exon and the left half of the intron and the other to the right half of the intron and the downstream exon. A Y-shaped molecule representing intron can be detected in splicing reactions *in vitro*, which suggests commonalties of the steps in cis- and trans-splicing. Differential splicing of the mRNA precursors containing multiple exons has been observed during different stages of development or in a tissue-specific manner in several systems. For example, membrane-bound and secreted forms of immunoglobulins are generated as a result of differential splicing of exons. Thus the process of splicing is vital for eukaryotic gene expression. Further, the phenomenon of splicing is widespread in that not only the other classes of eukaryotic RNAs (rRNA and tRNA) but also the prokaryotic genes contain introns. The presence of introns in the genes may be a consequence of evolution. Different domains of the existing genes may have been put together in different combinations and the transcripts spliced to generate mature RNA coding for a new function.

1. Berget, S., Moore, C. and Sharp, P. A., *Proc. Natl. Acad. Sci. USA*, 1977, **74**, 3171–3175
2. Chow, L. T., Gelinas, R. E. Broker, T. R. and Roberts, R. J., *Cell*, 1977, **12**, 1–8.

Umesh Varshney, Centre for Genetic Engineering, Indian Institute of Science, Bangalore.

SCIENTIFIC CORRESPONDENCE

Comparative chemical analysis of oleogum resin of *Commiphora wightii* Arnott. Bhandari

Commiphora wightii (Arnott). Bhandari (Syn. *Commiphora mukul*) of the family of Burseraceae is an important medicinal plant. The plant is generally distributed in arid regions, particularly on the Indian side of the Thar desert[1]. The present communication describes analytical data of guggal (the oleogum resin) of different agroclimatic zones of Rajasthan.

The petroleum ether extractive values were determined as mentioned in *British Pharmacoepia*[2]. Nitrogen was estimated by the Kjheldahl method using a Khel autonitrogen analyser. Essential oils were determined by the method described by Indian Standards Institute[3]. To estimate guggalipids, one gram of guggal was macerated in 25 ml of ethyl acetate in a mortar and filtered. The process was repeated several times. The pooled ethyl acetate fractions were then concentrated under vaccum and weighed to obtain guggalipids (ethyl acetate soluble material). The separation of E- and Z-guggalsterones was carried out according to Sukhdev (a personal communication) with slight modifications by HPLC on μ bond C_{18} (RCSS) (10 mm × 8 cm column) using 35% water/methanol as mobile phase, at a flow rate of 1 ml min^{-1}. Sterones were monitored at 254 nm. For quantitative analysis, E & Z-guggalsterones were used as standards.

Analytical data are presented in Table 1. Essential oils, petroleum ether extractive values and nitrogen exhibited variation depending on the place of collection. The minor amount of nitrogen has been established for gum exudates of several genera[4]. In the present study, highest guggalipids (47.55%); E-guggalsterone (0.99%), Z-guggalsterone (2.45%) and combined E- and Z-guggalsterones (3.47%) were in guggal from Udaipurwati. Because of the non-availability of standards, other steroids could not be quantified. Guggalipids have been reported as hypolipidemic agent. Ketonic fraction of guggalipids has significant lipid-lowering activity and in this fraction E- and Z-guggalsterones are mainly responsible for hypolipidemic activity. An earlier reported[5] concentration of E- and Z-guggalsterones was 2%.

The results reveal that the guggal from Udaipurwati contained highest content of guggalipids and active ingredients mainly responsible for hypolipidemic activity. Hence, it seems to be superior in quality as compared to others. According to results the composition of the oleogum resin varies with geographic location, cli-

Table 1. Composition of oleogum resin of *Commiphora wightii* (Arnott) Bhandari collected from various places in Rajasthan

% of oleogum resin	Guggal herbal farm Mangliwas (Ajmer)	Forest of Nimkathana (Sikar)	Forest of Udaipurwati (Jhunjhunu)	Forest of Jaisalmer	Forest of Balotra (Barmer)
Ethyl acetate soluble material (guggalipids)	37.14	36.00	47.55	31.61	19.55
Petroleum ether extractive value	10.18	12.74	10.26	13.67	7.05
Essential oils	0.50	0.45	0.60	0.60	0.40
Nitrogen	0.25	0.24	0.22	0.30	0.25
E-guggalsterone	0.65	0.64	0.99	0.41	0.15
Z-guggalsterone	1.70	1.49	2.48	0.97	0.60
E + Z-guggalsterone	2.35	2.13	3.47	1.38	0.75

mate, soil nutrition and perhaps genetic variations.

