery MJ, Dicipinigaitis PV. New horizons: current and potential future self-treatments for acute upper respiratory tract condition. *Postgraduate Medicine* 2013;125(1):82-96. DOI: 10.3810/P.G.M.2013.01.2605
- Butler CC, Hood K, Kinnersley P, Robling M, Prout H, Houston H. Predicting the clinical course of suspected acute viral upper respiratory tract infection in children. *Family Practice* 2005;22(1):92-5.
- Kusel MM, De Klerk N, Holt PG, Landau LI, Sly PD. Occurrence, and management of acute respiratory illnesses in early childhood. *Pediatric Infectious Disease Journal* 2007;43(3):139-46.
- French CT, Irwin RS, Fletcher KE, Adam TM. Evaluation of a cough-specific quality-of-life questionnaire. *Chest* 2002;121(4):1123-31.
- El-Gindy A, Emara S, Mesbah MK, Hadad GM. Liquid chromatography and chemometric-assisted spectrophotometric methods for the analysis of two multicomponent mixtures containing cough suppressant drugs. *Journal of AOAC International* 2005;88(4):1069-80.
- Evans H, Tuleu C, Sutcliffe A. Is honey a well-evidenced alternative to over-the-counter cough medicines? *Journal of the Royal Society of Medicine.* 2010;103(5):164-165. DOI:10.1258/jrsm.2010.090445
- Paul IM, Beiler J, McMonagle A, Shaffer ML, Duda L, Berlin CM. Effect of Honey, Dextromethorphan, and No Treatment on Nocturnal Cough and Sleep Quality for Coughing Children and Their Parents. *Arch Pediatr Adolesc Med.* 2007;161(12):1140-1146. DOI:10.1001/archpedi.161.12.1140
- Srisatyapal Bhisagacharya, Kashyap Samhita, Sutra Sthana Chapter Lehan adhyaya, p 5, Chaukhamba Bharti Prakashan, 2006.
- Srisatyapal Bhisagacharya, Kashyap Samhita, Sutra Sthana Chapter 9, p 9, Chaukhamba Bharti Prakashan, 2006.
- Srisatyapal Bhisagacharya, Kashyap Samhita, Sutra Sthana Chapter Lehanadhyaya, p 1-2, Chaukhamba Bharti Prakashan, 2006.
- Abrol DP. Bees and Beekeeping in India, p 718, Kalyani Publishers. India. 2009.
- Sharma P V, Sharma G P, Kaiyadev Nighantu (Pathya-Apathya Vibodhak), Aushadhi Varga, p 36-41, Chaukhamba Surbharati Prakashan, 2009.
- Chow J. Probiotics and prebiotics: a brief overview. *J Ren Nutr.* 2002; 12: 76-86.
- White JW. Composition of honey. In: Crane E, editor. *Honey: A Comprehensive Survey.* London: Heinemann; 1979. p. 157-192.
- Al-Mamary M, Al-Meerri A, Al-Habori M. Antioxidant activities and total phenolics of different types of honey. *Nutr Res.* 2002; 22: 1041-1047
- Johnston JE, Sepe HA, Miano CL, Brannan RG, Alderton AL. Honey inhibits lipid oxidation in ready-to-eat ground beef patties. *Meat Sci.* 2005; 70: 627-631.
- Paul IM, Beiler J, McMonagle A, Shaffer ML, Duda L, Berlin CM Jr. Effect of honey, dextromethorphan, and no treatment on nocturnal cough and sleep quality for coughing children and their parents. *Arch Pediatric Adolescent Med.* 2007;161(12):1140-6.

26. Shadkam MN, Mozaffari-Khosravi H, Mozayan MR. A comparison of the effect of honey, dextromethorphan, and diphenhydramine on nightly cough and sleep quality in children and their parents. *J Altern Complement Med.* 2010;16(7):787-93.
27. Cohen HA, Rozen J, Kristal H, Laks Y, Berkovitch M, Uziel Y, *et al.* Effect of honey on nocturnal cough and sleep quality: a double-blind, randomized, placebo-controlled study. *Paediatrics.* 2012;130(3):465-71.
28. Miceli Sopo S, Greco M, Monaco S, Varrasi G, Di Lorenzo G, Simeone G. Effect of multiple honey doses on non-specific acute cough in children. An open randomized study and literature review. *Allergol Immunopathol (Madr).* 2015;43(5):449-55
29. Ayazi P, Mahyar A, Yousef-Zanjani M, Allami A, Esmailzadehha N, Beyhaghi T. Comparison of the effect of two kinds of Iranian honey and diphenhydramine on nocturnal cough and the sleep quality in coughing children and their parents. *PLoS One.* 2017;12(1): e0170277.
30. Cohen HA, Hoshen M, Gur S, Bahir A, Laks Y, Blau H. Efficacy, and tolerability of a polysaccharide-resin-honey based cough syrup as compared to carbocysteine syrup for children with colds: a randomized, single-blinded, multicenter study. *World J Pediatr.* 2017;13(1):27-33.
31. Oduwole O, Udoh EE, Oyo-Ita A and Meremikwu, MM. Honey for acute cough in children. *The Cochrane database of systematic reviews*, 2018;4(4), CD007094. <https://doi.org/10.1002/14651858.CD007094.pub5>
32. Abuelgasim H, Albury C, Lee J. Effectiveness of honey for symptomatic relief in upper respiratory tract infections: A systematic review and meta-analysis. *B.M.J. Evid Based Med.* 2021Apr, 26(2):57-64. DOI: 10.1136/bmjebm: 111336.
33. Nitsche MP, Carreño M. Is honey an effective treatment for acute cough in children? *Medwave.* 2016 May 30;16 Suppl 2: e6454. English, Spanish. DOI: 10.5867/medwave.2016.6454.
34. Shin, H.; Ustunol, Z. Carbohydrate Composition of Honey from Different Floral Sources and Their Influence on Growth of Selected Intestinal Bacteria. *Food Research International* 2005;38:721–728.
35. Nguyen HTL, Panyoyai N, Kasapis S, Pang E, Mantri N. Honey, and Its Role in Relieving Multiple Facets of Atherosclerosis. *Nutrients.* 2019;11(1):167.
36. Ahmed S, Sulaiman SA, Baig AA, *et al.* Honey as a Potential Natural Antioxidant Medicine: An Insight into Its Molecular Mechanisms of Action. *Oxid Med Cell Longev.* 2018; 8367846. Published 2018 Jan 18. DOI:10.1155/2018/8367846.

Cite this article as:

Rakesh Kumar Nagar and Nisha Kumari Ojha. Role of honey in nocturnal cough in paediatric patients: A critical review. *Int. J. Res. Ayurveda Pharm.* 2022;13(4):135-139 <http://dx.doi.org/10.7897/2277-4343.1304103>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: IJRAP is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publishing quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IJRAP cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of IJRAP editor or editorial board members.