1. Anon, in *The Wealth of India*, A Dictionary of Indian Raw Materials and Industrial Products, CSIR, New Delhi, 1950, vol. II, pp. 42.
2. Anon, in *British Pharmacoepia*, The Pharmaceutical Press, 17 Bloomsburry Square, London, 1958, pp. 884–885.
3. Anon, *ISI Handbook of Food Analysis*, ISI, New Delhi, 1983, vol. V, p. 119.
4. Anderson, D. M. W., Bell, P. C., Gill, M. C. L. and Yaccomeni, C. W., *Phytochemistry*, 1984, 23, 1927–1929.
5. Sukh Dev, *Proc. Indian Natl. Sci Acad*, 1983, A49, 359–385.

ACKNOWLEDGEMENTS. Financial assistance from ICAR, New Delhi and HPLC analysis from the Central Drug Research Institute, Lucknow are duly acknowledged. I thank Dr Sukh Dev, Director, Maltichem Research Centre, Baroda, for standards.

Received 23 July 1993, revised accepted 9 December 1993

M. L. SHARMA

Agricultural Research Station, PB-7
(Rajasthan Agricultural University)
Umnedganj
Kota 324 001, India

OPINION

Role of technology and relevance of self-reliance

S. C. Tiwari

Global economy and new world order

Rapid economic liberalization during the last two years, though projected as well thought out, and the continuation of Nehruvian policy in the changed world order to lead India into becoming an economic giant, may indeed turn out to be a pathway to economic slavery. My apprehension is likely to sound naive when most vocal elements of society starting from politicians to intelligentsia have been mesmerized by the charm of World-Bank and IMF loans and the lure of high-tech life style with the modernization of Indian industry through multinationals. Inconvenient questions are not raised, disturbing issues not debated, and deeper long-term implications of the new market-driven adhoc economic measures are not appreciated. I think the role of scientists and technologists is much more profound than merely undertaking a bargaining exercise for more funds. I intend to share my thoughts and experiences with the readers in the context of technological self-reliance.

Though political and social changes occur in complex ways, some observations may help to understand the present world scene. Technological advances are responsible for the super power status of a few countries, and the prime impetus for major technologies has been the war-cloud rather than the welfare. Holton[1] noted that 'a current symptom is the popular identification of science with the technology of superweapons'. In USA, the share of basic research was only 7% out of 10 billion dollars spent on scientific research, and only 15,000 out of 7,50,000 scientists and technologists were involved in any basic research around 1958. According to a 1983 report[2], 75% of the satellites were for military use and USA spent 1.5 billion dollars on antisatellite weapons. High technology is primarily a military technology which needs huge non-profitable expenditure of the governments. In view of the secrecy involved the outdated military technology is transferred to the industry as advanced technology. Industry has to devise a method for its commercialization, and most often by introducing perverted usage and complex solutions to simple problems of the society. Sustenance and growth of advanced technology is entirely dependent on the artificial and questionable notions of progress and needs. Mass production of consumer articles requires world market and continuous supply of raw materials to the industry. The diminishing quality of raw materials in technologically advanced countries increases the energy cost of extraction of pure materials, hence the energy crisis and search for cheap raw materials. The so-called developing countries provide raw materials at throwaway prices in exchange for manufactured goods, and in the name of modernization consumerism spreads in these countries. Imported outdated industrial technology and race for modernity are perpetual processes for economic deprivation in the poor countries.

In the cold war era, whereas American industries provided vital economic support to military technology by exploiting world market and American people, the closed system in USSR permitted a limited access to world market. Moreover, in contrast to American consumerism society, in USSR the high tech lifestyle was relatively nonexistent. Nevertheless USSR was competing with USA in the arms race even in antisatellite weapons and third generation nuclear weapons[2]. Bankruptcy of the USSR and weakening of the American economy was a foregone result. Once USSR collapsed, the only way open to USA and the Western powers for retaining their superiority was through economic domination forcing market-driven economy in the rest of the world, and dumping the obsolete technologies in the so-called developing countries. I suggest that advanced technology is not economically viable in the long run, and therefore the collapse of the American system is also inevitable.

India's post-independence period could be broadly divided into three major phases in terms of the outlook of Western powers. The period until 1970 was marked by general apathy. Nuclear and space research programmes and establishment of a large pool of S&T personnel created a sense of alarm during the next 15 years or so. It was during this period that Indian political leadership showed strong commitment to self-reliance in S&T and provided unqualified support for S&T. Seen in this light one may understand the reason for the attention Indian science received in reputed US and UK science journals. In fact, a detailed survey on